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

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

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

About Graduate Education at Penn State

For information about specific areas, see the links on the left. For general information, see http://www.gradschool.psu.edu/about-us

The Graduate Faculty

For information, see http://www.gradschool.psu.edu/faculty-and-staff/faculty-list/

The Graduate Council

For information, see: http://www.gradschool.psu.edu/gradcouncil

Administration

For information, see http://gradschool.psu.edu/about-us/staff/

Program Locations

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

- **Penn State Erie**- -http://psbehrend.psu.edu
- **Penn State Harrisburg**- - www.hbg.psu.edu
- **College of Medicine**- -www.pennstatehershey.org/web/college/home
- **Penn State Great Valley**- - www.gv.psu.edu
- **University Park campus**- -http://www.gradschool.psu.edu

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

GRADUATE LIFE

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

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

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

GRADUATE STUDENT ASSOCIATION

For information, see
www.clubs.psu.edu/up/gsa
.

GRADUATE SCHOOL ALUMNI SOCIETY

For information, see http://www.gradschool.psu.edu/index.cfm/alumni/gsas/

CURRENT STUDENTS

For information, see http://www.psu.edu/current-students

COMMUNITY ACTIVITIES

For information, see http://www.psu.edu/visitors-and-neighbors

REGULATIONS AND CONDUCT STANDARDS FOR STUDENTS ENROLLED IN THE GRADUATE SCHOOL

It is the responsibility of students to be cognizant of the rules, regulations, and procedures of the University. This information is contained in the graduate school policies athttp://gradschool.psu.edu/current-students/student/

MOTOR VEHICLE REGULATIONS

For information, see guru.psu.edu/policies/BS04.html

BICYCLE REGULATIONS

For information, see guru.psu.edu/policies/SY16.html

STANDARDS OF CONDUCT

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

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

RESOLUTION OF PROBLEMS

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

OWNERSHIP OF INTELLECTUAL PROPERTY

For information, see https://www.research.psu.edu/otm and guru.psu.edu/policies/RA11.html

RESEARCH PROTECTIONS

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

For information, see https://www.research.psu.edu/otm

Conflict of Interest--See guru.psu.edu/policies/RA20.html

For policy statements on these issues, see guru.psu.edu/policies/RA14.html and guru.psu.edu/policies/RA15.html. See also policies on safety issues at guru.psu.edu/policies/SY24.html

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

STUDENT SERVICES

CAREER SERVICES

For information, see http://studentaffairs.psu.edu/career/

CENTER FOR COUNSELING AND PSYCHOLOGICAL SERVICES (CAPS)

For information, see http://studentaffairs.psu.edu/counseling/

OFFICE FOR DISABILITY SERVICES

For information, see www.equity.psu.edu/ods .

OFFICE OF GRADUATE EDUCATIONAL EQUITY PROGRAMS

For information, see http://gradschool.psu.edu/diversity/

HEALTH INSURANCE

For information, see http://studentaffairs.psu.edu/health/services/insurance/

UNIVERSITY HEALTH SERVICES (UHS)

For information, see http://studentaffairs.psu.edu/health/

Penn State Erie, see https://psbehrend.psu.edu/student-life/student-services/health/health-services/general-services

Penn State Harrisburg, see https://harrisburg.psu.edu/student-health-services

HOUSING AND FOOD SERVICES

For information about housing, see http://housing.psu.edu/

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

INTERNATIONAL STUDENT SERVICES

For information, see https://global.psu.edu/

VETERANS OUTREACH OFFICE

For information, see www.equity.psu.edu/veterans .

Application and Admission Procedures

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

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

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

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

Degree Admission--Applicants interested in applying to a graduate program at Penn State should obtain information on individual program requirements via the website at
www.gradsch.psu.edu/prospective/program.cfm
. Applicants may apply for admission to only one program at a time.

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

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

Admission is granted jointly by the Graduate School and the department or graduate program in which the student plans to study. The establishment of standards by which applicants are admitted is a departmental or program responsibility. Although the Graduate School has no fixed minimum grade-point requirement for admission, an applicant is generally expected to maintain a junior-senior grade-point average of at least 2.50 on Penn State's grading scale of A (4.00) to D (1.00). Individual programs often establish higher grade-point average requirements and use other criteria to judge candidates for admission. In exceptional cases, departments or major programs may also approve admission by reason of special backgrounds, abilities, and interests. Departmental or program requirements are given in the descriptive statements appearing under the graduate programs listed in the latter part of this publication.
A student who has been admitted to a program in which the doctorate is offered may begin working toward that degree but has no official status as a doctoral student and no assurance of acceptance as a doctoral candidate until a candidacy examination administered by the major department or committee has been passed. (See Candidacy Examination under Degree Requirements.)

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

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

Nondegree Admission--If you do not intend to pursue a graduate degree, but want to take graduate-level courses for personal enrichment, professional development, permanent certification, or to apply for degree status at a later date, you can seek admission as a nondegree graduate student. Information on applying for nondegree graduate status may be obtained via the website
at http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/enrollment-types/

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

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

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

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

English Proficiency--The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below.

Minimum Acceptable Test Scores

Individual graduate programs of study may require higher scores for admission.

TOEFL
Internet-based test (iBT) - a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, with Graduate School approval, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher within the first semester of enrollment.

Paper-based test (taken prior to July 2017) – the minimum acceptable score is 550.

Paper-based test (taken July 2017 or later) – a combined total of the 3 sections evaluated must be 60 or greater.

IELTS
The minimum acceptable composite score for the IELTS Academic Test is 6.5.

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

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

Information about the TOEFL can be obtained by visiting its website at www.toefl.org. Local administration at University Park campus of the TOEFL is handled by the IECP. Information about the IELTS can be obtained by visiting its website at www.ielts.org.

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

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

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

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

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

affiliate formally or informally with one of the departments, institutes, or other subdivisions of the University engaged in scholarly pursuits.

Policy on Second Doctorates--The Graduate School does not admit applicants to concurrent double Ph.D. degree programs, D.Ed. degree programs, or D.M.A. degree programs, or to concurrent doctoral degree programs in any combination (Ph.D., D.Ed., and/or D.M.A.). In general, the Graduate School discourages the pursuit of a second Ph.D., D.Ed., or D.M.A. degree. However, if an applicant who holds one of these degrees requests admission to a second doctoral degree program (either Ph.D., D.Ed., or D.M.A.), the applicant is asked to give the Graduate School the reason why the second doctorate is necessary (as opposed to taking course work or obtaining a master's degree in the second field or working in a postdoctoral appointment in the second field). The Graduate School then may solicit responses concerning the necessity of the second doctorate from representatives of the field at Penn State or elsewhere. This information is then given to the Dean of the Graduate School for the final decision. If approved, all Graduate School requirements for the second doctorate must be met *de novo.*

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

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

Updated: 1/8/18

TRANSFER COURSES

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

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

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

Forms for transfer of credit can be obtained from each graduate program. (See http://www.gradschool.psu.edu/prospective-students/program-contact-information/ for graduate program contact information.)

Updated: 7/8/14

Classification of Students

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

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

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

Nondegree Student--If you do not intend to pursue a graduate degree, but want to take graduate-level courses for personal enrichment, professional development, permanent certification, or to apply for degree status at a later date, you can seek admission as a nondegree graduate student. Information on applying for nondegree graduate status may be obtained via the website at http://www.gradschool.psu.edu/prospective-students/how-to-apply/new-applicants/enrollment-types/

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

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

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

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

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

8/24/16

CREDIT BY EXAMINATION

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

Student Aid

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

Assistantships, Fellowships, Traineeships, Scholarships, Loans, Employment

For information, see http://www.gradschool.psu.edu/graduate-funding/funding/.

Veterans' Benefits

For information, see www.equity.psu.edu/veterans/outreach.asp

THE UNIVERSITY LIBRARIES

For information, see https://libraries.psu.edu/

THE PENN STATE PRESS

For information, see https://libraries.psu.edu/about/departments/penn-state-university-press

INFORMATION TECHNOLOGY SERVICES

For information, see http://ovpit.psu.edu/

SPECIALIZED COMPUTING FACILITIES

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

Colleges

College of Arts and Architecture

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

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

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

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

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

College of Earth and Mineral Sciences

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

College of Education

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

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

College of Engineering

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

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

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

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

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

College of Health and Human Development

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

Eberly College of Science

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

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

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

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

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

Interdisciplinary—The Applied Research Laboratory (ARL) uses more than 2,000 computers in multiple networks of Microsoft Windows, LINUX, Solaris, and VAX workstations, with software supporting data acquisition and processing, process control, modeling and simulation, visualization, data fusion, interactive problem solving, and business applications. MATLAB is used extensively. A synthetic environment lab is available for 3-D visualization.
High-performance computer resources include multiple Linux clusters and grids, and access to U.S. government HPC resources. Mechanical and printed circuit CAD software is used for design, and computer-aided manufacturing software is used extensively to run the shop's multi-axis CNC machines. Student access is dependant upon their relationship with ARL.

The Materials Research Institute (MRI, at
www.mri.psu.edu
), together with more than a dozen academic departments/units, offers students access to professionally staffed materials processing, characterization, and computer simulation facilities. MRI enables new opportunities for multidisciplinary education and research within the materials-related disciplines.

Materials Simulation Center (MSC)

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

Center for Computational Materials Design (CCMD)

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

Institute for Computational Science

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

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

DOCTORAL DEGREES

The Doctor of Philosophy (Ph.D.), an academic degree, and the Doctor of Education (D.Ed.) and Doctor of Musical Arts (D.M.A.), both professional degrees, are conferred by the University. Recognized as different in purpose, the three doctoral programs consequently have different requirements in certain respects.

ADMISSION

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

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

GENERAL REQUIREMENTS

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

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

SATISFACTORY SCHOLARSHIP

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

GRADE-POINT AVERAGE

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

TIME LIMITATION

A doctoral student is required to complete the program, including acceptance of the doctoral dissertation or the passing of the final performance, within eight years after the date of successful completion of the candidacy examination. Individual programs may set shorter time limits. Extensions may be granted by the director of Graduate Enrollment Services in appropriate circumstances.

TRANSFER CREDIT

A maximum of 30 credits from a completed master's degree earned from an institution that does not grant the doctorate in the student's major program may be accepted in partial fulfillment of the requirements for a D.Ed. degree at Penn State with no intervening time limitation. The master's degree must have been earned at a regionally accredited U.S. institution or a recognized degree-granting international institution in the country in which it operates. Thirty (30) such credits are awarded for only one master's degree.

A maximum of 30 credits from a completed master's degree earned at a regionally accredited U.S. institution or a recognized degree-granting international institution in the country in which it operates may be accepted in partial fulfillment of the requirements for a D.M.A. degree at Penn State with no intervening time limitation. Thirty (30) such credits are awarded for only one master's degree. All D.M.A. students must complete a minimum of 60 credits at Penn State.

A maximum of two full academic years of work (60 credits) beyond the baccalaureate earned at a regionally accredited U.S. institution, or a recognized degree-granting international institution in the country in which it operates, that grants

the doctorate in the candidate's major program may be accepted by the Graduate School to apply toward D.Ed. degree requirements.

Because there is no Graduate Council minimum total-credit requirement for a Ph.D. degree at Penn State, 30 credits are not accepted towards Ph.D. requirements for a completed master's degree.

A maximum of 10 credits of high-quality graduate work may be transferred toward any doctoral degree at Penn State. Refer to the Transfer Courses section of this *Bulletin* for more information.

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

CANDIDACY EXAMINATION

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

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

If the student is seeking dual candidacy in an approved dual-title graduate degree program, the dual-title field must be integrated into the candidacy examination of the student's major program (i.e., a single candidacy examination is administered, which incorporates both the graduate major field and the dual-title field).

For the Ph.D. student, the examination may be given after at least 18 credits have been earned in graduate courses beyond the baccalaureate. The examination must be taken within three semesters (excluding summer sessions) of entry into the doctoral program.

For the D.Ed. student, the examination should be given when the student has earned a total of at least 30 credits toward the graduate degree, including the master's program and graduate work done elsewhere. A student transferring from another graduate school with 30 or more credits earned toward a graduate degree must take the candidacy examination prior to earning more than 25 credits toward the graduate degree at Penn State.

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

The results of all candidacy examinations, regardless of the outcome, must be reported to Graduate Enrollment Services via the Candidacy Reporting Form immediately following the examination.

ADVISERS AND DOCTORAL COMMITTEES

Following admittance to a graduate degree program, the student should confer with the head of that major program concerning procedures and the appointment of an academic adviser. Consultation or arrangement of the details of the student's semester-by-semester schedule is the function of the academic adviser. The academic adviser may be a member of the doctoral committee, or may be another member of the Graduate Faculty designated by the program head or chair of the major program for this specific duty. The academic adviser may be different than the major adviser who supervises the culminating experience (dissertation/final performance; i.e., dissertation/performance adviser).

Doctoral Committee

General guidance of a doctoral candidate is the responsibility of a doctoral committee consisting of four or more active members of the Graduate Faculty, which includes at least two faculty members in the major field. For research doctorate (Ph.D.) committees, one member of the committee may be a Category Q member of the Graduate Faculty and serve in the roles specified under Expected Duties of Category Q members. The dissertation/performance adviser must be a member of the doctoral committee. The dissertation/performance adviser usually serves as chair, but this is not required. If the candidate is also pursuing a dual-title field of study, a co-chair representing the dual-title field must be appointed. In most cases, the same individual (e.g., dissertation/performance adviser) is a member of the Graduate Faculty in both the major and dual-title fields, and in such cases may serve as sole chair.

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

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

If the candidate has a minor, that field must be represented on the committee by a "Minor Field Member." (For additional

information related to minors for D.Ed. students, see "Major Program and Minor Field" under "D.Ed.—Additional Specific Requirements" in this *Bulletin*.)

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

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

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

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

The graduate program head/chair also must review periodically the Graduate Faculty listing for his/her program on the Graduate School's website to ensure that those listings are accurate.

Chair

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

Responsibilities of Doctoral Committees

The doctoral committee is responsible for approving the broad outline of the student’s program and should review the program as soon as possible after the student’s admission to candidacy. Moreover, continuing communication among the student, the committee chair, the dissertation/performance adviser, and the members of the committee is strongly recommended, to preclude misunderstandings and to develop a collegial relationship between the candidate and the committee.

COMPETENCIES

ENGLISH COMPETENCE

Candidates for all doctoral degrees are required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the doctorate. Graduate programs are expected to establish mechanisms for assessing and improving competence of both domestic and international students. Assessments should include pieces of original writing. Programs and advisers should identify any deficiencies before or at the candidacy examination and direct students into appropriate remedial activities. Competence must be formally attested by the program before the doctoral candidate’s comprehensive examination is scheduled. (Note: Passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a doctoral degree candidate and for conferral of a doctorate from Penn State.)

COMMUNICATION AND FOREIGN LANGUAGE COMPETENCE

Although no Graduate Council requirement for communication and foreign language competence exists, doctoral programs may have program-specific communication and/or foreign language requirements that provide an important benefit to students and are appropriate to the field.

In addition to demonstrating competence in English as described above, each candidate for a doctoral degree is required to meet any communication and foreign language requirements set forth by the respective doctoral degree program. The candidate should ascertain specific communication and foreign language requirements, if any, by contacting the head of the graduate program, whose name appears in the program description under Graduate Programs.

DOCTORAL EXAMINATION REQUIREMENTS

(Comprehensive Examinations [all doctoral degrees]; Final Oral Examinations [Ph.D./D.Ed.]/Final Performances [D.M.A.])

The doctoral examinations (the comprehensive examination and the final oral examination/final performance) are administered/overseen and evaluated by the entire doctoral committee.

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

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

The program head will notify Graduate Enrollment Services, providing two weeks' notice, when the candidate is ready to schedule the comprehensive examination or the final oral examination/final performance. Doctoral examinations are scheduled and announced officially by the Office of Graduate Enrollment Services upon recommendation of the program head, and must not be held without official notification from the Graduate School. Two weeks' notice is required by the Office of Graduate Enrollment Services for scheduling any doctoral examination.

It is expected that doctoral examinations will take place at the campus location of the graduate center offering the program, and the graduate student must be physically present at any doctoral examination.

- Ph.D./D.Ed.: The dissertation adviser, as well as the chair of the doctoral committee (if not the same individual as the dissertation adviser), along with additional members of the committee to total a minimum of three, also must be physically present at the comprehensive/final examinations. (Thus, for a five-person committee, two members could participate via distance.) Requests for exceptions to allow participation of any committee member via distance must accompany the Examination Request Form, and must be submitted to the director of Graduate Enrollment Services for approval at least two weeks prior to the date of the examination. Of those approved to participate via distance, no more than one member may participate via telephone; any or all of those approved to participate via distance may participate via interactive videoconferencing. Special arrangements, i.e., requirements for meeting participation via distance, must be communicated to the student and all doctoral committee members well in advance of the examination.
- D.M.A.: All committee members must be physically present at the oral comprehensive examination and the final performance; the examination and the performance will be scheduled at a time when all members agree to be present.

If a committee member is unable to participate in any of the doctoral examinations and this results in not enough members serving on the committee (i.e., four or more active members of the Graduate Faculty), another Penn State graduate faculty member will need to be appointed officially to the doctoral committee to replace the absent member in order to constitute a legitimate doctoral committee. A revised committee appointment form must be submitted to Graduate Enrollment Services, removing the individual as a regular committee member and requesting the replacement committee member. These changes and approvals must occur before the actual examination takes place (ad hoc substitutes are not permitted).

A favorable vote of at least two-thirds of the members of the committee is required for passing a comprehensive or final oral examination or a final performance. If a candidate fails an examination/performance, it is the responsibility of the doctoral committee to determine whether the student will be granted a second opportunity to take the examination or to perform. Regardless of the outcome and of the committee's decision about whether to grant a second opportunity, the program head must report the results of each scheduled examination/performance immediately to Graduate Enrollment Services.

COMPREHENSIVE EXAMINATION

When a candidate for a doctoral degree has substantially completed all course work, a comprehensive examination is given (for the D.M.A., all required recitals except the final performance [i.e., two solo recitals, two chamber music recitals, and a lecture-recital with pre-approved monograph] also must have been completed successfully prior to the scheduling of the comprehensive examination). The examination is intended to evaluate the candidate's mastery of the major, and if appropriate, the minor field and whether the candidate is prepared to embark upon his/her dissertation research (Ph.D./D.Ed.) or preparation for the final performance (D.M.A.).

Official requests to add a minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishment of the doctoral committee and prior to scheduling of the comprehensive examination. More information regarding minors may be found as noted below.

- For Ph.D. candidates: http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq2
- For D.Ed. candidates: http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq3
- For general information regarding minors: bulletins.psu.edu/graduate/programs/minors

As noted above, doctoral candidates must have satisfied the English competence and any program-specific communication and foreign language requirement before scheduling the comprehensive examination.

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

The format for the comprehensive examination may be entirely oral, or it may have both a written and an oral component.

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

FINAL ORAL EXAMINATION (Ph.D./D.Ed.)/FINAL PERFORMANCE (D.M.A.)

The doctoral candidate who has satisfied all other requirements for the degree will be scheduled by the Office of Graduate Enrollment Services, on the recommendation of the head of the graduate program, to take a final oral examination (Ph.D./D.Ed.)/give a final performance (D.M.A.). Two weeks' notice is required by the Office of Graduate Enrollment Services for scheduling this final benchmark. Typically, the final oral examination/final performance may not be scheduled until at least three months have elapsed since the comprehensive examination was passed, although the director of Graduate Enrollment Services may grant a waiver in appropriate cases.

Final Oral Examination (Ph.D./D.Ed.)—Both the dissertation adviser/committee chair and the student are responsible for ensuring the completion of a draft of the dissertation and for adequate consultation with members of the doctoral committee well in advance of the final oral examination. Major revisions of the dissertation should be completed before this examination.

It is the responsibility of the doctoral candidate and committee chair/dissertation adviser to provide a copy of the dissertation to each member of the doctoral committee at least two weeks before the date of the scheduled examination. The dissertation should be complete and in its final draft, with correct and polished content and style, appropriate notes, bibliography, tables, etc., at the time it is distributed to the committee members. If a committee member finds that the final draft is not correct and polished with respect to content and style, it is his/her responsibility to notify the committee chair/dissertation adviser at least one week in advance of the final oral examination date. The committee member should indicate his/her concerns regarding the draft and may recommend consideration of postponement of the examination to the committee chair/dissertation adviser. The chair/adviser, in consultation with committee members, is responsible for notifying the student and assessing whether the student can make the necessary revisions to the final draft before the examination date. If it is determined that revisions cannot be made in time, the final oral examination must be postponed.

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

If a committee member is unable to participate in the final oral examination, the member may sign as a special signatory. A revised committee appointment form will need to be submitted to Graduate Enrollment Services, removing the individual as a regular committee member and if it is desired to designate that individual as a special signatory, a memo from the program head must accompany the revised committee form, requesting that the committee member be moved to a special signatory. As noted above, if there are then not enough members serving on the committee (i.e., four or more active members of the Graduate Faculty), another Penn State graduate faculty member will need to be appointed officially to the doctoral committee to replace the absent member in order to constitute a legitimate doctoral committee. These changes and approvals must occur before the actual examination takes place (ad hoc substitutes are not permitted).

The committee examines the dissertation and administers the final oral examination, and once any final revisions have been made and the dissertation is deemed acceptable, committee members sign the doctoral signatory page.

Final Performance (D.M.A.)—The culminating experience of the D.M.A. degree is a public final performance (solo recital) that will be discussed and evaluated by the doctoral committee.

The student who approaches the final recital will have passed the comprehensive examination, as well as all previous required recitals (as described above, under “Comprehensive Examination”). The repertoire for the final performance will be decided by the student in consultation with the performance adviser and other faculty members in the major area, after which the student will prepare the final performance independently, without weekly coaching. The performance adviser may request a pre-hearing of the recital material before the doctoral committee members from the major area; the results of this pre-hearing are intended to be advisory and will not necessarily affect the scheduled final performance. The student's full doctoral committee will attend the public recital (i.e., the final performance) at University Park and evaluate it; as part of the evaluation, the doctoral committee will discuss the final performance with the student in private.

If a committee member is unable to attend the final performance in person, resulting in not enough members serving on the committee (i.e., four or more active members of the Graduate Faculty), another Penn State graduate faculty member will need to be appointed officially to the doctoral committee as noted above to replace the absent member in order to constitute a legitimate doctoral committee. A revised committee appointment form must be submitted to Graduate Enrollment Services, removing the individual as a regular committee member and requesting the replacement committee member. These changes and approvals must occur before the actual performance takes place (ad hoc substitutes are not permitted). Exceptions to accommodate unexpected last-minute situations that may prevent a committee member’s attendance in person but that may allow for the committee member to participate at a distance (e.g., by interactive videoconferencing) may be granted but must be requested and approved through Graduate Enrollment Services before the actual performance takes place.

DISSERTATION ACCEPTANCE

Completion of the requirements of a Ph.D. or D.Ed. degree program entails acceptance of the dissertation, as indicated by the signatures of at least two-thirds of the doctoral committee, as well as the head of the graduate program, on the doctoral signatory page, and by its acceptance as meeting the editorial standards of the Graduate School, so that it

constitutes a suitable archival document for inclusion in the University Libraries. Thus, it is to be noted that passage of the final oral examination is necessary but not sufficient for award of the degree; the dissertation must be accepted as the ultimate step for the Ph.D. or the D.Ed. and is to be made available to the public through inclusion in the University Libraries.

Updated: 7/7/17

Ph.D.--ADDITIONAL SPECIFIC REQUIREMENTS

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

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

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

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

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

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

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

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

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

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

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

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

A Thesis Guide, which gives details concerning format and other requirements, can be accessed at: http://www.gradschool.psu.edu/current-students/etd/

Updated: 12/14/11; links updated: 8/13/14

D.Ed.--Additional Specific Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

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

at: http://www.gradschool.psu.edu/current-students/etd/.

Updated: 10/23/12

D.M.A.--Additional Specific Requirements

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

Pennsylvania Department of Education Certificate Candidates

For information, see
www.ed.psu.edu/certification
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PROFESSIONAL DEVELOPMENT CERTIFICATES

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

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

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

A minimum of 30 credits at the 400 level or higher is required, of which at least 20 must be earned at the established graduate campus/center of the University where the program is offered. Some graduate programs require additional credits; the exact number can be determined by consulting the specific program description in the Graduate Programs section of the Graduate Bulletin. A minor is not required of all candidates for the M.A. or M.S. degree. A department or committee in charge of a major program may require a candidate to offer work in a minor field, or the minor may be elected with the permission of the student's committee.

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

At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program, with a minimum number of 800-level credits as appropriate to the degree and as approved by the graduate program to be applied to degree requirements. A culminating experience is required. The options for the culminating experience are: a thesis based upon original research in the field; a scholarly paper or essay that is research-oriented; or a capstone course that includes a work product which demonstrates evidence of analytical thinking and synthesis of knowledge in the field of study. The transcript for all students graduating with an M.S. or M.A. degree will be notated to reflect the applicable culminating experience. Programs may offer one, two, or all three options, subject to approval of the Graduate Council Joint Curricular Committee.

If a student is required to write a thesis, at least 6 credits in thesis research (600 or 610) must be included in the program. If no thesis is required, at least 18 credits must be in 500-level courses.

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

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

The Thesis/Dissertation Guide provides details concerning format and other requirements.

The nature and extent of the scholarly paper or essay shall be determined by the major program. The department head or program chair shall report to the Office of Graduate Enrollment Services that the student has met the approved requirement. The department or program is responsible for ensuring that the work is finalized by the published deadline for the semester/session. The program head may require one or more copies of the essay for the program's library or files.

Some graduate programs that emphasize research admit only students interested in pursuing the Ph.D. degree.

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

Master’s Minors

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

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

Updated: 7/17/17; links updated 8/13/14

Master of Accounting (M.Acc.)

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

M.Agr.--Additional Specific Requirements

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

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

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

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

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

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

M.Arch.--Additional Specific Requirements

The M.Arch. degree requires 40 credits of preparatory course work, plus 57 credits of core graduate course work for a total of 97 credits. Some or all of the preparatory course work may have been completed previously, in which case the total credits required for the degree may be reduced in an equivalent manner to a minimum of 57 credits of core courses. At least 36 credits must be at the 500 level, and at least 57 credits must be taken in residence at University Park. The culminating experience of the M.Arch. degree is a master's design project, requiring the student to identify and formulate an area of inquiry and then to complete a research-intensive design project, documented in a volume that includes the design and the research. A capstone course in Design Inquiry is associated with this culminating experience, and students are required to complete two semesters of 6 credits each, for a total of 12 credits.

M.A.S.--Additional Specific Requirements

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

M.B.A.--Additional Specific Requirements

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

M.E.M.--Additional Specific Requirements

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

M.Eng.--Additional Specific Requirements

The Master of Engineering degree programs provide training for advanced professional competence in several fields of engineering. This professional master's degree emphasizes practical application of knowledge for solving problems and should be distinguished carefully from the research-oriented programs that lead to the academic degree of Master of Science. A minimum of 30 graduate credits is required, of which 20 must be earned at the campus/center where the degree program is offered. At least 18 credits must be earned in 500- or 800-level courses; a minimum of 6 of these 18 credits must be earned in 500-level courses.

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

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

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

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

A minimum of 30 graduate credits is required, of which 20 must be earned at the campus where the degree program is offered. Special requirements include 11-12 credits of core courses covering air pollution, water quality, solid/hazardous waste management, and policy/risk assessment. At least 18 credits at the 500 level or above (with at least 6 credits in 500 level) must be included in the program, which includes 1 credit of E P C 590 and up to 3 paper-writing (596) credits offered through the student's department of affiliation.

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

M.F.A.--Additional Specific Requirements

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

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

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

M.Fin. -- Additional Specific Requirements

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

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

M.F.R.--Additional Specific Requirements

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

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

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

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

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

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

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

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

M.H.A.--Additional Specific Requirements

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

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

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

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

This degree is no longer offered.

M.I.A. -- Additional Specific Requirements

Students admitted to the Master of International Affairs program must take a total of 42 credits, including 18 credits of required core courses with the remaining credits chosen from elective courses that will cluster around areas of concentration designed by the program faculty. A minimum of 18 credits must be at the 500 level or above. In addition to the core curriculum and elective courses, degree candidates must complete either (1) a master's paper or (2) a supervised internship placement. The master's paper will involve integrating and showing mastery of the subject matter of the student's curricular emphasis; the supervised internship placement must be of sufficient depth and professionalism to allow the student to experience the integration of his/her curricular studies in a professional environment. A reflective paper will be submitted as a part of this credit requirement.

M.L.A.--Additional Specific Requirements

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

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

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

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

M.L.D.--Additional Specific Requirements

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

M.Mus.--Additional Specific Requirements

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

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

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

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

M.M.E.--Additional Specific Requirements

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

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

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

M.P.A.--Additional Specific Requirements

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

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

M.P.M.--Additional Specific Requirements

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

M.P.S.--Additional Specific Requirements

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

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

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

M.S.E.--Additional Specific Requirements

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

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

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

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

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

Academic Information and Procedures

It is each student's responsibility to know or seek out as needed the regulations and pertinent procedures of Graduate Council and the Graduate School as set forth in the *Graduate Degree Programs Bulletin* and in the *Thesis/Dissertation Guide,* published by the Office of Theses and Dissertations, and to meet the standards and requirements expressed by these regulations. Graduate students are encouraged to contact the Office of Graduate Enrollment Services, 114 Kern Graduate Building (814-865-1795), for guidance if they have any questions, uncertainties, or difficulties concerning any procedure or regulation of Graduate Council, the Graduate School, or the University as it may affect them.

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

UNSATISFACTORY SCHOLARSHIP

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

CONFIDENTIALITY OF STUDENTS' RECORDS

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

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

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

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

Programs and Advanced Degrees

PROGRAMS

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

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

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

ADVANCED DEGREES OFFERED

The degrees of Doctor of Philosophy, Doctor of Education, Doctor of Musical Arts, Doctor of Nursing Practice, and Doctor of Public Health are conferred by the University. The Ph.D. places a strong emphasis on research. The D.Ed. emphasizes professional competence in a field of education. The D.M.A. recognizes professional-level performance and scholarly knowledge of the instrument and the discipline of music. The Doctor of Nursing Practice degree recognizes the highest level of clinical nursing practice. The Doctor of Public Health recognizes leadership in the application of translational science and implementation of research findings to practice in the field of Public Health. All require high attainment and productive scholarship.

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

Graduate degree programs are offered at five campuses of the University: University Park (UP colleges and the School of International Affairs); Penn State Erie (The Behrend College); Penn State Harrisburg (Capital College); Hershey (the College of Medicine); and the Great Valley School of Graduate Professional Studies in Malvern, PA. Some graduate programs also are offered online through Penn State's World Campus.

CHANGE OF DEGREE OR PROGRAM

A graduate student who has been admitted for work in one major but who wants to transfer to another should complete an application for a change of degree or major. The student's credentials will be reviewed and the proposed new graduate program head or committee chair consulted. If the change is approved but the student is inadequately prepared for the new major, the student may be required to make up certain deficiencies.

A graduate student admitted for either an academic/research degree (M.A., M.S., or Ph.D.) or a professional degree who wants to change from one type of degree to another must complete an application for a change of degree. Similarly, a student who has earned a master's degree at Penn State but who wants to earn a doctoral degree in a different field must complete an application for a change of degree. A student may be required to make up certain deficiencies if inadequately prepared for the new program.

CONCURRENT GRADUATE DEGREE PROGRAMS

In general, graduate students are best advised to focus on one degree objective at a time. However, a candidate for a master's degree in one major field who wishes to begin work for either a master's or a doctoral degree in a second field; or a candidate for a doctoral degree who wishes to begin work on a master's degree in a second field while concurrently completing the doctoral program can petition to do so (approval will not be granted for any combination of concurrent doctorates, including the Ph.D., D.Ed., or D.M.A. degrees). The department or program heads of both majors and the director of Graduate Enrollment Services must approve any such plan. Guidelines for preparation of a proposal for concurrent graduate degrees have been established by Graduate Council. The guidelines and form are available on the Graduate School website at: http://www.gradschool.psu.edu/forms-and-documents/ges-owned-forms-and-documents/concurrentgraduatedegreeprogramsplanofstudy/.

DUAL-TITLE GRADUATE DEGREE PROGRAMS

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

INTEGRATED UNDERGRADUATE-GRADUATE (IUG) DEGREE PROGRAMS

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

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

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

Updated: 8/28/2017; links updated 6/19/2015

Registration

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

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

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

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

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

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

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

Anyone who has interrupted such a normal sequence and now plans to return and register for course work should submit an application found at the corresponding link below:

http://www.gradschool.psu.edu/apply/

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

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

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

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

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

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

REGISTRATION NEAR THE COMPLETION OF A PROGRAM

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

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

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

Students who are only resuming in order to submit their intent to graduate should not complete an application to resume study. These students should contact their plan of study to have their records activated in order to submit their intent to graduate. **Important Note: This is only for students who have already satisfied all course requirements who need to graduate. Students who still need to enroll in courses should complete an application to resume study.**

6/21/17; links updated, 8/13/14

Graduate Credits

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

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

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

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

Graduate courses carry numbers from 500 to 699 and 800 to 899. Refer to Graduate Course Definitions for the distinction between 500- and 800-level courses.

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

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

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

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

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

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

Schedule of Courses--The most current information on courses that will be offered in any specific semester is at http://schedule.psu.edu. It gives the number of the class, the hours at which the class will meet, the location of the class, and in some cases the instructor's name.

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

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

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

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

Updated: 3/17/17

Credit Loads and Academic Status

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

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

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

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

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

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

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

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

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

Employment--Many students depend upon part-time employment to help meet their expenses. A student who is thus employed, whether on or off campus, must recognize the time demands of a work schedule in planning an academic program. A student holding a fellowship or scholarship may not accept employment of any kind for service beyond that specifically permitted by the appointment. A graduate assistant may assist in classroom or laboratory instruction, in research or in other work. The tasks assigned to a graduate assistant often are identical in nature to those required for the advanced degree sought. Additional compensation is paid to a graduate assistant by the University for additional hours of work only with special, advance approval of the administrative head of the academic unit in which the assistantship is held, and of the chair of the student's graduate academic program, and provided that such compensation is not for additional hours of work on the assigned assistantship duties. A graduate assistant may not hold a concurrent appointment with the University other than a Fellowship Supplement.

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

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

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

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

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

Updated: 4/15/12

Grading System

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

In addition to the quality grades listed above, three additional grade designations, DF (deferred), NG (no grade), and R, may appear on a student's transcript. If work is incomplete at the end of a semester because of extenuating circumstances, the instructor may report DF in place of a grade, which will appear temporarily on the student's record. It is not appropriate to use the DF either casually or routinely to extend a course beyond the end of the semester or to extend a course for a student who has failed so that the individual can do extra work to improve the grade. Required work should be completed and the DF resolved as soon as possible once assigned, but must be resolved (i.e., the course must be completed) no later than 12 weeks after the course end date as noted on the Registrar's Schedule of Courses, unless an extension of a specific duration to a specified date is agreed upon by the instructor and student and approved by the Graduate School that allows for a completion deadline longer than 12 weeks. A memo with a justifying statement and the agreed-upon date must be submitted by the instructor to the Office of Graduate Enrollment Services in order to request an extension. A deferred grade that is not resolved before the end of this period automatically converts to an F and cannot be changed without approval by the Graduate School. A memo with a justifying statement for changing the F grade must be submitted by the instructor to the Office of Graduate Enrollment Services in order to request a DF that has defaulted to an F grade be changed.

If an instructor does not submit a grade (including a quality grade, DF, or R) for a graduate student by the grade-reporting deadline, the designation NG (no grade) appears on the transcript. An NG that is not reconciled within 12 weeks following the posting of the NG automatically becomes an F.

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

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

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

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

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

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

Corrected Grades for Graduate Students

A corrected grade may be submitted by the instructor for a course taken in the previous semester to correct a mistake made in calculating or recording a grade for a particular graduate student. Each graduate student is responsible for checking his/her semester grade report for accuracy immediately upon receipt, and for informing the instructor for any course in which the graduate student suspects that an error has been made in grading. Each instructor is responsible for checking the semester grade list in the student information system (using eLion) after grades have been recorded for a given semester.

If an error in calculating or recording a grade is brought to an instructor's attention, and the instructor agrees that an error has been made, the instructor may use the student information system to change the grade up to 12 weeks after the end of the semester in which the course was taken. No grade change can be made directly via the student information system more than 12 weeks after the end of the semester in which the course was taken; after this time, an exception, including academic justification for the requested change and for the timing of the change (i.e., after the allowable grade change period has expired), must be requested and approved through Graduate Enrollment Services.

When a course instructor is no longer available to resolve an error in calculating or recording a grade, the instructor's department head is authorized to take the necessary action.

Revised by Graduate Council, April 2011

Revised by Graduate Council, March 2014; changes effective Fall 2014*

*Note that because of the ongoing transition from ISIS to LionPATH as the University's student information system, it is possible that neither system will be configured accurately to automate the policy as it is described above until LionPATH implementation is complete; however, it is the expectation of Graduate Council that all members of the graduate community at Penn State will comply in full with the policy as described, regardless of programming/configuration quirks in the technology."

6/12/15

Thesis

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

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

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

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

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

Graduation

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

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

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

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

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

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

GRADUATE PROGRAMS

Graduate programs are arranged in alphabetical order, accessible by clicking the links for each letter of the alphabet and then the link for the program name (see left side of this page).

If you do not know the exact name of a program, you can type a word connected with the subject area into the bulletin's search engine and choose "Degree Programs" from the drop-down menu under "Area." That will give you a list of programs that contain the search term you typed.

Within each program description, specific information varies. Typical descriptions include contact information, a graduate faculty list, degrees conferred, requirements, and links to course descriptions. In most cases, a link to the home page of the program, which will take you out of the bulletin site to the program's site, is in the description.

Corporate Innovation and Entrepreneurship

Dr. Shawn Clark, Clinical Professor for Innovation and Entrepreneurship
The Smeal College of Business
451C Business Building
814-865-4449

Degrees Conferred:

M.P.S.

The Graduate Faculty

The Program

The Master of Professional Studies in Corporate Innovation and Entrepreneurship program prepares graduates to stand out in the workplace and/or a competitive job market by studying at a highly-reputed business school with some of the world's leading academic thinkers and industry experts. This program provides students with the business, leadership, and organizational skills needed to lead and facilitate corporate innovation in its many forms, new venture creation, effective change management, and entrepreneurial business planning. Students will acquire the skills needed to succeed in today's dynamic work environments, gain a firm understanding of business and technology issues and problems, and be prepared to become leaders of innovation. The two primary concentration areas provided through this program, involving business and engineering, will give students the opportunity to develop competencies tailored to their needs in a corporate setting. Additional secondary academic concentrations are offered to allow students to explore focused business domains in-depth that relate directly to innovation and entrepreneurship. The program is taught by the same world-class professors who teach our M.B.A., executive education, and engineering students. A solid foundation in innovation, entrepreneurship, strategy, decision analysis, management, organizational behavior, accounting, marketing, business planning, and finance will make graduates more attractive to hiring managers and enable them to advance more rapidly into management and leadership positions. These learning outcomes are achieved by a combination of online learning experiences, lectures by faculty, invited guest lecturers, reading of key literature, individual and team projects, and a capstone experience that synthesizes and integrates past learning.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the General Information section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants will be required to:

- Have completed an average of three years of post-undergraduate, professional work experience. Managerial or team leadership experience is preferred but not required. Less experienced candidates will be considered at the discretion of the program director.
- Submit two strong letters of recommendation.
- Submit official transcripts from all post-secondary institutions attended.
- Submit a statement of purpose (a 600 word essay articulating career and education goals) and a current resume.

Language of Instruction

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Applicants to the Penn State Smeal Master of Professional Studies in Corporate Innovation and Entrepreneurship program must have a minimum TOEFL score of 585 on the paper-based test, or a total score of 80 with a 20 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for the IELTS for applicants is 6.5.

Degree Requirements

Requirements listed here are in addition to requirements stated in the Degree Requirements section of the *Graduate Bulletin*.

A minimum of 33 credits is required for the Master of Professional Studies in Corporate Innovation and Entrepreneurship program. At least 18 credits must be at the 500 or 800 level, with at least 6 at the 500 level. In addition to the 15 required core credits listed below, students are required to complete 9 elective credits in a Primary Concentration area, and 9 elective credits in a Secondary Concentration. The list of courses that will fulfill the Primary and Secondary Concentration areas is maintained by the graduate program office.

Required courses: (15 credits, including the 3-credit capstone course described below)

Course	Credits
MBADM 531 - Corporate Innovation and Entrepreneurship	3
ENTR 810 - Emerging Trends, Technology, and Corporate Innovation	3
ENTR 502 - Business Modeling and New Venture Creation	3
ENTR 820 - Corporate Innovation Strategies and Entrepreneurial Methods	3
ENTR 830 - Entrepreneurial Business Planning and Strategy Execution	3

Culminating Experience

- ENTR 830 Entrepreneurial Business Planning and Strategy Execution (capstone)

The capstone course, ENTR 830, serves a critical role in helping students synthesize and integrate past learning in the M.P.S. program, providing additional education on how to write a form business case or business plan, implement plans and new venture strategies, and scale new ventures to become mature business organizations. Additionally, this class requires students to write a robust, in-depth research paper on a topic related to innovation and entrepreneurship.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring 2018

Blue Sheet Item #: 46-05-000

Review Date: 2/20/2018

Accounting (ACCNT)

James A. Nemes, Chancellor and Director of Academic Affairs
Penn State Great Valley
30 East Swedesford Road,
Malvern, PA 19355
610-648-3200

Bo Ouyang, Professor-in-Charge
Management Division
Penn State Great Valley School of Graduate Professional Studies
30 East Swedesford Road,
Malvern, PA 19355
610-648-3200

Degree Conferred: Master of Professional Accounting (M.P.Acc.)

The Graduate Faculty

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Students who apply for admission should have completed course work substantially equivalent to an undergraduate degree in Business (or a business discipline) from Penn State University. Applicants to the Penn State Great Valley M.P.Acc. program should also have a grade-point average of at least 3.0 (on a 4.0 scale) in their final 60 credits of undergraduate course work, both overall as well as in accounting courses. If the undergraduate major is not Accounting, an applicant must have completed the following minimum core of accounting course work (or its equivalent) with a final grade of B- or better: ACCTG 211 (Financial and Managerial Accounting for Decision Making), ACCTG 310 (Federal Taxation I), ACCTG 340 (Cost Accounting), ACCTG 403 (Auditing), ACCTG 471 (Intermediate Financial Accounting I), and ACCTG 472 (Intermediate Financial Accounting II).

All applicants to the Penn State Great Valley M.P.Acc. program are required to submit GMAT or GRE scores. A waiver will be considered if the applicant has an advanced degree (e.g., master's degree or higher) from a regionally accredited university with AACSB accredited programs OR one or more professional business certifications including a CFA, CPA, FRM, and/or CMA, or doctoral degree (e.g., Ph.D., M.D., J.D.).

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students must complete a minimum of 30 credits at the 400, 500, or 800 level, with at least 18 at the 500 or 800 level, and a minimum of 9 credits at the 500 level. This includes 24 credits in the required core courses:

- ACCTG 512 Financial Accounting Theory and Reporting Problems (3 cr.)
- BLAW 444 Advanced UCC and Commercial Transactions (3 cr.)
- ACCTG 806 Advanced Topics in Taxation (3 cr.)
- ACCTG 873 Advanced Topics in Financial g (3 cr.)
- ACCTG 803 Accounting Information and Decision Systems (3 cr.)
- ACCTG 462 Governmental and Not-for-Profit Accounting (3 cr.)
- ACCT 550 Professional Responsibilities and Ethics (3 cr.)
- ACCTG 831 Advanced Auditing (3 cr.)

The remaining 6 credits of electives may be chosen from a list of approved electives maintained by the program office. Note that one of the electives must be a 500-level graduate course.

ACCTG 831 Advanced Auditing serves as the capstone course for this degree. This capstone course taken at the end of the program uses all the knowledge gained from prior coursework and applies them through presentation and analysis of case studies. Students will study investigative accounting, consulting, and litigation support activities undertaken in forensic accounting engagements through the use of case studies. This capstone course includes a final capstone project which emphasizes case analysis to develop critical thinking and analytical skills in the use of accounting reports for broad-based business analysis. In this capstone project, students examine a current issue in accounting and regulation. Through this comprehensive capstone project, students acquire a big-picture understanding of accounting trends and regulatory issues, along with the critical-thinking skills to evaluate and debate them.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring 2018

Blue Sheet Item #: 46-06-000

Review Date: 4/10/2018

Additive Manufacturing and Design

KAREN A. THOLE, *Head of the Department of Mechanical and Nuclear Engineering*
137 Reber Building
814-865-2519

Degree Conferred:

- M.S. in Additive Manufacturing and Design (resident)
- M.Eng. in Additive Manufacturing and Design (online)

The Graduate Faculty

The Program

The overall goal of the Master's of Science in Additive Manufacturing and Design and Master's of Engineering in Additive Manufacturing and Design are to educate students and working engineers to become technically outstanding experts in additive manufacturing. Specifically, the objectives include:
1. Apply foundational knowledge, critical thinking, problem solving, and creativity in the uses of additive manufacturing and associated design tools and methods.
2. Grow as leaders in manufacturing while maintaining the highest ethical standards in applying additive manufacturing to industry-relevant problems and design challenges.
3. Strive for the advancement of the state-of-art in additive manufacturing and design.
4. Develop innovative solutions through new design paradigms in their respective industries.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission. The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.
To maintain a high quality program, it is important that our students are of a caliber to succeed. As such, the admission requirements for the students enrolling in the MSAMD and MEngAMD degree program will be based on: academic records, GRE scores, applicable work experience, their personal statement of interests in additive manufacturing design, and three letters of recommendation from a previous professor or supervisor who can attest to the applicant's academic potential. Applicants will be expected to have a Bachelor of Science or four-year Associates degree in engineering, manufacturing, materials science, or related field from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution. An undergraduate cumulative grade point average of 3.0 or better on a 4.0 scale in the final two years of undergraduate studies is required.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

- A minimum of 30 credits at the 400, 500, or 800 level is required. For the M.S., at least 18 credits must be in 500-level courses. For the M.Eng., at least 18 credits must be at the 500 or 800 level, with a minimum of 6 credits at the 500 level.
- Completion of 5 required courses that total 19 credits with a grade point average of 3.00 or higher. The 5 required courses are EDSGN 562 (4 credits), E SC 545 (4 credits), IE 527 (4 credits), MatSE 567 (4 credits), and ME 566 (3 credits).
- A minimum of at least 8 credits in 400 and/or 500 level courses offered with the following designations: EDSGN, E SC, IE, MATSE, or ME. Note that EDSGN 596, E SC 596, IE 596, MATSE 596, and ME 596 cannot be used to fulfill this requirement.
- Completion of 3 credits in one of the following offerings to complete the culminating project: EDSGN 596, E SC 596, IE 596, MATSE 596, or ME 596. MSAMD students will be required to complete one (1) credit in each of three (3) semesters while MEngAMD students can complete a three (3) credit course in one (1) semester.
- A scholarly paper must be completed to meet the specific requirement of the culminating experience. This paper will demonstrate depth of knowledge to his/her adviser, a second reader, and the Associate Department Head of Graduate Studies in one of the five aforementioned Departments.
- All students must successfully complete one credit of colloquium preferably in their first two semesters in the program. The one-credit colloquium does not count toward the 30 graduate course credits in Requirement 1 above. The following courses are offered to meet this requirement: EDSGN 590, ESC 514, IE 590, MATSE 590, and ME 590.
- All students will be required to complete SARI (Scholarship and Research Integrity) training.

The M.S. degree is designed to be completed in 3 semesters, or one calendar year (fall, spring, and summer). A research adviser will be assigned to students in their first semester. Students who need more time to complete the final paper will be allowed to complete the paper, and have it reviewed and approved after the third semester has ended. Students are not required to remain in residence while they complete the final paper. However, extensions granted to students in this program must comply with theGraduate Council policy on deferred grades.

CULMINATING EXPERIENCE - MS PAPER and MEng PAPER
Candidates must write a culminating project paper on a topic mutually agreed upon with the adviser. Students will be encouraged to utilize an industry internship (resident students) or current employer (online students) to identify a relevant or practical problem of importance that additive manufacturing and appropriate design methods could address. The quality of the required paper is such that it must be suitable for publication in a professional journal or proceedings at a national or international conference, which generally requires a peer-review process.

Student Aid

Graduate assistantships available to students in the residential program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree."

Last Revised by the Department: Summer Semester 2017

Blue Sheet Item #: 46-01-000

Applied Demography

Program Home Page

Alexis R. Santos, Director of Graduate Studies
Department Office: 303 Oswald Tower
814-863-9718

Degree Conferred

Master of Professional Studies (M.P.S.)

The Graduate Faculty

Master of Professional Studies in Applied Demography

The M.P.S. degree in Applied Demography is a 30-credit program of study for working professionals interested in understanding the concepts, measures, data, software, and analytical skills that can be utilized in both the public and private sectors. The content of the program will include readings, materials, and exercises that draw on demographic research from both the U.S. and the international context.

The M.P.S. in Applied Demography provides professionals with the skills necessary to perform applied demographic analysis to aid in decision-making processes. The program content exposes the student to a broad range of methods and problems in the public and private sectors, aiming to provide students with practical experiences. The program will also familiarize students with the methods, techniques, and projects used in the applied demography setting in their line of work.

Admission Requirements

Educational Background

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Applicants are expected to have one undergraduate course in Statistics or work experience where statistics are used.

Students who do not have an undergraduate GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Work experiences will be considered for applicants who have more than two years of experiences in a related field. Applicants who are still completing their baccalaureate requirements at the time of application may be admitted to the Graduate School provisionally, pending the award of the degree. Completion of admission in such cases is dependent upon receipt of the missing credentials.

Core Application Packet

- Completed official online Graduate School application and payment of a nonrefundable application fee.
- Statement of purpose: a 2-3 pages essay articulating career and educational goals that demonstrate the student's written communication skills and basic statistical knowledge
- A current curriculum vitae (vita) or résumé.
- Three letters of recommendation that attest to the student's readiness for graduate study and document the requisite of minimum of two years of work experience. Letters must be submitted through the online application system. Within the online application you will be asked to enter the names and email addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via email asking them to complete a brief form that will serve as your recommendation. Applicants must inform all recommenders that recommenders must submit the form in order for the application to be complete.
- Official transcripts from all post-secondary institutions attended.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Total required credits for the M.P.S.: 30 credits. At least 18 credits at the 500 or 800 level, with at least 6 credits at the 500 level.

PRESCRIBED COURSES: 12 credits (plus the 3-credit Capstone course described below under CULMINATING EXPERIENCE)

- APDEM 801 Principles of Demography
- SOC 573 Demographic Techniques
- APDEM 802 Data, GIS, and Applied Demography
- APDEM 803 Applications in Applied Demography

ELECTIVE COURSES 15 credits

SUPPORTIVE/PROGRAM (ELECTIVE COURSES): 9 credits minimum

- APDEM 804 Business Demography
- APDEM 805 Public Sector Demography
- APDEM 806 Applied Demography and Health
- SOC 579 Spatial Demography

EXTERNAL ELECTIVES: Up to 6 credits

- CEDEV 500 Principles of Community and Economic Development and Leadership
- CEDEV 509 Population, Land Use, and Municipal Finance
- GEOG 588 GIS for Emergency Management
- H P A 850 Health Care Marketing
- PADM 535 Policy Analysis & Planning
- PL SC 490 Policy Making and Evaluation
- STAT 501 Regression Methods
- STAT 505 Applied Multivariate Statistical Analysis
- STAT 800 Applied Research Methods

M.P.S. in Applied Demography students will have the opportunity to design their program of study by choosing from a list of elective courses, based in their area of interest. The elective courses will be chosen in consultation with the student's advisor. The elective courses counting towards the M.P.S. will be reviewed on an annual basis by an advisory board to ensure that we are matching the listed electives with M.P.S. student interests and needs, and that the identified courses outside of the M.P.S. are offered frequently enough.

CULMINATING EXPERIENCE: (3 credits)

- APDEM 808 – Capstone course

The culminating experience provides students with an opportunity to apply their knowledge of applied demography to a research project. The choice of

research project topic and exact form will be mutually determined by the faculty mentor and the student. The student will work with a faculty mentor/adviser on a capstone project that will be written up as a capstone report. Students are expected to utilize methods acquired during other courses in the M.P.S. in Applied Demography and apply them to a topic of interest. The report will be formally presented to peers in the M.P.S. and faculty members at the end of the semester (i.e. final presentation via videoconference). The capstone report must be approved by the faculty mentor/adviser to meet course requirements.

Course Substitutions

Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis consistent with Graduate Council policy, and must be petitioned and approved in advance by the program administrator, with input from the student's adviser.

Financial Aid

Financial aid opportunities for part-time students who participate through the World Campus are described at: http://www.worldcampus.psu.edu/tuition-and-financial-aid.

Last Revised by the Department: Fall 2016

Blue Sheet Item #: 45-01-000

Review Date: 8/23/2016

Bioinformatics and Genomics

Program Home Page

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Degrees conferred:

Ph.D., M.D./Ph.D., M.S.

The Graduate Faculty

The Program

The IGDP in BG is an interdepartmental program that engages faculty members from six colleges on two campuses. This broad-reaching Program provides students a wide range of understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is truly changing biological research as well as health and lifestyles.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

- Fully completed, official online Penn State Graduate Application.
- Paid, nonrefundable application fee (see Requirements for Graduate Admission for current fee).
- Official transcripts from all post-secondary institutions attended.
- Completed BG-specific questions on the Graduate Application.
- Application for a U.S. visa (international applicants only).
- Officially submitted Graduate Record Examination (GRE) General Test scores. Successful applicants generally have scores above the 75th percentile for each of the verbal, quantitative, and analytical writing section.
- Names and contact information, including business email addresses, for three references.
- Statement of goals that pertain to the life sciences including motivation for pursuing a research degree; research experience and interests; and professional experience. The statement should include problems that are of interest to the applicant and how the applicant's past experiences have prepared him or her to pursue this research.
- International applicants are required to submit English proficiency test scores, unless they are from one of the countries listed as exempt in the *Graduate Bulletin*. English proficiency test scores must meet or exceed the minimum acceptable scores listed in the Bulletin. Applicants to the BG program must have a minimum TOEFL score of 575 for the paper-based test, or a total score of 90 with a 19 on the speaking section for the Internet-based test (iBT). Successful applicants generally have a minimum score of 100 (including 23 on the speaking component) on the Internet-based test.
- Successful applicants generally will have a minimum 3.5 on a 4.0 scale junior/senior undergraduate grade point average, and will have completed course work in both quantitative and life science subjects.

DEGREE REQUIREMENTS

M.S. Degree

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

For master's degree, a minimum of 30 graduate credits and a 3.0 overall GPA are required. At least 18 credits in the 500 and 600 series combined must be included in the program. Required courses for master's degree are: MCIBS 551 Genomics (3), MCIBS 554 Foundations in Data Driven Life Sciences (3), STAT 555, Statistical Analysis of Genomics Data (3), BMMB 852 Applied Bioinformatics (2), BIOL 405 Molecular Evolution (3), MCIBS 541 Critical Analysis of Bioinformatics and Genomics Research Topics (1 credit per semester, maximum of 2 credits), MCIBS 589 Colloquium in Bioinformatics and Genomics (3), MCIBS 591 Ethics in Life Sciences (1), MCIBS 596 Individual Studies (2), and MCIBS 600 Thesis Research (6). No more than 6 credits of Thesis Research may be counted toward 30 credit minimum. MCIBS 595 Internship and electives also count towards the minimum 30 credit requirement. Options are not offered for the M.S. degree.

Students must complete original laboratory research and internship that culminates in a thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Ph.D. Degree

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

For the Ph.D., a minimum of 35 credits is required. During the first year of study, Ph.D. candidates are required to take 17 credits of core required courses: MCIBS 551 Genomics (3), MCIBS 554 Foundations in Data Driven Life Sciences (3), STAT 555, Statistical Analysis of Genomics Data (3), MCIBS 541 Critical Analysis of Bioinformatics and Genomics Research Topics (1 credit per semester, maximum of 2 credits), MCIBS 589 Colloquium in Bioinformatics and Genomics (3 credits total) MCIBS 591 Ethics in Life Sciences (1), and MCIBS 596, Individual Studies (2 credits total), representing three Research Rotations. Each candidate for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

At the end of the first year, admission to Ph.D. candidacy is determined by performance in course work, laboratory rotations, and the BG Graduate Program Candidacy Examination. Students join their research laboratory by the end of the second semester of the first year.

The doctoral committee of a Ph.D. student is formed upon entry into the dissertation laboratory, and must comply with all Graduate Council requirements. Students are strongly encouraged to consider joint co-advisers, each representing a different area of expertise within the field of bioinformatics and genomics.

During the second year, students may take additional courses in consultation with the doctoral committee. Students may select an option area in which they conduct research and take additional courses specified by the Option (see below). Students are not required to choose an Option. Additionally, students will complete one semester of Teaching Assistantship in a graduate or undergraduate course and complete required training to perform duties of Teaching Assistantship.

Ph.D. candidates must pass a comprehensive examination prior to the end of the fifth semester of enrollment, the written portion of which is in the format of a grant application. As part of this examination, the candidate also gives an oral presentation of this proposal to their doctoral committee.

A dissertation must be prepared and defended by each Ph.D. candidate. Students must present their dissertation in accordance with Graduate Council and Graduate School guidelines as described in the THESIS GUIDE: Requirements for the Preparation of Master's Theses and Doctoral Dissertations. To earn the Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School and the student must pass a final oral examination (the dissertation defense).

The final examination of the doctoral candidate is an oral examination administered and evaluated by the entire doctoral committee. It consists of an oral presentation of the dissertation by the candidate and a period of questions and responses. These will relate in large part to the dissertation, but may cover the candidate's entire program of study, because a major purpose of the examination is also to assess the general scholarly attainments of the candidate. The portion of the examination in which the dissertation is presented is open to the University community and the public; therefore, it is expected that the examination will take place at University Park or the Hershey campus. It is expected that the Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the final oral examination.

Ph.D. students in Bioinformatics and Genomics may enroll in one of two options, but are not required to do so.

Option in Algorithms and Computation

Students are admitted to the Option in Algorithms and Computation after successfully completing: (1) the first year of the IGDP in BG; (2) three research rotations, of which at least two must be with faculty affiliated with the Algorithms and Computation Option; and (3) the candidacy examination. During the second year, Ph.D. candidates choosing this option will be required to take (1) CSE/BMMB 566 Algorithms and Data Structures in Bioinformatics (3); (2) one of the two courses CMPSC 465 Data Structures and Algorithms (3) or CSE 565 Algorithm Design and Analysis (4); and (3) two courses from a list of prescribed electives which includes, but is not limited to the following: CMPSC 431W Database Management Systems (3), CMPSC 450 Concurrent Scientific Programming (3), CSE 557 Concurrent Matrix Computations (3), CMPSC 464 Introduction to the Theory of Computation (3), CSE 583 Pattern Recognition – Principles and Applications (3), CSE 562 Probabilistic Algorithms (3), CMPEN 455 Digital Image Processing (3), and CMPEN 454 Fundamentals of Computer Vision (3) and CHE 512 Optimization in Biological Networks (3).

Option in Statistical Genomics

Students are admitted to the Option in Statistical Genomics, after successfully completing: (1) the first year of the IGDP in BG; (2) three research rotations, of which at least two must be with faculty affiliated with the Statistical Genomics Option; and (3) the candidacy examination. During the second year, Ph.D. candidates choosing this option will be required to take: (1) one of the two courses STAT 501 Regression Methods (3) or STAT 511 Regression Analysis and Modeling (3); (2) STAT 557 Data Mining I (3); and (3) two courses from a list of prescribed electives which includes, but is not limited to the following: STAT 414 Introduction to Probability Theory (3), STAT 415 Introduction to Mathematical Statistics (3), STAT 416 Stochastic Modeling (3), STAT 502 Analysis of Variance (3), STAT 504 Analysis of Discrete Data (3), STAT 505 Applied Multivariate Analysis (3), and STAT 540 Statistical Computing (3).

M.D./Ph.D. JOINT DEGREE PROGRAM

M.D./Ph.D. Admissions Requirements

Students interested in simultaneously pursuing an M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint degree program. The College of Medicine M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the M.D. and Ph.D. program. Students not accepted into the joint degree program can be referred to either the M.D. or Ph.D. program, depending on their qualifications.

The general admission requirements for the Ph.D. degree are listed above. Additional requirements for the joint degree are listed below. Admissions requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program section of the Penn State College of Medicine website. After the review committee has accepted an applicant to the joint degree program, s/he must apply to the Graduate School for admission to the graduate program. Students must be admitted to the joint degree program prior to taking the first course they intend to count towards the graduate degree.

In addition to the basic college level premedical school requirements for the Penn State College of Medicine (one each year of biology, chemistry, physics, math, and organic chemistry), the M.D./Ph.D. program has the following requirements:

- **Academic Achievement** Applicants to our program generally have very strong grades and MCAT scores. In recent years, successful applicants have an average GPA of 3.75 and MCAT scores of 33-34. Applicants are not required to take the GREs.
- **Research Experience** We are especially interested in students with a strong and sustained background in research. Students who have spent 1-2 years after graduation conducting research are strongly encouraged to apply. Alternatively in-depth research experience as an undergraduate can suffice.
- **Recommendations** We are especially interested in receiving letters of recommendation from faculty with whom you conducted research and who can comment on your passion and potential for research.
- **Goals** Applicants must be able to clearly articulate the reasons for pursuing the joint degree.
- **International Students** All qualified students are eligible to apply regardless of citizenship.

M.D./Ph.D. Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the Penn State College of Medicine website. Degree requirements for the Ph.D. degree are listed in the Ph.D. Degree Requirements section above.

During the first two years of medical school, the student conducts at least three research rotations. After successful completion of the first two years of medical school the candidate enters the MCIBS Graduate Program.

During the summer after the second year of medical school M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves in lieu of the knowledge based part of the candidacy examination for the BG program. Successful completion of BMS 506 A and B, which is taken in the second year of medical school, with a grade of B or higher meets the critical thinking and paper analysis requirement of the candidacy exam.

BG Program Requirements

The doctoral committee of an M.D./Ph.D. student in the BG program is formed upon entry into the dissertation laboratory, and must comply with all Graduate Council requirements. The committee must include at least two members of the BG program graduate faculty and one M.D./Ph.D. steering committee member.

The required courses: MCIBS 589, Colloquium, MCIBS 591, Ethics in the Life Sciences, MCIBS 551 Genomics, MCIBS 554 Foundations in Data Driven Life Sciences, MCIBS 541, Critical Analysis in BG Research Topics, STAT 555, Statistical Analysis of Genomics Data. In addition, based on the background and needs of the student the following elective courses will also be taken: BIOL 405, Molecular Evolution, STAT 500, Applied Statistics, BMMB 852, Applied Bioinformatics (2).

The BG program will accept SPM 711 Scientific Principles of Medicine (8 credits) in lieu of 6 credits of elective courses and 2 credits of MCBIS 596. If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the Ph.D. degree if all Ph.D. degree requirements have been satisfied.

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their doctoral committee.

M.D./Ph.D. candidates are required to have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the final doctoral examination, and this must be accepted before they return to the third year of medical school. A dissertation must be prepared and defended by each M.D./Ph.D. candidate.

STUDENT AID

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

COURSES

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Data Analytics (DAAN)

Program Chair

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Degree Conferred:

M.P.S., M.S.

The Graduate Faculty

The Program

The M.P.S. in Data Analytics (M.P.S.-DAAN) degree is a 30-credit, interdisciplinary master's program that provides students the skills required to collect, classify, analyze, and model data at large and ultra-large scales and across domains using statistics, computer science, machine learning, and software engineering.

The curriculum consists of 30 credits, delivered both in residence at the School of Graduate Professional Studies (Great Valley) and online through the Penn State World Campus. The program provides broad coverage of topics related to predictive analytics while provide in-depth coverage of topics such as data collection and quality, large scale data storage and retrieval, and business and enterprise analytics.

Students select to follow either the base program, which prepares them to design and deploy predictive analytics systems, or specialized options in Business Analytics or Marketing Analytics. The base program is available both in residence and online; the options are only available online.

The M.S. in Data Analytics (M.S.-DAAN) degree is a 30-credit research-oriented graduate degree program focused on applying predictive and prescriptive analytics to problems across domains. The program will provide students the skills necessary to frame problems in analytical terms amenable to data analysis; identify the datasets necessary to address the problem; the techniques appropriate to reveal the insight sought, and present that insight to stakeholders.

M.P.S. (DAAN)

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission.

Admission to the M.P.S. in Data Analytics program will be based on baccalaureate academic records, applicable work experience, and two letters of recommendation from a previous professor or supervisor who can attest to the applicant's academic potential. Applicants with an undergraduate degree in a quantitative discipline such as science, engineering, or business may apply. Students from other disciplines will be considered based on prior coursework and/or standardized test scores. Applications must include a statement of professional goals, a curriculum vitae or resume, and two letters of recommendation. Test scores from the GMAT or GRE exams are required. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale in the final two years of undergraduate studies is required.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

The M.P.S.-DAAN degree is conferred upon students who earn a minimum of 30 credits of coursework while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18 credits at the 500 or 800 level (with at least 6 credits at the 500 level). The program curriculum includes 9 credits of core courses, 9 credits of either a selected option or the base program, 9 credits of electives, and a 3-credit capstone course.

Required Courses

Prescribed courses for the degree include the following 9 credits of core courses

- STAT 500: Applied Statistics (3 credits)
- I E 575: Foundations in Predictive Analytics (3 credits)
- SWENG 545: Data Mining (3 credits) or STAT 557: Data Mining 1 (3 credits)

Base Program

(Offered at Penn State Great Valley and through World Campus)

Director: Colin Neill, Associate Professor of Software Engineering and Systems Engineering

The base program will create graduates who can design, deploy, and manage the technology infrastructure and data analytical processes of predictive analytics including data aggregation, cleaning, storage, and retrieval. These graduates will work in positions that require them to design and maintain data analytics systems and tools such as Data Modeler, Data Architect, Extraction, Transformation, Loading (ETL) Developer, Business Intelligence (BI) Developer, Data Warehouse Developer and Data Analyst.

Base program required courses

- IN SC 521: Database Design Concepts (3 credits)
- DAAN 825: Large-Scale Databases & Warehouses (3 credits)
- DAAN 881: Data-Driven Decision Making (3 credits)

Additional Courses

An additional 9 credits of elective courses must be selected from the approved list. The list of approved elective courses is maintained by the graduate program office.

Business Analytics Option

(Offered through World Campus)

Director: Terry A. Harrison, Professor of Supply Chain and Information Systems

This option prepares graduates to explore and analyze large data sets to support data-driven business decisions. Target audiences include business analysts, analytic system designers and the data scientists who have a focus on problems arising in the context of business decision-making. The BAN option is organized around the industry-standard rubric of the spectrum of analytics activities: descriptive (what happened), diagnostic (why did it happen), predictive (what will happen) and prescriptive (what should happen).

- BAN 530: Business Strategies for Data Analytics (3 credits)
- BAN 540: Marketing Analytics (3 credits)
- BAN 550: Prescriptive Analytics for Business (3 credits)

Marketing Analytics Option

(Offered through World Campus)

Director: Chelsea Hammond, *Clinical Assistant Professor of Marketing*

The aim of this option is to convey how marketing analytics are (1) applied within organizations, (2) conducted, and (3) meaningfully communicated and applied to business decision-making and strategy. The target market would be college graduates that desire to build their skills in marketing analytics functions, but may have little or no formal training in marketing analytics. The MAN option will be highly industry applicable, since it is aimed at giving students the core marketing analytics knowledge they will need to successfully apply marketing analytics in today's data-driven organizations.

- MKTG 811: Driving Business Success with Marketing Analytics (3 credits).
- MKTG 812: Evaluating Marketing Communication in the Digital World (3 credits).
- MKTG 813: Data-Driven Customer Acquisition & Retention (3 credits).

Culminating Experience

All students will complete their program of study with the capstone course corresponding to their chosen option. While each capstone course focuses on problems relevant to their specific domains, they all provide students with an opportunity to apply their knowledge of the theories, methods, processes, and tools of data analytics, learned throughout their program, in a culminating and summative experience. DAAN 888 is the culminating experience for the base program, BAN 888 for the Business Analytics Option, and MKTG 814 for the Marketing Analytics Option. The choice of project topic and exact form will be mutually determined by the instructor and each student. A written paper based on the applied project is required and must contain project description, analysis, and interpretation of its findings. Students are encouraged to upload their capstone projects to be available publically via ScholarSphere and to participate in the Graduate Exhibition.

M.S. (DAAN)

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission.

Admission to the M.S. in Data Analytics program will be based on baccalaureate academic records, applicable work experience, and two letters of recommendation from a previous professor or supervisor who can attest to the applicant's academic potential. Applicants with an undergraduate degree in a quantitative discipline such as science, engineering, or business may apply. Students from other disciplines will be considered based on prior course work and/or standardized test scores. Applications must include a statement of professional goals, a curriculum vitae or resume, and two letters of recommendation. Test scores from the GMAT or GRE exams are required. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale in the final two years of undergraduate studies is required.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The M.S. degree is an academic degree, which is strongly oriented toward research. To receive the Master of Science degree in Data Analytics, a student must complete at least 30 credits beyond the baccalaureate degree at the 400, 500, 600, or 800 level. At least 18 credits in the 500 and 600 series, combined, must be included in the program.

The program curriculum includes 15 credits of core courses, 9 credits of elective courses, and 6 credits of supervised research. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Required Courses

Prescribed courses for the degree include the following 15 credits of core courses

- STAT 500: Applied Statistics (3 credits)
- IE 575: Foundations in Predictive Analytics (3 credits)
- SWENG 545: Data Mining (3 credits)
- DAAN 501: Analytics Research and Problem Framing (3 credits)
- DAAN 871: Data Visualization (3 credits)

Additional Courses

An additional 9 credits of elective courses must be selected from the approved list of elective courses maintained by the graduate program office.

Students must take a minimum of 6 credits of DAAN 600: Thesis Research. The thesis work should be an in-depth investigation intended to extend the state of knowledge in some specialty area. For thesis guidelines and time lines, refer to the Penn State Graduate School website.

Student Aid

Graduate Assistantships available to students in the program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2018
Blue Sheet Item #: 46-04-000
Review Date: 1/9/2018

Energy, Environmental, and Food Economics (EEFE)

Degrees Conferred:

Ph.D., M.S.
Dual Title M.S., Ph.D. in Energy, Environmental, and Food Economics and Demography
Dual Title M.S., Ph.D. in Energy, Environmental, and Food Economics and Operations Research

Graduate Faculty

The Programs

The programs in Energy, Environmental, and Food Economics (EEFE) are designed to educate students as applied research economists in the fields of energy economics, environment and natural resource economics, and industrial organization in the food sector. The EEFE graduate program offers Master of Science (M.S.) and Doctor of Philosophy (Ph.D.) degrees. Through completion of advanced course work and rigorous skills training, the Ph.D. and M.S. programs will prepare students to conduct independent research in accordance with the highest ethical standards, scientific integrity, and interpersonal collegiality, and to effectively interpret and communicate the results of their research. The M.S. degree is a research-oriented degree. Thus, a strong component of the M.S. candidate's program includes training in scientific methods as well as techniques of analysis applicable to the field. Additional depth and breadth of training required in the EEFE Ph.D. curriculum will prepare students to conduct original research that advances scientific knowledge in their fields of specialization. Students will also acquire the background and skills necessary to be effective teachers, mentors, and practitioners of economics. As an intercollege graduate program, EEFE faculty members reside in several Penn State departments and Colleges. Students in the program have access to and utilize resources of the participating departments (courses, faculties and facilities).

Students may elect to pursue dual-title degrees in Energy, Environmental, and Food Economics and Demography, and Energy, Environmental, and Food Economics and Operations Research.

Admissions Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants must complete the online Graduate School application and pay a nonrefundable application fee.
Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the graduate program, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Letters of recommendation and an applicant's statement of purpose are also required.
Students admitted to the M.S. program are expected to have:

- At least 9 credits in economics, including intermediate undergraduate microeconomic theory and intermediate undergraduate macroeconomic theory.
- Introductory statistics and two semesters of calculus.
- A minimum 3.00 junior/senior GPA (on a 4.00 scale).

Promising students with special backgrounds, abilities, and interests who do not meet these requirements may be admitted provisionally at the discretion of the program. Students provisionally admitted to the program are required to acquire the necessary background skills in economics, mathematics and statistics once they join the program.
Students admitted to the Ph.D. program are in general expected, though not required, to have a master's degree in economics, agricultural economics, resource economics or other closely related field. Consistent with this general expectation, students admitted to the Ph.D. program should have course work in:

- Differential and integral calculus, and linear algebra.
- Master's-level economic theory.
- Master's-level statistics/econometrics.

Students admitted to the Ph.D. program are also expected to have a minimum 3.00 Grade Point Average (GPA) in master's-level course work (on a 4.00 scale). Exceptions to the minimum 3.00 GPA may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Promising students who seek to enter the Ph.D. program but who have course work deficiencies may be admitted to the M.S. program and subsequently apply to the Ph.D. program after successfully eliminating the deficiencies. Completion of the M.S. degree is not required of students admitted to the Ph.D. program from the M.S. program. The expected time to completion of the Ph.D. for students without course work deficiencies is 3.5 to 4 years.
Student seeking the Ph.D. dual-title degrees in Demography or Operations Research must meet additional admissions requirements. Refer to the Demography (http://bulletins.psu.edu/graduate/programs/D/GRAD%20DEMOG) and Operations Research (http://bulletins.psu.edu/graduate/programs/O/GRAD%20O%20R) program descriptions for details.

M.S. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits at the 500 and 600 level is required for the EEFE M.S. degree, including 6 credits of research (EEFE 600 or 610). Courses taken to remove deficiencies in preparation may extend the minimum number of credits required. A minor is not required. EEFE M.S. students are required to write a thesis and to pass a final oral examination as part of the requirements for the degree. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School.

Core M.S. Course Requirements**:** 15 credits consisting of microeconomic theory (3 credits), applied welfare economics (3 credits), econometrics (6 credits), and quantitative methods (3 credits). The required courses for the core curriculum are:

- AEREC 510 Econometrics I (3 credits)
- AEREC 511 Econometrics II (3 credits)
- AEREC 512 Applied Microeconomic Theory I (3 credits)
- AEREC 527 Quantitative Methods I or EME 500 Energy and Mineral Project Investment Evaluation (3 credits)
- AEREC/EME 529 Applied Welfare Economics (3 credits)

Additional M.S. Course Work Requirements: 9 credits of field electives taught at the 500 level. These courses will be chosen in consultation with the student's academic adviser and cannot include readings or independent study courses (596s).

Thesis Research: 6 credits of thesis research (EEFE 600 or 610).

M.S. degree students must complete Scholarship and Research Integrity (SARI) Training (10 hours).

Ph.D. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students in the EEFE Ph.D. program will be required to complete 36 credits of course work at the 500- and 600-level, write and successfully defend a second year paper, write and successfully defend a Ph.D. dissertation, and pass a candidacy examination and a comprehensive examination. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Course work requirements include 21 credits of core course work, at least 12 credits of field courses, and 3 credits of elective courses selected from a list of

approved electives maintained by the program office.

Core Ph.D. Course Requirements: 21 credits consisting of microeconomic theory (6 credits), applied welfare economics (3 credits), econometrics (6 credits), quantitative methods (3 credits), and computational economics (3 credits). The required courses for the core curriculum are:

- ECON 502 Microeconomic Analysis* (3 credits)
- AEREC 510 Econometrics I (3 credits)
- AEREC 511 Econometrics II (3 credits)
- ECON 521 Advanced Microeconomic Theory (3 credits)
- AEREC 527 Quantitative Methods I (3 credits)
- AEREC 533 Applied Computational Economics (3 credits)
- AEREC/EME 529 Applied Welfare Economics (3 credits)

*Students selecting the Energy Systems Field may petition to substitute EME 500 Energy and Mineral Project Investment Evaluation (3) for ECON 502

Ph.D. Field Course Requirements: Two fields consisting of a minimum of 6 credits each from designated field courses.

Energy Economics, Policy and Systems

- ENNEC 540 Economic Analysis of Energy Markets (3 credits)
- ENNEC 560 Mineral and Energy Finance I (3 credits)

Environment and Natural Resource Economics

- AEREC 519 Resource and Environmental Economics I (3 credits)
- AEREC 541 Resource and Environmental Economics II (3 credits)

Food Industrial Organization

- AEREC 503 Agricultural Marketing (3 credits)
- AEREC 536 Agricultural Commodity Markets (3 credits)

Ph.D. Electives: A minimum of 3 credits at the 500 level, of which 3 credits must be selected from the following list:

- AEREC 531 Microeconometrics (3 credits)
- ENNEC 541 Economics of Energy and the Environment (3 credits)

Ph.D. degree students must also complete Scholarship and Research Integrity (SARI) Training (10 hours).

Dual-Title Graduate Degree in EEFE and Demography

Admissions Requirements

Students must apply and be admitted to the graduate program in EEFE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Demography dual-title program. Refer to the Admission Requirements section of the Demography Bulletin page. Doctoral students must apply for enrollment into the dual-title degree program in Demography prior to obtaining candidacy in EEFE.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in EEFE, listed above. In addition, students pursuing the dual-title Ph.D. in EEFE and Demography must complete the degree requirements for the dual-title in Demography, listed on the Demography Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from EEFE and must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both EEFE and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an EEFE and Demography dual-title doctoral degree student must include at least one member of Demography Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Demography, the member of the committee representing Demography must be appointed as co-chair. The Demography representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in EEFE and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in EEFE and Operations Research

Admissions Requirements

Students must apply and be admitted to the graduate program in EEFE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page. Doctoral students must apply for enrollment into the dual-title degree program in Operations Research prior to obtaining candidacy in EEFE.

Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in EEFE, listed above. In addition, students pursuing the dual-title Ph.D. in EEFE and Operations Research must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from EEFE and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both EEFE and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an EEFE and Operations Research dual-title doctoral degree student must include at least one member of Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in EEFE and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships that are available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. A graduate student may register for or audit courses below the 500 level in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for the EEFE degrees.

Last Revised by the Department: Summer Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Engineering Leadership and Innovation Management

Dr. Sven Bilén, Ph.D., P.E., Head of the School of Engineering Design, Technology, and Professional Programs
Department office: 213 Hammond Building
814-865-7589

Degree Conferred:

Master of Engineering (M.Eng.)
Minor (Residential and World Campus)

The Graduate Faculty

The Program

The program is designed to develop the attributes required by today's successful engineering executives. Specifically, these include increased technical competency, expanded professional skills, the ability to identify opportunities for improvement, and the ability to work effectively in a globally connected engineering environment. Upon completion of the full one-year program, the successful student will have developed and demonstrated abilities enabling them to: establish and ensure team/project alignment with an organization's mission, vision, strategy, and tactics; identify needs and effectively allocate resources to complete a project; form, lead, and serve effectively on teams (e.g., handling diversity in its many manifestations, negotiating effectively, and resolving personnel conflict or team dysfunction); work with others to identify opportunities for new products and businesses within an existing business structure; develop a product, service, or process from a concept to fielded solution or commercialization; identify personal strengths and workplace trait preferences through self-critical reflection and create a plan that incorporates identified personal strengths to address personal development opportunities; apply these critical skills to develop others in the work group; identify organizational strengths and weaknesses in order to define improvement strategies and plans; and lead cross-cultural and international projects, teaming with engineers and business professionals from around the U.S. and the world. These learning outcomes will be achieved through a combination of lectures by faculty, invited guest lecturers, reading of key literature, individual and team projects (including international virtual-team projects), and practical involvement in an engineering capstone design/market development team. Students enrolled in other M.S., M.Eng., or Ph.D. programs can also build knowledge and competencies in Engineering Leadership and Innovation Management through the minor described below.

Master of Engineering Admission Requirements

Educational Background

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

The student cohort should reflect today's international engineering environment, with selective admittance. The admission requirements include:

- Applicants must hold an undergraduate degree in engineering. Applicants must have a 3.0 minimum undergraduate GPA (or equivalent). Exceptions to the minimum 3.0 grade-point average may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Applicants will be accepted up to the number of places available for new students.
- 1 year of professional experience in an engineering position (or equivalent). Students wishing to enter the program directly from an undergraduate degree can fulfill the 1 year requirement for engineering experience through summer internships, summer employment, or co-op experiences plus additional experience within professional societies. Justification for this experience should be included in the Personal Statement during the application process.
- Submission of a completed online Graduate School Application for Admission, including a Personal Statement, resume, and three letters of recommendation. The Personal Statement should include a 2-3 page essay demonstrating your written communication skills with the following information: a) statement of purpose (career and educational goals), b) narrative describing your leadership and innovation experiences through summer internships, summer employment, co-op experiences, community engagement, professional societies, etc. and c) narrative describing your professional experience in an engineering position (or equivalent) to meet the 1 year requirement.
- Submission of official transcripts from all post-secondary institutions attended.
- Submission of official scores from the Graduate Record Examination General Test (GRE) or Graduate Management Admission Test (GMAT).

Applicants who are still completing their baccalaureate requirements at the time of application may be provisionally admitted to the Graduate School conditional on the awarding of the baccalaureate degree.

Core Application Packet

- Completed official online Graduate School application and payment of nonrefundable application fee.
- Statement of purpose: a 2-3 page essay articulating career and educational goals that demonstrates your written communication skills.
- Vita or Résumé.
- Three letters of recommendation that attest to your readiness for graduate study and document the requisite minimum of one year of work experience. Letters must be submitted through the online application. Within the online application you will be asked to enter the names and email addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via email asking them to complete a brief form that will serve as your recommendation. Please inform all recommenders they must submit the form in order for your application to be complete.
- Official transcripts from all post-secondary institutions attended.

Master of Engineering Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Total required credits for the ELIM program is 30 credits.

Required courses: (18 credits, plus the 3-credit capstone course described below)

- ENGR 408: Leadership Principles*
- ENGR 411: Business Basics for Entrepreneurs*
- ENGR 501: Engineering Leadership for Corporate Innovation
- ENGR 802: Engineering Across Cultures and Nations
- ENGR 405: Project Management for Professionals
- ENGR 804: Engineering Product Innovation

Elective Courses: 9 credits

- 500-level elective (3 credits)
- 500- or 800-level elective (3 credits)
- 400-, 500-, or 800-level elective (3 credits)

These electives (course options list available) will be chosen by the student, in consultation with their company (if they are associated with a sponsoring company) and the ELIM program director. Electives should be chosen to meet the needs and interests of the student and can be selected from across the university. The electives can utilize existing courses within the graduate curricula of the College of Engineering, Smeal College of Business , Psychology, or Organization Development and Change and Workforce Education and Development within the College of Education, allowing the student to expand his/her knowledge in a technical, business or psychology focus area. Students may also pursue a concentration in a specific related domain by completing the 9 elective credits in one of the following core areas: Psychology of Work, Leadership and Decision Making, Organization Development and Change, or Work

Force Education and Development. In addition, there are two Graduate Minor Programs and one Certificate Program at the University that can be completed through the 9 elective credits: Electrochemical Science and Engineering Master's Minor, Computational Science Graduate Minor, and Human Factors Engineering and Ergonomics Graduate Certificate Program.

Culminating Experience: 3 credits

- ENGR 805: ELIM Capstone Project

The Capstone course provides an opportunity to apply and integrate the knowledge and skills that were gained throughout the ELIM program with strategic management concepts. Capstone projects will target real world opportunities, problems, and challenges of an existing organization. Students who successfully complete this course will be able to: identify and assess the impact of opportunities and threats in a company's external environment, including its industry and its set of competitors; identify and assess a company's internal strengths and weaknesses, and match them with its opportunities and threats to suggest alternative strategies; define the business-level strategies of a company; define competitors, competitive rivalry, competitive behavior, and competitive dynamics; and describe corporate-level strategy of the company as it relates to the capstone project.

*Students entering the program who have previously taken ENGR 405, ENGR 408 or ENGR 411 will be required to substitute alternate courses under the direction of the program director.

Engineering Leadership and Innovation Management Minor

Successful engineers and technical experts are expected to be well versed not only in technical skills but also in so-called soft skills such as communication, ethics, entrepreneurial thinking, and professionalism. These areas of leadership and innovation set technical experts apart and prepare them to be future global business leaders. This graduate minor is highly relevant to numerous graduate degrees associated with engineering, business, technical, or science related programs. This graduate minor consists of four 3-credit courses (12 credits) for master's students and five 3-credit courses (15 credits) for doctoral students.

Minor Admission Requirements:

- Applicants must hold an undergraduate degree in engineering, science, or relevant discipline.
- Applicants must have a 3.0 minimum undergraduate GPA (or equivalent). Exceptions to the minimum 3.0 grade-point average may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.
- Applicants must be accepted and/or currently enrolled in a graduate program at Penn State. Official requests to add a minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishment of the doctoral committee and prior to scheduling the comprehensive examination.
- Applicants to the Engineering Leadership and Innovation Management (ELIM) minor must submit a minor program application (see website for details).

Other Program Requirements:
In accordance with Graduate Council policy, a representative from the Graduate Faculty in Engineering Leadership and Innovation Management must be appointed to the doctoral committee of each student enrolled in the doctoral minor in Engineering Leadership and Innovation Management (ELIM).

List of Courses Included in the Master's Minor:

The Engineering Leadership and Innovation Management (ELIM) minor (12-credits) is comprised of four courses:

1. ENGR 501 Engineering Leadership for Corporate Innovation (3 credits-required course)
2. ENGR 802 Engineering Across Cultures and Nations (3 credits- required course)
3. ENGR 804 Engineering Product Innovation (3 credits-required course)
4. ENGR 405 Project Management for Professionals (3 credits-required course)*

*Related courses may be substituted for ENGR 405 from an approved list of courses maintained by the ELD office.
Other elective courses outside this list may be petitioned for substitution to meet the ENGR 405 requirement.

List of Courses Included in the Doctoral Minor:

The Engineering Leadership and Innovation Management (ELIM) doctoral minor (15-credits) is comprised of five courses:

1. ENGR 501 Engineering Leadership for Corporate Innovation (3 credits-required course)
2. ENGR 802 Engineering Across Cultures and Nations (3 credits- required course)
3. ENGR 804 Engineering Product Innovation (3 credits-required course)
4. ENGR 405 Project Management for Professionals (3 credits-required course)*
5. 500-level elective in a related field**

*Related courses may be substituted for ENGR 405 from an approved list of courses maintained by the ELD office.
Other elective courses outside this list may be petitioned for substitution to meet the ENGR 405 requirement.
**For a doctoral minor a 500-level elective in a related field is required. Students must obtain approval for the elective course from their ELIM advisor in advance of registering.

Other Relevant Information

All graduate students must participate in **Scholarship and Research Integrity (SARI)** training by completing the online University module offered through the Office of Research Protections (ORP) during their first year of study and 5 hours of discussion-based training. The 5-hour discipline-specific discussion-based training may be obtained through participation in classroom discussions as part of ENGR 408 (5 hours) and ENGR 501 (5 hours), required courses within the ELIM program. If students are unable to attend the specific lectures that include the SARI training, students will be able to attend seminars hosted by the College of Engineering that include professional development. These requirements must be met before graduation.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring 2017

Blue Sheet Item #: 45-04-000

Review Date: 1/10/2017

Facilities Engineering and Management

M. KEVIN PARFITT
Interim Department Head, Department of Architectural Engineering
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Degree Conferred:

M.Eng.

Program Description

The Facilities Engineering and Management Masters of Engineering is a master's degree program designed to prepare professionals in the field of facilities management. The program is designed to address the critical need for professionals with relevant expertise in facilities management. The curriculum consists of 30 credits, delivered in residence. It provides broad coverage of topics related to facilities management while providing in-depth coverage of elective topics of the students choosing. Students will take a number of core program courses that provide an in-depth understanding of the role of facilities engineer and facilities manager. A capstone project will be required of all students which will serve to combine the material learned and provide a cumulative educational experience within a semester long project.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Educational Background

For admission, an applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution with an architectural engineering degree or other cognate discipline or (2) bachelor's degree in an unrelated field with significant experience in facilities management or (3) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Applications must include a statement of purpose, a curriculum vita or resume, and three letters of recommendation. Official records of scores on the Graduate Record Exam (GRE) are also required. In special circumstances, a student may be admitted at the discretion of the program for graduate study without these scores. The department has no established minimum GRE score for applicants.

Language of Instruction

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Core Application Packet

- Statement of Purpose – A statement of professional experience and goals (up to 500 words)
- Vita or resume
- Three letters of recommendations
- Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) score, if applicable
- Application fee

Admissions Process

Applications will be evaluated by the Facilities Engineering and Management admission committee based on the applicants' technical qualifications for the program relative to their previous educational and professional experience and English language proficiency. In general, successful applicants are expected to have earned a GPA of at least 3.0 on a 4.0 scale. The candidate must apply to the program via the Graduate School application for admission.

Master's Degree Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin. The Facilities Engineering and Management degree is conferred upon students who earn a minimum of 30 graduate credits, of which 20 must be earned at the campus/center where the degree program is offered, while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18 credits in graduate courses (500 series), and who complete a quality culminating capstone project in consultation with a graduate advisor. The program curriculum includes 15 credits of core courses, 12 credits of electives, and a 3-credit capstone project.

Required courses

Prescribed courses for the degree include 18 credits of core courses:

- AE 881 Effective Facility Management and Planning (3 cr.)
- AE 880 Facilities Energy Management (3 cr.)
- AE 581 Facilities Management Information Systems (3 cr.)
- AE 531/598D Legal Aspects in Engineering and Construction (3 cr.)
- AE 572 Project Development and Delivery Planning (3 cr.)
- AE 596 Capstone Course (3 cr.)

Elective Courses
A list of elective courses can be found on the department's website - http://www.engr.psu.edu/ae/courses/graduate.asp.

Substitutions

Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis, and must be petitioned and approved by the Academic Program Chair, with input from the student's advisor.

Student Aid

Student financial aid opportunities are available through the Office of Student Aid - http://studentaid.psu.edu/. Students on graduate assistantships must adhere to the course load policy listed in the Bulletin - http://www.gradschool.psu.edu/graduate-funding/infoga/.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit

these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Blue Sheet Item #: 44-06

Review Date: 4/5/2016

Contact info updated: 7/26/16

Agricultural and Biological Engineering (ABENG)

Program Home Page

PAUL H. HEINEMANN, *Head of the Department of Agricultural and Biological Engineering*
105 Agricultural Engineering Building
814-865-7792

Degrees Conferred:

Ph.D., M.S.
Dual-Title M.S. Agricultural and Biological Engineering and International Agriculture and Development
Dual-Title Ph.D. Agricultural and Biological Engineering and International Agriculture and Development
Dual-Title M.S. Agricultural and Biological Engineering and Operations Research
Dual-Title Ph.D. Agricultural and Biological Engineering and Operations Research

The Graduate Faculty

The Programs

Agricultural and Biological Engineering offers students the opportunity to gain expertise in areas of engineering for biological/agricultural systems corresponding to their professional interests. Graduate students select research projects (and supporting course work) from a wide range of interest areas that match faculty research expertise. Research projects are available in physical properties of biological materials, plant and animal production systems, food engineering, wood engineering, agricultural structures, agricultural safety, food safety, bulk solids handling and storage, agricultural systems engineering, agricultural by-product utilization, forage processing and handling systems, electronics instrumentation, online computer control systems, erosion and sedimentation control, waste management, water quality, and natural resources management and conservation.

Excellent facilities, including equipment and instrumentation, are available for research in the designated areas. Among the special facilities are field plot areas; a full-scale sedimentation basin test facility; hydraulic flumes; sedigraph; gas and ion chromatography units; atomic absorption unit; rainfall simulators; food properties lab; food equipment and processing lab; microbiological engineering lab; fermentation lab; computer vision systems; hydraulic and pneumatic test stands; fabrication shop; electronics instrumentation; microcomputer laboratory; controlled environment chambers; composite characterization labs; wood structures lab; and wood mechanics lab. Collaborative arrangements allow access to a large variety of other resources: Penn State Institutes of the Environment and Energy; Huck Institutes of the Life Sciences; Materials Research Institute; Materials Characterization Laboratory; Nanofabrication Facility; Penn State Institute for CyberScience; PA Housing Research Center; Center for Food Manufacturing; USDA Pasture Systems and Watershed Management Research Lab; a mushroom research and demonstration facility and a 1,500-acre agricultural research center for cooperative work with agronomic and horticultural production systems as well as animal production systems.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

An undergraduate major in engineering is normally a prerequisite to work in the major. Students without an undergraduate engineering degree will be considered for admission on a provisional basis pending the completion of a number of additional credits to be specified on an individual basis. These additional credits will not count towards the program degree requirements.

All students must submit scores from the General Aptitude Test of the Graduate Record Examinations (GRE) prior to admission (except those who have an ABET-accredited engineering degree). There is no minimum GRE score required for admission, as this is only one of several qualifications considered in the admission review process. However, financial assistance is often influenced by the degree of success exhibited by GRE scores and grade-point averages (GPAs) from previous engineering programs.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

All applicants must provide the department with official transcripts from all post-secondary institutions attended, as well as a statement of purpose written by the applicant, and at least three letters of recommendation. Admission into the Agricultural and Biological Engineering Graduate Program is based upon a thorough review of all applicant qualifications, and the best-qualified applicants will be accepted up to the number of students for which department resources are available.

Entrance to Master of Science Program

Completion of an undergraduate degree in agricultural or biological engineering or in another related engineering discipline is required for direct admission to the Agricultural and Biological Engineering Graduate Program. Students need at least a 3.0 (4.0 base) junior/senior grade-point average to be considered for admission.

A student with an undergraduate degree in a non-engineering field can be admitted to the M.S. program on a provisional basis, pending the completion of a number of additional credits to be specified on an individual basis. These additional credits will not count towards the M.S. degree requirements. The provision status continues until completion of the engineering undergraduate requirements in mathematics, physics, engineering sciences (thermodynamics, statics, dynamics, strength of materials, fluid-mechanics and electrical circuitry), and 6 credits of 400-level Biological Engineering courses. Upon completion of these preparatory courses with a minimum grade-point average of 3.0, the student will be admitted to the graduate program.

Entrance to Doctor of Philosophy Program

The program requirement for acceptance to graduate study toward a Ph.D. degree in Agricultural and Biological Engineering is an M.S. degree with research thesis in an engineering or science discipline with a B.S. degree from an engineering program. Outstanding students interested in direct admission from a B.S. engineering program to the Ph.D. Program should contact the Graduate Program Coordinator. Direct admission will be based on critical evaluation of the student's potential to conduct publishable research, academic record, results of standardized tests, statement of purpose, and reference letters. Students who apply directly to the Ph.D. program but are not qualified will be considered for admission into the M.S. program.

A student with an undergraduate degree in a non-engineering field can be admitted to the Ph.D. program on a provisional basis, pending the completion of a number of additional credits to be specified on an individual basis. These additional credits will not count towards the Ph.D. degree requirements.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

All candidates for the M.S. degree must complete a minimum of 30 credits at the 400, 500, 600, or 800 level, with at least 6 credits in thesis research (600 or 610). All candidates for the M.S. must write a thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the students must pass a thesis defense.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Official entrance into a Ph.D. program occurs upon successful completion of the Ph.D. Candidacy Exam. Ph.D. degree requirements include successful completion of the following: approved graduate course work, Ph.D. English competency requirements, a comprehensive examination, and final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

No specified number of courses completed or credits earned are required by the department. However, the candidate must complete at least 9 credits of Agricultural and Biological Engineering (ABE) course work beyond the baccalaureate degree. Six credits must be 500-level ABE courses (excluding ABE 500, 590, 594, 595, 596); the remaining 3 credits must be in any BE 460 course or higher. Unless previously taken, all Ph.D. students must complete ABE 500. The student's doctoral committee will recommend the minimum requirements in such supporting areas as mathematics, engineering, agricultural/biological sciences, and physical sciences. The candidate is expected to develop a program of study and submit it to the appointed doctoral committee for consideration and approval. All Ph.D. students are required to participate in resident education or extension teaching activities for the equivalent of at least one semester during their graduate program. A typical plan of study consists of about 90 credits beyond the baccalaureate degree with about 30 of the total credits for research. All requirements for a Ph.D. degree, whether satisfied on this campus or elsewhere, must be completed within eight years after passing the candidacy examination.

PH.D. LANGUAGE AND COMMUNICATION REQUIREMENT--The purpose of the communication requirement is to strengthen the student's professional communication skills. The candidate must take a minimum of two courses (a minimum total of 5 credits) and receive a grade of B or better in each course taken. Course selections must be approved by the academic adviser prior to registration. Courses used to satisfy this requirement must include the substantial practice of writing and/or speaking.

Dual-Title Graduate Degree in Agricultural and Biological Engineering (ABENG) and International Agriculture and Development (INTAD)

Graduate students with research and educational interests in international education may apply to the dual-title program in Agricultural and Biological Engineering and International Agriculture and Development. The goal of the dual-title program in ABENG and INTAD is to enable graduate students from ABE to acquire the knowledge and skills of their primary area of specialization in ABE, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, engineering, outreach, and project management anywhere in the world. Students acquire a broad perspective on how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can effectively engage in agricultural development activities within various countries and regions.

Admission Requirements

Students must apply and be admitted to the graduate program in ABENG and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of theINTAD Bulletin page. Doctoral students must be admitted into the dual-title degree program in INTAD prior to obtaining candidacy in their primary graduate program.

Degree Requirements for the Dual-Title M.S. in ABENG and INTAD

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree, listed above. In addition, students must complete the degree requirements for the dual-title M.S. in INTAD, listed on the INTAD Bulletin page. Up to 6 credits of INTAD approved courses can be applied to fulfilling ABENG program requirements. Final course selection must be approved by the student's advisory committee.

Degree Requirements for the Dual-Title Ph.D. in ABENG and INTAD

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed above. In addition, students must complete the degree requirements for the dual-title Ph.D. in INTAD, listed on the INTAD Bulletin page. Some courses may satisfy both ABENG program requirements and those of the INTAD program. Up to 6 credits of INTAD approved courses can be applied to fulfilling ABENG program requirements. Final course selection must be approved by the student's doctoral committee.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from ABENG and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. There will be a single candidacy examination, containing elements of both ABENG and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an ABENG and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in ABENG and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in Agricultural and Biological Engineering (ABENG) and Operations Research (OR)

Graduate students with interests in operations research may apply to the dual-title program in Agricultural and Biological Engineering and Operations Research. The goal of the dual-title program in ABENG and Operations Research is to enable graduate students from ABENG to acquire the knowledge and skills of their primary area of specialization in ABENG, while at the same time gaining the perspective and methods needed for work systems analysis and modeling. Graduate study in this program seeks to prepare students to utilize the tools, techniques, and methodology of operations research, while maintaining a close association with areas of application. Operations research is the analysis--usually involving mathematical treatment--of a process, problem, or operation to determine its purpose and effectiveness and to gain maximum efficiency.

Admission Requirements

Students must apply and be admitted to the graduate program in ABENG and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the OR dual-title program. Refer to the Admission Requirements section of theOR Bulletin page. Doctoral students must be admitted into the dual-title degree program in OR prior to obtaining candidacy in their primary graduate program.

Degree Requirements for the Dual-Title M.S. in ABENG and OR

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree, listed above. In addition, students must complete the degree requirements for the dual-title M.S. in OR, listed on the OR Bulletin page. Up to 6 credits of OR approved courses can be applied to fulfilling ABENG program requirements. Final course selection must be approved by the student's advisory committee.

Degree Requirements for the Dual-Title Ph.D. in ABENG and OR

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed above. In addition, students must complete the degree requirements for the dual-title Ph.D. in OR, listed on the OR Bulletin page. Some courses may satisfy both ABENG program requirements and those of the OR program. Up to 6 credits of OR approved courses can be applied to fulfilling ABENG program requirements. Final course selection must be

approved by the student's doctoral committee.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from ABENG and must include at least one Graduate Faculty member from the OR program. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. There will be a single candidacy examination, containing elements of both ABENG and OR. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an ABENG and OR dual-title Ph.D. student must include at least one member of the OR Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in OR, the member of the committee representing OR must be appointed as co-chair. The OR representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in ABENG and OR. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Faculty linked: 5/12/14

Laster Revised: Summer 2018

Review Date: 6/26/2018

Architectural Engineering (A E)

M. KEVIN PARFITT, *Head, Department of Architectural Engineering*
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Degree Conferred:

- Ph.D., M.S., M.A.E., M.Eng.
- Integrated Bachelor of Architectural Engineering (B.A.E.) and Master of Science in Architectural Engineering (M.S.)
- Integrated Bachelor of Architectural Engineering (B.A.E.) and Master of Architectural Engineering (M.A.E.)

The Graduate Faculty

Students may specialize in building construction, building illumination systems, building mechanical and energy systems, or building structural systems.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Scores from the Graduate Record Examinations (GRE) are required for admission to the Ph.D., M.S., and M. Eng. programs. For the M. Eng. degree, the GRE requirement will be waived for students who have graduated with a degree from the College of Engineering at The Pennsylvania State University with a cumulative grade-point average greater than 3.00.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission to the AE graduate programs. Students accepted into the Architectural Engineering program generally have an undergraduate degree in mechanical engineering, electrical engineering, civil engineering, architectural engineering, science, or architecture.

All degree candidates are required to provide a letter of intent outlining the student's intended area of study as well as three letters of recommendation. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

A limited number of undergraduate students in the B.A.E. program will be considered for admission to one of two integrated undergraduate-graduate degree programs. The first leads to the student earning both the B.A.E. and M.A.E. degrees and involves a graduate-level component in the capstone senior project. The second provides the student with the opportunity to earn both the B.A.E. and M.S. degrees and involves a research-oriented thesis in addition to the capstone undergraduate senior project. Students shall be admitted to an IUG program in the 6th semester of the program (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must apply to and meet the admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master's degree. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree Application materials for both programs are available on the AE Department website. To be considered for admission to either program, students must have attained a GPA of at least 3.0 and a grade of C or better in all classes listed as AE. A commitment from an AE graduate faculty member to serve as the student's M.S. thesis adviser is necessary for admission to the B.A.E./M.S. program. In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

A thesis is required for the M.S. degree, which consists of a minimum of 30 credits: 24 credits of course work and a 6-credits of thesis research, either 600 or 610. A minimum of 12 of the course credits must be completed at the 500 level. A student's program of courses in the M.S. program is developed in cooperation with the student's academic adviser.

For the Ph.D. degree, a dissertation that displays a student's ability to conduct high-quality original scholarly work is required of all Ph.D. students. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School. Each student accepted into the Ph.D. degree program must pass the Ph.D. Candidacy Examination, which requires students to display an understanding of basic material in all AE option areas, along with an in-depth understanding of material covered in the AE undergraduate courses within their area of focus. This examination must be taken no later than the beginning of the student's second year in the program. Each Ph.D. student must also pass an English Proficiency Examination that is administered by the department, typically during the first semester. The English Proficiency Examination must be passed before scheduling the Comprehensive Examination. The student's program of courses is developed in cooperation with the student's doctoral committee. It is recommended that this consist of approximately 30 credits of courses beyond the master's degree, although there is no established minimum or maximum. At the conclusion of the student's course work, the Ph.D. student must pass a two-day written comprehensive examination that is developed by the student's Ph.D. committee. Following the comprehensive exam, continuous registration is required for all Ph.D. graduate students until the dissertation is approved. Each student presents a comprehensive thesis proposal to his/her committee prior to starting his/her dissertation research and must present the results of this research in a final oral examination.

The M.Eng. in Architectural Engineering degree is a non-thesis professional master's degree. Candidates for the M.Eng. degree are required to complete 30 credits of course work. A minimum of 18 credits must be at the 500 level. Students must follow the approved program of courses for one of the four available specialty areas. Minor modifications to these programs are permitted, with approval of the Graduate Program Officer. Each student must also complete a capstone project supervised by a member of the graduate faculty, completed while enrolled in AE 596. The capstone project requires students to work individually or within a group on an aspect of architectural engineering of their choosing. The project should demonstrate the ability of the student to integrate and apply concepts and techniques learned in the program courses.

Students admitted to an integrated program (B.A.E./M.A.E. or B.A.E./ M.S.) must maintain a GPA in all classes used toward the M.A.E. or M.S. degree of at least 3.0. For both the integrated B.A.E./M.A.E. and B.A.E./M.S. degree programs, 30 credits of the 172 total credits required to receive both degrees are applied toward the master's degree (up to 12 credits count toward both degrees). For the B.A.E./M.S. a minimum of 18 credits is required at the 500 and 600 level combined. For the B.A.E./M.A.E., a minimum of 18 credits is required at the 500 or 800 levels, with at least 6 credits at the 500 level. For the B.A.E./M.A.E. degree program, all of graduate credits are course credits. For the B.A.E./M.S. degree program, a thesis is required and six credits of thesis research (600 or 610) must be included in the candidate's academic course plan. Approved integrated program course sequences are available for each of the four undergraduate option areas. These sequences specifically identify the 12 credits of courses that count toward both degrees. The courses that can double-count for the B.A.E./M.A.E. are as follows:

A E 457 HVAC Control Systems (3)
A E 461 Architectural Illumination Systems and Design (3)
A E 467 Advanced Building Electrical System Design (3)
A E 475 Building Construction Engineering I (3)
A E 476 Building Construction Engineering II (3)
A E 570 Production Management in Construction (3)
A E 557 Central Cooling Production and Distribution Systems (3)
A E 565 Daylighting (3)

The courses that can be double-counted for the B.A.E./M.S. are as follows:

A E 430 Indeterminate Structures (3)
A E 457 HVAC Control Systems (3)
A E 461 Architectural Illumination Systems and Design (3)
A E 467 Advanced Building Electrical System Design (3)
A E 475 Building Construction Engineering I (3)
A E 476 Building Construction Engineering II (3)
A E 530 Computer Modeling of Building Structures (3)
A E 557 Centralized Cooling Production and Distribution Systems (3)
A E 558 Centralized Heating Production and Distribution Systems (3)
A E 562 Luminous Flux Transfer (3)
A E 565 Daylighting (3)
A E 570 Production Management in Construction (3)

At least 6 of the double-counted credits must be at the 500- or 800-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Each student must submit a course plan detailing the graduate component for approval when applying to this program and must request approval from the Graduate Program Officer for any proposed modifications to this plan following admission to the program. If students accepted into the IUG program are unable to complete the M.A.E. or the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

All students in the M.Eng., M.S., and Ph.D. programs must also attend a minimum of 10 approved lectures during their degree program.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* A limited number of research and teaching assistantships, scholarships, and fellowships are available to M.S. and Ph.D. students in the Department of Architectural Engineering. The intent of these assistantships and awards is to support students conducting research under faculty supervision. For this reason, students in the M.S. and Ph.D. programs who receive these types of financial support are expected to complete their degree program, including the thesis or dissertation, and may not transfer to the Master of Engineering degree program. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ARCHITECTURAL ENGINEERING (A E) course list

Last Revised by the Department: Summer Semester 2016

Blue Sheet Item #: 44-07

Review Date: 06/28/2016

Art Education (A ED)

Program Home Page

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Degrees Conferred:

Ph.D., M.S., M.P.S., Ph.D. and M.S. Dual Degrees in Art Education and Women's Studies
Ph.D. Dual-Title Degree in Art Education and African American and Diaspora Studies

The Graduate Faculty

This program helps students prepare for careers in college teaching, administration, research, public school art teaching, and art supervision.

Admission Requirements

For admission to the Graduate School, an applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, enrollment, and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5.

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

Students who seek admission to the graduate program must make formal application to The Graduate School and admissions committee of the Art Education program. To be admitted without deficiencies, the student is expected to have completed either a baccalaureate degree in art education or a program considered by the admissions committee to provide an appropriate background for the application's degree objectives. Related programs include work in studio art, art history, art education, education, museum education, etc. Deficiencies may be made up by course work that is not counted as credit toward an advanced degree. Students pursuing graduate degrees may simultaneously take course work leading to teaching certification and art supervisory certification. The students who plan to teach art education at the college level should note that some institutions require professors to hold a public school art teaching certificate and to have had public school teaching experience.

Students with a minimum 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The most qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 average may be made for students with special backgrounds, abilities, and interests. Transcripts should indicate high attainment in appropriate academic and creative work. Letters of recommendation should attest to scholarship and ability to work independently. In addition to the above requirements, there are specific requirements for degree programs:

Ph.D. & M.S. Application Materials:

1. Completed official Penn State Graduate School Application for Admission.
2. Scores from the Graduate Record Examinations (GRE) or from the Miller Analogies Test (MAT) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.
3. Submit a one- to two-page Statement of Professional Intent which includes: (a) professional objectives, (b) how these objectives would be furthered by graduate study, (c) the areas in which research and creative work are planned, (d) what the applicant hopes to do with the graduate degree he or she is seeking to attain, and (e) evidence that the applicant is prepared to undertake graduate level work.
4. Submit an example of scholarly writing.
5. Submit three (3) letters of recommendation. Letters of recommendation should attest to the applicant’s scholarship and ability to work independently.
6. Submit two (2) official transcripts from all institutions of higher education attended.
7. Submit a Portfolio (optional). Applicants may submit images of their creative works that represent arts-based research or images that illustrate their conception of art.
8. Indicate in your Statement of Professional Intent if you would like to be considered for an Assistantship/Fellowship.

M.P.S. Application Materials:

1. Completed official Penn State Graduate School Application for Admission.
2. Statement of purpose in pursuing the M.P.S. in Art Education.
3. Three letters of recommendation.
4. Teaching portfolio to include teaching philosophy and a sample of curricular materials developed by the applicant.
5. A critical reflective written response to an article provided in the GRADS application site. The response should outline the key arguments made by the author(s), a critical evaluation of the logic and assumptions in the article, and a connection to the applicant's own instructional or professional experience.
6. Curriculum vitae with evidence of professional leadership and service.
7. Two official transcripts from all institutions attended, including official military transcripts (if applicable). (All college or university transcripts are required regardless of the length of time that has passed, the grades earned, or the accreditation of the institutions attended.)
8. International applicants whose first language is not English or who have received a baccalaureate or master's degree from an institution in which the language of instruction is not English, please refer to the international students page for more information about language proficiency.

Master's Degree Requirements

A minimum of 30 graduate credits is required for the M.S. and M.P.S. degrees. Students must take a minimum of 15 credits in art education. Of those, M.S. candidates are expected to complete the following 3-credit core: A ED 502, 505; 536 or 588; and A ED 590 (1 credit for each two semesters enrolled in course work). Students must take additional credits to total a minimum of 15 credits. All master's degree candidates must also complete 6 credits of foundational studies at the 400 level or above in areas such as art history, studio, philosophy, educational theory and policy, educational psychology, psychology, and anthropology. The remaining 9 credits are made up of elective studies.

Additional M.S. requirements. For M.S. candidates, 18 credits of course work must be at the 500 level or above. M.S. candidates must prepare and orally defend a thesis. Requirements include 6 credits of thesis research within the 30 credits.

Additional M.P.S. requirements. Students who seek admission to the M.P.S. in Art Education program should have current or recent teaching positions in a school, museum, cultural institution, or other community site at the time of application, with the expectation that the student continue to teach art in schools, museum, or other sites throughout the M.P.S. program. Applicants admitted to the degree program who have accumulated credits as non-degree graduate students may have up to 15 credits of coursework accumulated in non-degree status applied to their degree, with approval of the program.

For the M.P.S. in Art Education program, a minimum of 30 graduate credits is required. Students must complete 18 credits in 500-level courses and above, with a minimum of 6 credits at the 500-level. A minimum of 18 credits in art education includes the following Internet-based 3-credit courses: A ED 811, 812, 813, 814, 815, and A ED 594. Selecting from World Campus offering in other programs, students must take an additional 6 credits of Foundational courses at the 400 level or above in art history, studio, philosophy, educational theory and policy, educational psychology, psychology, and/or anthropology, and 6 credits of Elective courses.

M.P.S. in Art Education program participants can start in any semester, taking one online art education course and one or more foundation or elective courses in other programs per semester. A ED 594 is the culminating experience for the program with an action research project in one's teaching context.

Doctoral Degree Requirements

Admission to Candidacy. Once admitted to the doctoral program, all students must take a candidacy examination, which is given during the first year that the student is in residence. During the candidacy examination there is a review of (1) the student's professional resume; (2) a statement regarding the general direction of the student's research interests and possible areas of thesis inquiry; (3) completed graduate courses; (4) proposed course of study for subsequent semesters; (5) selected graduate papers written by the student; (6) slides or original work if studio inquiry is part of the student's program of study.

English competence. At or before the candidacy exam, all candidates for doctoral degrees are required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the requirement for the doctoral program. Competency must be formally attested to by the student's committee before the comprehensive examination is held.

Course requirements. All doctoral students are expected to complete the following 3-credit core courses: A ED 502, 505, 536, 588; and A ED 590 (1 credit for each two semesters enrolled in course work).

Additional Ph.D. requirements. All Ph.D. students must complete at least 2 continuous semesters of residency after being admitted to candidacy. Although not required by the program, Ph.D. students are strongly encouraged to complete a minor area of study. A foreign language is not required of Ph.D. candidates. Instead, the inquiry and foreign language requirement for the Ph.D. is met through 12 credits of graduate-level course work in a related discipline as determined by the student's committee. All Ph.D. students are required to complete 18 credits of course work in art education. These 18 credits comprise the core courses plus two other courses in art education at the 400-level or above.

Comprehensive examination. Ph.D. candidates are required to take a written and oral comprehensive examination once their course work is substantially completed. The examination, prepared by the student's doctoral committee, covers all phases of the student's doctoral work both inside and outside the field of art education.

Doctoral dissertation. Ph.D. candidates are required to complete a dissertation on a topic of research approved by the student's doctoral committee. The dissertation must be defended before the academic community at a final oral examination.

Dual-Title Graduate Degree in Art Education and African American and Diaspora Studies

Admission Requirements

In addition to the admission requirements set forth by the Graduate School and the Art Education Program, students will be admitted to the dual-title degree program in Art Education and African American and Diaspora Studies with approval from admissions committees in the Art Education Program and African American and Diaspora Studies programs, respectfully. For example, students can apply to the dual-title program by applying to the Art Education Program, and following admission requirements that include a statement of purpose that addresses their interest in the dual-title graduate degree program in Art Education and African American and Diaspora Studies. Students who are already enrolled in either the Art Education Program or the African American Studies Department can apply directly for admission to the dual-title degree before their admission to candidacy.

General Graduate School requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

PhD Degree
In addition to the required Art Education coursework listed above, students in the dual-title PhD degree must complete the following:

15 credits of coursework related to African American and Diaspora Studies, all at the 500 level or above. Of these 15 credits, 9 must come from the required core course sequence in African American and Diaspora Studies, which comprises the following courses:

AF AM 501 (3 crs) Seminar in African American and Diaspora Studies. This is a foundational graduate survey of the academic field of African American and Diaspora Studies.

AF AM 502 (3 crs) Blacks in the African Diaspora. This is a graduate readings seminar in the theory and history of Blacks in the African Diaspora.

AF AM 503 (3 crs) Sexual and Gender Politics. This is a graduate readings seminar in the theory and history of sexual and gender politics in the Black Diaspora from the Colonial Era forward.

Students must also take 6 elective credits, all of which must come either from the list below or otherwise have the prior approval of the African American and Diaspora Studies supervising faculty. Over time, additional courses may be added to the list of acceptable electives. The director of graduate studies in the Department of African American and Diaspora Studies will maintain a comprehensive list of approved courses. Particular courses may simultaneously satisfy requirements in Art Education and African American and Diaspora Studies. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

A ED 522: Participatory Inquiry in the Public Sphere (3)
A ED 545: Visual Culture: Race, Class, and Gender (3)
A ED 812: Diversity, Visual Culture, and Pedagogy (3)
ART 511: Issues in Contemporary Art (3)
ART H 416: Topics in American Art (3) [Recent topic: African American Art Since 1900]
ART H 447: Topics in the Art of the African Diaspora (3)

Foreign Language Requirements

A foreign language is not required of PhD candidates in Art Education. Instead, the inquiry and foreign language requirement for the PhD is met through 12 credits of graduate-level course work in a related discipline as determined by the student's committee. All PhD students are required to complete a minimum of 18 credits of course work in art education. These 18 credits comprise the core courses plus two other courses in art education at the 400-level or above.

Candidacy

The dual-title field must be fully integrated into the candidacy exam for the doctoral program. In addition, candidates for the dual-title PhD in Art Education and African American and Diaspora Studies will be required to conduct a candidacy exam before the end of their second semester in the program and present to their committee a candidacy packet that includes a current CV, a statement that addresses research interests that intersect both areas, a proposed list of courses, and 2-4 writing samples. As described in the Art Education PhD requirements in the Graduate Bulletin, at or before the candidacy exam, all candidates for doctoral degrees are required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the requirement for the doctoral program. Competency must be formally attested to by the student's committee before the comprehensive examination is held.

Committee Composition

For the dual-title PhD degree, at least one member of the committee must be a member of the African American and Diaspora Studies graduate faculty.

Comprehensive Exams

The African American and Diaspora Studies graduate faculty member on the student's committee is responsible for developing and administering the African American and Diaspora Studies portion of the student's comprehensive exams. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student's research interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam may address one or more of the following components: broad history of the field, contemporary theory and debates, and either sexual and gender politics or a topic related to the student's specific area of interest.

Dissertation

The candidate must complete a dissertation and pass a final oral defense of that dissertation on a topic that reflects their original research and education in both Art Education and African American and Diaspora Studies in order to earn the dual-title PhD degree. The dissertation committee for a dual-title doctoral degree student must include a minimum of four faculty members, i.e., a chair and at least three additional members, all of whom must be members of the Graduate Faculty, and one of which must be on the Graduate Faculty in the Department of African American and Diaspora Studies. If the chair is not faculty in African American and Diaspora Studies, then the committee member representing African American and Diaspora Studies must be appointed as co-chair.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ART EDUCATION (A ED) course list

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06

Review Date: 04/14/2015

Graduate coordinator updated: 10/26/15

Applied Behavior Analysis (ABA)

Program Home Page

KIMBERLY A. SCHRECK, *Coordinator*
Penn State Harrisburg
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Middletown, PA 17057
717-948-6048
kas24@psu.edu
www.hbg.psu.edu

Degree Conferred:

M.A.

The Graduate Faculty

The Program

The program, offered at Penn State Harrisburg, helps master's level graduates prepare to function in community settings as applied behavior analysts, and to provide the academic training necessary for graduates to apply for national board certification in behavior analysis. The overall model emphasizes the core areas of the discipline including the scientific basis of behavior analysis, as well as how biological, social, and individual differences affect human behavior. Training will emphasize the development of both assessment and intervention skills.

The program helps prepare graduates to work in hospitals, medical schools, mental health centers, health maintenance organizations, a wide variety of educational settings, forensic settings, research facilities, and in center- and home-based programs for individuals with autism and developmental disabilities.

The program is intended for both part- and full-time students. Courses will be scheduled for fall and spring semesters. Admission is in the fall and spring semesters only.

Admission Requirements

Students will be admitted on a competitive basis and must submit the following:

- a completed Graduate School online application and payment of the application fee
- two official transcripts of all colleges and universities attended
- three letters of recommendation
- a brief (two-page) interest statement

The applicant must have either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants must have at least 18 credits in education, psychology, or related disciplines with a cumulative grade-point average of 3.0 or above in the last 60 credits. Scores from the Graduate Record Examinations are required in the verbal, quantitative, and analytic portions.

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

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

A personal interview may be required.

Transfer Credits

Subject to the limitations given below, a maximum of 10 credits of high-quality graduate work done at a regionally accredited institution or recognized degree-granting institution may be applied toward the requirements for the master's degree. However, credits earned to complete a previous master's degree, whether at Penn State or elsewhere, may not be applied to a second master's degree at Penn State. Transferred academic work must have been completed within five years prior to the date of the first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official graduate transcript of a regionally accredited university. Pass-fail grades are not transferable to an advanced degree program unless the "Pass" can be substantiated by the former institution as having at least B quality.

The ABA program cannot guarantee approval by the Behavior Analysis Certification Board of courses taken at other institutions, even those institutions that also have BACB University Approved Coursework.

Degree Requirements

Requirements for the M.A. in Applied Behavior Analysis include 30 credits in required course work, including the master's project paper, supervised internship experience, and 6 elective credits for a total of 36 credits.

ABA Core Courses (to be offered annually) are required for all students in the program.

APPLIED BEHAVIOR ANALYSIS (ABA)
500. Experimental Analysis of Behavior (3)
511. Behavior Modification (3)
522. Single Subject Research (3)
533. Applied Analysis of Behavior (3)
577. Behavioral Assessment and Treatment
588. Ethics and Legal issues in ABA (3)
594A. Research Project (3)
595. Internship (9)

Elective Courses (6 credits)

APPLIED BEHAVIOR ANALYSIS (ABA)
555. Behavioral Interventions in Autism (3)

566. Behavioral Pediatrics (3)
594A. Research Project (3-15)
597. Special Topics (1-3)

PSYCHOLOGY-CI (PSYC)
592. Current Topics (3)

PSYCHOLOGY (PSYCH)
443. Treatment and Education in Developmental Disabilities (3)

The culminating project in ABA 594A Research Project requires the completion of a master's project (e.g., research manuscript, training manual, literature review manuscript, or publication). The type and scope of the project is agreed upon by the student's research chair.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-04-129

Review Date: 01/15/2013

UCA Revision #1: 11/8/06

Faculty linked: 8/14/14

Astrobiology (ABIOL)

JAMES F. KASTING, Program Coordinator
2217 Earth and Engineering Sciences Building
814-865-7394; Astrobiology Research Center

Degree Conferred

Students electing this degree program through participating programs earn a degree with a dual title in the Ph.D., i.e., Ph.D. in (graduate program name) and Astrobiology.

The following graduate programs offer dual degrees in Astrobiology: Astronomy and Astrophysics; Biology; Biochemistry, Microbiology, and Molecular Biology; Geosciences; and Meteorology.

The Graduate Faculty

The Program

The Astrobiology dual-title degree program is administered by the Department of Geosciences for the participating graduate programs. A program committee with representatives from each participating department maintains program definition, defines the nature of the candidacy examination and assigns the examining committee, identifies courses appropriate to the program, and recommends policy and procedures for the program's operation to the dean of the Graduate School and to the deans of the participating colleges. The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences and the Eberly College of Science and, where appropriate, other graduate programs in the University. The program enables students from several graduate programs to gain the perspectives, techniques, and methodologies of Astrobiology, while maintaining a close association with major program areas of application.

Astrobiology is a field devoted to the exploration of life outside of Earth and to the investigation of the origin and early evolution of life on Earth. For admission to pursue a dual-title degree under this program, a student must apply to (1) the Graduate School; (2) one of the participating major graduate programs; and (3) the Astrobiology program committee. Usually students will apply and be accepted into the major program first. Application to the dual-title degree program can occur upon matriculation, but should be completed before the candidacy examination in the major program is scheduled.

Admission Requirements

Graduate students with research and educational interests in astrobiology may apply to the Astrobiology Dual-Title Degree Program. Candidates must submit transcripts of their undergraduate and graduate course work, a written personal statement indicating the career goals they hope to serve by attaining an Astrobiology dual title, and a statement of support from their dissertation adviser. A strong undergraduate preparation in the basic sciences is expected, with evidence of an interest in multiple disciplines.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the major graduate program in which they are enrolled, in addition to the minimum requirements of the Astrobiology program. The minimum course requirements for the dual-title in Astrobiology are ABIOL 574 Planetary Habitability (3 credits), ABIOL 590 Astrobiology Seminar (2 credits), ABIOL 570 Astrobiology Field Experience (2 credits), and at least 2 credits of 400- or 500-level course work outside of the student's major program in an area relevant to Astrobiology (through consultation with their adviser). All students must pass a candidacy examination that assesses their potential in the field of astrobiology. This examination may be part of the candidacy examination in the student's major graduate program if an Astrobiology faculty member serves on the examination committee and if acceptable to the major program. If not, the Astrobiology dual-title program will offer a second candidacy examination. The structure and timing of the second candidacy examination will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the Astrobiology program, but this person may be the adviser and have an appointment in the major program of study. The field of Astrobiology should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of Astrobiology is required. A public oral presentation of the dissertation is required.

Financial Aid

Financial aid is generally available through the major program and through highly competitive University Graduate Fellowships (UGF). In addition, Penn State's Astrobiology Research Center (PSARC) provides support for students through research assistantships and graduate fellowships. Typically, students in Astrobiology are supported 12 months per year on some form of assistantship, fellowship, or summer wages provided by PSARC, UGF, or their home department.

Other Relevant Information

Students intrigued by the possibility of pursuing research in Astrobiology should visit the PSARC website and the NASA Astrobiology Institute website.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ASTROBIOLOGY (ABIOL) course list

Last Revised by the Department: Fall Semester 2004

Blue Sheet Item #: 32-04-078

Review Date: 11/22/04

Faculty linked: 5/12/14

Accounting (ACCTG)

Program Home Page

STEVEN HUDDART, *Chair*
Department of Accounting, Smeal College of Business
354 Business Building
814-865-0041
sjh11@psu.edu

Degrees Conferred:

Master of Accounting (M.Acc.) in Accounting
Integrated B.S. in Accounting and Master of Accounting (M.Acc.) in Accounting Program

The Graduate Faculty

The Master of Accounting allows students to complete the educational requirements to become a certified public accountant in Pennsylvania, as well as most other states. Certified Public Accountants (CPAs) conduct independent audits and provide accounting, tax, and management advisory services. The program prepares students to enter into careers in public accounting, corporate accounting, management accounting, governmental accounting, financial analysis, and law enforcement.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Admission to the program is competitive. Criteria for evaluating applicants can include: professional and academic accomplishments, GMAT scores, personal data from application forms and, possibly, interviews or examinations.

Students who apply to the program should have an undergraduate educational background equivalent to a Bachelor of Science degree from the Penn State University Smeal College of Business. Students who apply to the program should have completed the equivalent of the following Penn State University courses: ACCTG 211, ACCTG 403W, ACCTG 404, ACCTG 405, ACCTG 471, ACCTG 472, and MIS 301. Applicants to the program from outside Penn State may be required to take an entry exam to demonstrate mastery of the material covered in these courses prior to beginning coursework in the master's program.

Although the program has no fixed minimum grade-point requirement, an applicant is generally expected to have maintained a junior-senior grade-point average of at least 3.00 on Penn State's grading scale of A (4.00) to D (1.00). In addition, an applicant is expected to have maintained a grade-point average of 3.00 for the required accounting courses.

Applicants to the program are required to take the Graduate Management Admission Test (GMAT). The GMAT requirement is waived for applicants with an undergraduate GPA of 3.50 or higher, or whose undergraduate degree is awarded by Penn State.

In addition to the Graduate School application for admission, the program requires a completed Smeal College of Business application for graduate study, and official transcripts from all post-secondary institutions attended.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students must complete a minimum of 33 credits. The 33 credits must be earned in 400-, 500-, or 800-level courses. At least 18 credits must be earned in 500- and 800-level courses, and at least 6 credits must be earned in 500-level courses.

Students must complete the following 24 required credits:

ACCOUNTING (ACCTG)

- 432. Accounting Information Systems (3)
- 495. Internship (3)
- 873. Advanced Topics in Financial Reporting (3)

BUSINESS ADMINISTRATION (BA)

- 817. Communication Skills for Management (3)
- 840. Business Data Management (3)
- 841. Business Intelligence (3)

BUSINESS LAW (BLAW)

- 444. Advanced UCC and Commercial Transactions (3)

FINANCE (FIN)

- 531. Financial Management (3)

Students must also complete an additional 9 credits of elective courses selected in consultation with their adviser. A list of approved elective courses is maintained by the graduate program office.

The culminating experience for the degree is the capstone course ACCTG 873.

Integrated B.S. in Accounting and Master of Accounting (M.Acc.) in Accounting Program

The Department of Accounting offers an integrated program allowing students to receive a B.S. in Accounting and Master of Accounting (M.Acc.) degrees within a five-year period. Students typically are admitted into the integrated program in the spring of the second year of the undergraduate program and the program is completed in the subsequent three years.

Admission Requirements

Students must apply to the program via the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the Accounting graduate program for the Master of Accounting degree, listed above. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

To apply for the program, students must be enrolled in the Smeal College of Business or the Division of Undergraduate Studies, and intend to complete the entrance-to-major requirements prior to completing 59 cumulative credits at Penn State.

Although the program has no fixed minimum grade-point requirement, an applicant is generally expected to have grade-point average of at least 3.20 on Penn State's grading scale of A (4.00) to D (1.00).

In addition, the Department may request an interview with an applicant, or require a GMAT exam or other exam. Admissions decisions will be based upon the student's application, undergraduate record, SAT scores and, if applicable, interviews and examination results.

Admitted students must have completed ACCTG 211 with superior performance by the end of the spring semester in which they apply for admission to the program.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Degree Requirements

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the alterations and double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Accounting are listed in theUndergraduate Bulletin. Degree requirements for the Master of Accounting degree are listed above. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count towards the graduate degree. If students accepted into the IUG program are unable to complete the M.Acc. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Students must complete the requirements for a B.S. in Accounting with the following alterations:

- Some of prescribed courses for the B.S. must be taken in sections that are available only to students enrolled in the program. These prescribed courses, which all count toward the undergraduate degree in accounting, are: ACCTG 403W, ACCTG 404, ACCTG 405, ACCTG 471, and ACCTG 472.
- The student need not satisfy the requirement that 6 credit hours be completed from the following list of courses: ACCTG 406, ACCTG 432, ACCTG 473, and ACCTG 481.
- The following courses cannot be used to satisfy the degree requirements of the integrated B.S./M.Acc. program: ACCTG 406, ACCTG 410, ACCTG 411, ACCTG 417, ACCTG 422, ACCTG 450, ACCTG 473, and ACCTG 481.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

The following courses will count towards both the B.S. and Master of Accounting degrees: ACCTG 432 (3), BA 840 (3), BLAW 444 (3), and FIN 531 (3).

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 or 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07-000; Integrated 46-07-000

Review Date: 6/26/2018

Faculty updated: 5/12/14

Accounting

Black School of Business, Penn State Erie - The Behrend College

Balaji Rajagopalan, Director of Black School of Business
Burke Center, Jordan Rd.
Erie, PA 16563

Degree Conferred: Master of Professional Accounting

The Graduate Faculty

The Program

The proposed Master of Professional Accounting (MPAcc) degree program in Accounting will require 30 credit hours beyond the bachelor's degree and will take one year to complete. This program will equip the students for the increasing legal and financial complexities faced by the accounting profession. This degree will also satisfy the requirements for taking the Certified Public Accountant (CPA) examination and becoming a CPA through the Pennsylvania State Board of Accountancy as well as most of the State Boards of the neighboring states.

Admission Requirements

The general Graduate Council requirements for admission to the Graduate School listed in the GENERAL INFORMATION section of the Graduate Bulletin apply to all students applying for the program. The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

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

Additionally, the following requirements also apply.

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants should have an undergraduate degree in business and the course-work should be substantially similar to the Penn State Erie undergraduate degree in business. If the degree is in business but not in accounting then applicants should have the following courses or their equivalents completed - ACCTG 211, ACCTG 310, ACCTG 340, ACCTG 371, ACCTG 403, and ACCTG 472, with B or better in every course. Applicants should have a minimum 2.8 GPA (on a 4.0 scale) in the junior and senior years and 3.0 GPA (on a 4.0 scale) in the accounting courses. Applicants are also required to take Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) and show GMAT (GMAT equivalent of GRE) scores of at least 400.

Applicants should submit the following documents,

1. Online Graduate School application including application fee
2. Statement of intent
3. Official transcripts for all completed undergraduate and graduate coursework
   (International applicants must submit official or attested university records, with certified translations if the records are not in English. Notarized copies are not sufficient.)
4. Official GMAT scores reported directly to Penn State Erie-The Behrend College
5. TOEFL or IELTS scores, if applicable

Degree Requirements

A minimum of 30 credit hours of instruction is required for the degree that must be acquired in 400-, 500-, or 800-level courses. At least 21 of the 30 credits must be 500 and 800 level courses, at least 9 credits (of the 21 credits) must be at the 500 level, and the remaining 9 credits must be at 400, 500, or 800 level.

The following courses need to be completed for a total of 30 hours of instruction.

Core (24 credits)	**Credits**
B LAW 444: Advanced UCC and Commercial Transactions	3
ACCTG 806: Taxes and Business Planning *or* ACCT 510: Business Tax Planning Theory & Practice	3
ACCTG 873: Advanced Topics in Financial Reporting *or* ACCT 573: Financial Reporting 2	3
ACCTG 881: Financial Statement Analysis *or* ACCT 561: Financial Statement Analysis	3
ACCT 504: Auditing Theory and Practice	3
ACCT 545: Strategic Cost Management	3
B ADM 526: Leadership and Ethics *or* ACCT 550: Professional Responsibilities and Ethics	3
FIN 451: Intermediate Financial Management	3
Electives (3 credits)	
3 credits of elective (Approved 400-, 500-, or 800-level course) or 3 credits of Internship (ACCTG 595)	3

Culminating Experience (3 credits)	
ACCTG 803: Forensic Accounting and Litigation Support	3
Total Credits	30

Last Revised Spring Semester 2014
Blue Sheet Item #: 42-07
Review Date: 06/10/2014; 08/14/14

Applied Clinical Psychology (ACPSY)

Program Home Page

GINA BRELSFORD, *Graduate Program Coordinator*
Penn State Harrisburg
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717-948-6759

MELANIE HETZEL-RIGGIN, *Graduate Program Coordinator*
Penn State Behrend
170 Irvin Kochel Center
4951 College Drive
Erie, PA 16563
814-898-6949

Degree Conferred:

M.A.

The Graduate Faculty (Harrisburg)

The Graduate Faculty (Erie)

The Program

The Master of Arts in Applied Clinical Psychology program helps students prepare to work as mental health professionals in a variety of settings and is intended to provide a broad training program in empirically validated clinical psychology which, when accompanied by an additional 12 credits in advanced graduate studies in psychology and/or counseling, can provide the academic training necessary for graduates to apply for master's level licensing as a professional counselor in the Commonwealth of Pennsylvania. The M.A. program requires 48 credits of course work. An optional 12-credit certificate program is available for students seeking licensure.

The overall model emphasizes the scientific bases of behavior, including biological, social, and individual difference factors. The training model is health-oriented rather than pathology-oriented and emphasizes the development of helping skills, including both assessment and intervention.

The degree program is intended for both part- and full-time students. Students are admitted fall semester only. The deadline for admission is May 1.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

Students will be admitted on a competitive basis and must submit the following:

- completed application form with the application fee
- Official transcripts of all colleges and universities attended
- three professional letters of recommendation
- a brief (two-page) interest statement
- verbal, quantitative, and analytical scores on the Graduate Record Examinations

The applicant must have a bachelor's degree from a regionally accredited academic institution or the equivalent, must have completed at least 18 credits in psychology, and must have a cumulative grade-point average of 3.0 or above in the last 60 credits of undergraduate course work. The undergraduate work must include a statistics course and a psychology research methods course with grades of B or higher. A personal interview is required.

Transfer Credits

Penn State allows a maximum of 10 transfer credits of high-quality graduate work to be applied toward the requirements for a graduate degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin.*

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

The M.A. in Applied Clinical Psychology requires 48 credits of coursework. At lest 20 must be earned at the established graduate campus where the program is offered. Included in the core courses are 100 hours of clinical practicum, 600 hours of supervised internship experience, and a master's research paper completed in association with PSYC 500.

Psychology Core Courses (23 credits) provide a foundation in professional ethics, individual differences and cultural diversity, the scientific bases of behavior, and scientific research skills. These courses are intended to facilitate the development of an awareness of the context in which clients live and in which interventions must work.

PSYCHOLOGY (PSYC)

- 500. Ethics and Professional Practice in Psychology and Counseling (3)
- 501. Cultural Competency in Psychology (3)
- 502. Applied Social Psychology (3)
- 520. Research Methods (4)
- 521. Statistics (4)
- 524. Biological Basis of Behavior (3)
- 530. Research Paper (3)

Clinical Core Courses (25 credits) provide a general background in clinical diagnosis, assessment, and interventions with appropriate supervised experience to allow students to develop the clinical skills appropriate for master's level practitioners.

PSYCHOLOGY (PSYC)

- 510. Human Growth and Development (3)
- 517. Psychopathology (3)
- 518. Interviewing and Counseling (3)
- 519. Theories and Models of Psychotherapy (3)
- 540. Group Interventions (3)
- 571. Tests and Measurement (3)

- 595A. Clinical Practicum (1)
- 595B. Clinical Internship (6)

Grade-Point Average

Students must have a 3.00 grade-point average to graduate from the program.

Financial Aid

There are a limited number of scholarhsips and research grants available, as well as graduate assistantships. Graduate assistantships available to students in this program and other formas of student aid are described in the Student Aid section of the*Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin.*

Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan which reimburses employees for partial or full tuition. To find other options available to you, contact the Financial Aid Office at 717-948-6307 (Harrisburg) or 814-898-6162 (Erie).

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

PSYCHOLOGY (PSYC) course list

Last Revised by the Department: Fall Semester 2015

Blue Sheet Item #: 44-04-000

Review Date: 1/12/15

Faculty linked: 8/14/14

Harrisburg coordinator updated: 5/12/16

Acoustics (ACS)

Program Home Page

VICTOR W. SPARROW, *Director of Graduate Program*
201C Applied Science Building
Phone: 814-865-6364; Fax: 814-865-3119

Degrees Conferred:

Ph.D., M.S., M.Eng.

The Graduate Faculty

The Program

The aim of this program is to enable the student interested in acoustics to obtain an integrated program covering acoustical science and engineering applications of acoustics.

Student curricula are individually tailored and integrated through a selection of core and elective courses in areas such as basic acoustics, physical acoustics, underwater acoustics, signal processing, optics, architectural acoustics, medical ultrasonics, aeroacoustics, vibrations, wave propagation, speech, physiological acoustics, psychoacoustics, thermoacoustics, hydroacoustics, and computational acoustics. The courses are offered by the Graduate Program in Acoustics and by other participating University departments, including Aerospace Engineering, Architectural Engineering, Bioengineering, Electrical Engineering, Engineering Science and Mechanics, Mechanical Engineering, Meteorology, Geosciences, Physics, and Communication Sciences and Disorders.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Entering students should hold a bachelor's degree in physics, engineering, mathematics, or a closely related field that would provide substantial preparation in mathematics (a minimum of two semesters of calculus-based physics and mathematics to include complex variables and differential equations). In addition, an undergraduate knowledge of statics and dynamics, linear algebra, and electronic circuit analysis, and the ability to use mathematical analysis software is expected. Students with a 3.00 junior/senior average (on a 4.00 scale), appropriate course backgrounds, and a B+ or better average in mathematics, physical science, and engineering courses will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. An individual with nontechnical background may also apply, but acceptance into the program will depend significantly on the applicant's undergraduate background and motives to pursue advanced study in acoustics. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds and abilities.

Scores from the Graduate Record Examinations (GRE) are required. As English is the language of instruction, English proficiency test scores (TOEFL/IELTS) are required for all international applicants. Please see the English Proficiency requirements listed in the Graduate Bulletin. In addition, the Acoustics Program requires a minimum speaking score on the TOEFL internet based test (iBT) of 25 or a minimum acceptable composite score from the International English Language Testing System of 6.5.

Admission to the Ph.D. program is a two-step process. First, the candidate must apply to the Acoustics Program via the Graduate School application for admission as a Ph.D. student, and the application is reviewed by the Admissions Committee. Admission will permit the student to begin working toward a doctoral degree. However, the student is not a doctoral candidate until he or she has passed the candidacy examination and been admitted to Candidacy.

Degree Requirements

The Masters of Engineering (M.Eng.) degree is a non-thesis professional master's degree, and it may be earned by resident students at University Park or through distance education. The Master of Engineering degree is based on graduate course work and a written paper or a developmental study must be submitted to the Acoustics Program. Normally, such a paper represents a study of a particular topic that is more limited than that necessary for a thesis. The paper is free of any formal requirements of the Graduate School, but it is expected that the student will use the Thesis Guide as an example of the appropriate format. The total number of credits required for the M. Eng. degree is 30 of which 18 credits must be from 500-level approved core courses in Acoustics. The 12 non-core course credits may be selected from the "Required and Approved" list of courses issued by the Acoustics Program Office. Students may take more than one credit of Colloquium (ACS 590) and more than six credits of Individual Study (ACS 596), but such additional credits cannot be applied to the total number of course credits required. Master of Engineering students may not apply research credits (ACS 600) to the total number of course credits required. The expected duration to complete the M.Eng. degree is 2 years for resident students. For additional details, please consult www.acs.psu.edu.

The Masters of Science (M.S.) degree program is based on a combination of graduate course work and research training that is documented and culminates (a) in a Master of Science thesis or (b) in a scholarly paper. The M.S. degree in Acoustics is only available for resident students at University Park. For track (a) both the course selection and research are directed by an adviser. When the student is working on the thesis research, at least two other faculty members, upon the adviser's suggestion, will be recommended to the Program Chair who will approve the thesis committee. The total number of credits required for the M.S. degree is 30, and at least 20 of those credits must be taken at University Park. 24 course credits are required, of which 18 must be from approved 500-level acoustics core courses. 6 Thesis Research credits (ACS 600) are required for students writing a Master of Science Thesis.

The scholarly paper track (b) is only available for students participating in the one-year M.S. program that requires 12-month continuous registration. As part of the one-year M.S. program students must take one credit of Research Topics (ACS 594) in both the fall and spring semesters, and take a special summer course, Contemporary Research Topics in Acoustics (ACS 580). The scholarly paper will be developed in the ACS 594 classes and will normally be completed as part of ACS 580. This paper will typically be a study of a particular topic that is more limited than that necessary for a thesis. The paper is free of any formal requirements of the Graduate School, but it is expected that the student will use the formatting as described in the Thesis Guide. Students in this one-year M.S. program will not take any Thesis Research credits (ACS 600). The total number of credits required for the M.S. degree is 30, and at least 20 of those credits must be taken at University Park. 24 course credits are required, of which 18 must be from approved 500-level acoustics core courses.

The 6 non-core course credits for either track may be selected from the "Required and Approved" list of courses issued by the Acoustics Program Office. Students may take more than one credit of Colloquium (ACS 590) and more than six credits of Individual Studies (ACS 596) for the paper track or Thesis Research (ACS 600) for the thesis track, but such additional credits cannot be applied to the total number of course credits required for the M.S. degree. The expected duration to complete the M.S. degree with thesis is 2 to 2.5 years and approximately 1 year for students in the one-year resident M.S. program. For additional details, please consult www.acs.psu.edu.

The Doctor of Philosophy (Ph.D.) degree is conferred in recognition of high attainment and productive scholarship. A candidate for the Ph.D. degree must pass the English proficiency and candidacy examinations, prepare and defend a thesis proposal as part of the comprehensive examination, pass the final oral examination (thesis defense), and the thesis must be approved by the doctoral committee. Ph.D. students are required to take 21 credits of 500-level Acoustics core courses, but the Ph.D. committee may require the doctoral candidate to take specific additional courses. In addition, a Ph.D. candidate must satisfy the University residency requirement by registering for two consecutive semesters, fall and spring, as a full-time student. Post-comprehensive exam, continuous registration is required until the thesis has been approved. Penn State's Graduate School allows eight years from successful completion of the candidacy exam for completion of a doctoral degree. The expected duration to complete the Ph.D. degree is 3 years after the completion of a Master's degree or 5 years without a Master's degree. For additional details, please consult www.acs.psu.edu.

Other Relevant Information

In addition to the acoustics courses listed here, the following courses on acoustics and closely related areas are available: AERSP 511, 524, 525; A E 458,

520; BIOE 506; E E 460, 557, 560, 561, 562; E SC 536, 537; E MCH 516, 521, 524A,B,C, 527, 528, 560, 562; M E 471, 554; PHYS 443. This list may change as other departments continue to add new courses relevant to acoustics.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load policy listed in the Bulletin.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ACOUSTICS (ACS) course list

Faculty updated: 5/12/14

UCA Revision #2: 7/30/07

Lifelong Learning and Adult Education (LLAED)

Program Home Page

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Program Home Page

Degrees Conferred:

Ph.D., D.Ed., M.Ed., M.D./M.Ed.

The Graduate Faculty, University Park

The Graduate Faculty, Harrisburg

The Graduate Faculty, World Campus

The Programs

Lifelong Learning and Adult Education extends through the life span from late adolescence to advanced age and takes place in a rich diversity of organizational as well as informal settings. The purpose of the Lifelong Learning and Adult Education program is to increase the knowledge and competence of those who work with adult learners. Course work, reading assignments, research projects, internships, informal discussions, and the dissertation all provide opportunities for in-depth and challenging learning experiences. The Lifelong Learning and Adult Education program is interdisciplinary, and students are advised to take courses in supporting fields within the University.

The M.Ed. is offered through the World Campus and at Harrisburg and Univesity Park. The D.Ed. is offered at Harrisburg and University Park. The Ph.D. is offered only at University Park.

Admission Requirements (for M.Ed., D.Ed., and Ph.D.)

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

The candidate must apply to the Program via the Graduate School application for admission. Scores from the Graduate Record Examinations (GRE), or the Miller Analogies Test (MAT), are required for admission. Either the GRE or MAT score is accepted for the D.Ed. and M.Ed. programs, but GRE scores are preferred. The Ph.D. program accepts only the GRE. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in the program without these scores.

The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Applicants with a total Verbal and Quantitative score above 302 on the GRE or 398 or above on the MAT, a junior/senior grade point average (GPA) of 3.00 or above (on a 4.00 scale), and a graduate GPA of 3.50 or above will be highly considered applications to the program. However, applicants with strong backgrounds and abilities in areas of particular interest or relevance to adult education practice may be admitted to either the doctoral programs with a baccalaureate degree only (provided the junior/senior GPA is at least 3.0), or with master's-level studies in which the graduate GPA is at least 3.2 and the GRE total score is at least 297.

A sample of student writing is required for each degree. M.Ed. applicants submit a recent writing sample, such as a term paper, report, or publication of 3000 words or more. Ph.D. and D.Ed. applicants should submit either a published article, master's paper, master's thesis, or a paper from their master's studies.

Three letters of reference are required from people who are best qualified to evaluate the applicant's ability to succeed in graduate study. These letters may be from an academic adviser, instructors who are familiar with the applican'ts academic record, a research project supervisor, an employment supervisor, or others who are able to provide a substantive evaluation of the applicant's work. Letters of recommendation must address the applicant's academic ability, motivation, and likelifhood of success in completing the program.

A statement of purpose describing the applicant's short and long range career objectives is required. This statement includes an explanation of how the proposed study of adult education relates to the stated career objectives.

Applicants who exhibit exceptional qualities without meeting all of the stated requirements for admission may be considered for provisional admission while they remove the identified deficiencies. Deficiencies must be rectified within the first two semesters of enrollment in the degree program; courses taken to remove deficiencies are considered to be prerequisites and do not earn credit toward the degree.

Admission Requirements for Joint M.D./M.Ed.

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Those who wish to apply for admission to the joint M.D./M.Ed. degree program would have to meet the admission requirements for both the M.D./M.Ed. programs. Admissions requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program section of the Penn State College of Medicine website. Prospective students interested in simultaneously pursuing an M.D. and M.Ed. first must apply to the Penn State College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the M.D. degree at Penn State. Applicants are encouraged to identify themselves as candidates for the joint degree program at this time. However, medical students who realize after accepting admission into Penn State's College of Medicine that they are interested in the joint M.D./M.Ed. can apply for admission to the joint degree during their first three years in the College of Medicine. Given that students will already be enrolled in the College of Medicine it will be possible for faculty to observe their academic record and counsel them on the advisability of the joint degree. The general admission requirements for the M.Ed. degree are listed above. Joint M.D./M.Ed. candidates may substitute the MCAT for GRE or MAT scores. After the student has been accepted to the College of Medicine, s/he must apply and be admitted to the Graduate School for admission to the graduate program. The general admission requirements for the M.Ed. degree are listed above.

Admission Requirements for the Dual-Title Ph.D., D.Ed., and M.Ed. in Comparative and International Education

Students must apply and be admitted to the graduate program in Lifelong Learning and Adult Education and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of theComparative and

International Education Bulletin page. Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to obtaining candidacy in their primary graduate program.

General Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits is required for the M.Ed. degree. The M.Ed. program in Lifelong Learning and Adult Education consists of a required core of 12 credits in ADTED courses and 18 credits in ADTED or other electives. The 12 core ADTED credits include the following four specified courses: ADTED 460, 505, 542, and 588. Students then choose an additional 18 credits (six courses) from the following ADTED courses in consultation with their adviser: 456, 457, 470, 480, 501, 502, 506, 507, 509, 510, 531, 532, 533, 560, 575, or 581. Other courses may be substituted for these electives with the adviser's permission.

M.Ed. students are required to write a master's paper as part of the required 30 credits of course work. Students complete the master's paper while enrolled in ADTED 588 during their last semester. A minimum of 18 credits out of the 30 must be taken at the 500 or 800 level, with a minimum of 6 credits at the 500 level, and a minimum of 24 credits must be in ADTED prefix courses.

M.Ed. students must select either the general M.Ed. degree or one of the three formal options: (1) Adult Basic Education and Literacy; (2) Global and Online Distance Education; and (3) Medical and Heatlh Professions, M.Ed. students who select a formal option must adhere to the requirements specified below.

Requirements for the M.Ed. – Adult Basic Education and Literacy Option

The M.Ed. in Lifelong Learning and Adult Education – Adult Basic Education and Literacy Option consists of a required core of 12 credits in ADTED courses, 12 credits in ADTED courses required for this option, and 6 credits of ADTED or other electives. The 12 core ADTED credits include the following four specified courses: ADTED 460, 505, 542, and 588. All students in this option also take four required courses: ADTED 480, 507, 509, and 560. Students then choose an additional 6 credits (two courses) from the following ADTED courses in consultation with their adviser: ADTED 456, 457, 470, 506, 510, 531, 533, 575, or 581. Other courses may be substituted for these electives with the adviser's permission.

Requirements for the M.Ed. – Global Online and Distance Education Option

The M.Ed. in Lifelong Learning and Adult Education – Global Online and Distance Education Option consists of a required core of 12 credits in ADTED courses, 12 credits in ADTED courses required for this option, and 6 credits of ADTED or other electives. The 12 core ADTED credits include the following four specified courses: ADTED 460, 505, 542, and 588. All students in this option also take four required courses: ADTED 470, 531, 532, and 533. Students then choose an additional 6 credits (two courses) from the following courses in consultation with their adviser: ADTED 506, ADTED 510, ADTED 575, ADTED 581, INSYS 432, or INSYS 467. Other courses may be substituted for these electives with the adviser's permission.

Requirements for the M.Ed. – Medical and Health Professions Option

The M.Ed. in Lifelong Learning and Adult Education – Medical and Health Professions Option consists of a required core of 12 credits in ADTED courses, 9 credits in ADTED courses required for this option, and 9 credits of ADTED or other electives. The 12 core ADTED credits include the following four specified courses: ADTED 460, 505, 542, and 588. All students in this option also take three required courses: ADTED 501, 502, and 507. Students then choose at least 3 additional credits (one course) from the following ADTED courses in consultation with their adviser: ADTED 470, 510, 531, 533, 575, or 581. Other courses may be substituted for these electives with the adviser's permission. Students may choose 6 additional credits of electives in consultation with their adviser.

Ph.D. and D.Ed. Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*. A minimum of 48 credits beyond the master's degree is required for the Ph.D. degree. Ph.D. students are required to take:

- 12 core credits in Lifelong Learning and Adult Education: ADTED 521 (3 cr.), ADTED 508 (3 cr.), ADTED 510 (3 cr.), and ADTED 542 (3 cr.).
- 18 credits in an emphasis area, including at least 6 credits of ADTED electives and at least 9 credits chosen from one or more Supporting Area(s) outside of Lifelong Learning and Adult Education. A list of courses that will count towards the Supporting Areas requirement is maintained by the graduate program office.
- 18 research credits, including one graduate-level basic statistics course, ADTED 550 (3 cr.), and one course on quantitative design/methods.

In addition, Ph.D. students must fulfill the residency requirement and English competence requirements, must pass candidacy, comprehensive, and final oral examinations, and maintain continuous registration during dissertation research.

Ph.D. students are required to take 12 core credits in Lifelong Learning and Adult Education, 18 credits in an emphasis area that is composed of Lifelong Learning and Adult Education and supporting courses outside Lifelong Learning and Adult Education, and 18 research credits, in addition to the residency requirement, candidacy, comprehensive and final oral examinations, and continuous registration during the dissertation research. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

A minimum of 60 credits beyond the master's degree is required for the D.Ed. degree. A minimum of 90 credits is required for the D.Ed. degree, of which at least 30 must be earned in residence at either University Park or Penn State Harrisburg. D.Ed. students who do not have previous experience in adult education are expected to acquire the equivalent of one year of experience in one or more fields of adult education practice prior to receiving their D.Ed. degree. All doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination. To earn the D.Ed. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School. The candidacy examination is administered after when the student has earned a total of at least 30 credits toward the graduate degree, including the master's program and graduate work done elsewhere. During the comprehensive examination, in addition to being examined in their area of specialization, all D.Ed. students are examined in the core adult education areas. A minimum of 21 credits in course work must be taken in Lifelong Learning and Adult Education, including 9 credits in core courses (ADTED 460 or 521 (3 cr.), ADTED 510 (3 cr.), and ADTED 542 (3 cr.)), and 12 credits of ADTED electives. A minimum of 15 credits must be taken outside Lifelong Learning and Adult Education as a minor or General Studies option. A minimum of 9 credits must be taken in research methods courses, including one graduate-level basic statistics course, ADTED 550 (3 cr.), and one course on quantitative design/methods. A minimum of 15 research credits (ADTED 600 or 610) is required.

Students in the Ph.D. program focus on research in Globalization and Lifelong Learning selecting one emphasis area (Distance Education, Literacy for Culturally and Linguistically Diverse Populations, Comparative Lifelong Learning, or Learning in Work and Communities). Required research methods courses help students develop the background knowledge and tools to enable them to engage in original research. D.Ed. students conduct applied research with the goal of improving practice in the general adult education field.

Joint M.D./M.Ed. Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on theM.D. Program section of the Penn State College of Medicine website. Degree requirements for the M.Ed. degree are listed in the General Master's Degree Requirements section above. In accordance with the Graduate Council policy on Joint Degree Programs, any nine credits from the M.D. program will meet the substitution requirement into the M.Ed., and any nine credits from the M.Ed. will be accepted into the M.D. program, from among the courses that reflect the interdisciplinary common ground between the two programs. It is to be noted that the course requirements for the joint degree are the same for students admitted to the M.Ed. in Lifelong Learning and Adult Education in the Medical and Health Professions option. If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the M.Ed. degree if all the M.Ed. degree requirements have been satisfied.

Dual-Title Ph.D., D.Ed., and M.Ed. in Comparative and International Education

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Lifelong Learning and Adult Education, listed above. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International EducationBulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Lifelong Learning and Adult Education and

must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Lifelong Learning and Adult Education and Comparative and International Education. Dual- title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Lifelong Learning and Adult Education and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Lifelong Learning and Adult Education and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ADULT EDUCATION (ADTED) course list

Last Revised by the Department: Fall 2018

Blue Sheet Item #: 47-01

Review Date: 8/28/2018

Faculty linked: 8/18/14

Program coordinators updated: 7/24/16

Agricultural and Extension Education (AEE)

Program Home Page

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Degrees Conferred:

Ph.D., M.S., M.Ed.
Dual-title Ph.D., M.S., and M.Ed. in Comparative and International Education
Dual title Ph.D. and M.S. in International Agriculture and Development

The Graduate Faculty

Graduate programs emphasize agricultural or extension education (including preparation for employment in college or university programs), youth and family programming, state-level administration, local-level administration, private industry and international education. A minor may be taken in an area of the student's choice or in general studies. Programs may include courses needed for certification in other fields of education.

Master of Science and Master of Education in Agricultural and Extension Education

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

All applicants must submit a letter of application, two or three pages in length, describing their professional experience, education, career goals, and reasons for pursuing the degree. Applicants must ensure that three recommendation and evaluation forms from individuals knowledgeable about the applicant are forwarded to the department. Only the most qualified applicants will be admitted to the graduate program. The graduate program may provisionally admitselected applicants pending resolution of the requirements listed here. Exceptions to the admission criteria listed below may be made at the discretion of the program for students with special backgrounds, abilities, and interests.

Prerequisite for admission to a master's degree program is a demonstrated professional interest in agricultural and extension education and/or applied youth and family education. Graduate Record Examination (GRE) scores are required for application. The GRE score is one of several variables taken into consideration for offers of admission to the AEE graduate program.

Master of Science: The purpose of the AEE M.S. degree program is to prepare students through experience and course work in research methods, data analysis, and research reporting to enhance their professional qualifications and career advancement. The program is designed for individuals who are primarily interested in conducting, interpreting, or communicating research for educational work or advanced graduate (i.e. doctoral) study. Graduates can go on to become: agricultural educators at the post-secondary level; Cooperative Extension educators or related professionals; and professionals in the public, private, or non-profit sectors focused on education, training, or human capacity development.

Master of Education: The purpose of the AEE M.Ed. degree program is to prepare students through experience and course work in teaching, learning, and educational planning and assessment to enhance their professional qualifications and career advancement. Prerequisite for admission to this program is a minimum of 18 credits in professional education courses (including educational psychology and teaching and/or professional internship), or certification as a teacher of agriculture, or equivalent professional experience, including extension. Credits obtained to fulfill this admission prerequisite requirement cannot be applied towards requirements for the degree. The program is designed for individuals who are primarily interested in teaching. Graduates can go on to become: agricultural educators at the secondary or post-secondary level; Cooperative Extension educators or related professionals; and professionals in the public, private, or non-profit sectors focused on education, training, or human capacity development.

Note:Students considering graduate education beyond the Master's level are encouraged to pursue the M.S. degree, which prepares students for advanced study and research activity.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A program of study agreement between adviser and student, including planned course work (approved by the student's graduate committee) and time frame, should be completed before beginning the second semester of study.

Master of Science: The Master of Science degree requires a minimum of 34 credits at the 400, 500, 600, or 800 level, with least 18 credits at the 500 and 600 level, combined. The 34 credits include:

- 16 credits in core required courses: AEE 501 (3), AEE 590 (1), AEE 520 (3), AEE 521 (3), a 3-credit course on Research Methods and Data Analysis, and a 3-credit course focused on writing, public speaking, or communicating scientific information to an audience. A list of courses that will fulfill the Research Methods and Data Analysis and the Communications requirements is maintained by the graduate program office;
- 9 credits in either the base program or one of two options defined below;
- 3 elective credits from a list of approved electives maintained by the graduate program office; and
- 6 thesis credits (AEE 600 or 610).

In addition to completing a minimum of 34 credits of required course work, M.S. candidates are required to:

- Conduct an empirical research study involving the collection of primary and/or secondary data;
- Write a thesis on their empirical research study;
- Conduct an oral defense of the research study and thesis; and
- Submit at least one article to a relevant peer-reviewed journal.

The thesis must be accepted by the committee members, the head of the graduate program, and the Graduate School, and the student must pass the thesis defense.

Master of Education: The Master of Education degree requires a minimum of 31 credits at the 400, 500, or 800 level, with a minimum of 18 credits at the 500 or 800 level, and at least 6 credits at the 500 level. The 31 credits include:

- 16 credits in core required courses: AEE 501 (3), AEE 509 (3), AEE 590 (1), AEE 520 (3), AEE 521 (3) or a 3-credit course on Research Methods and Data Analysis, and a 3-credit course focused on writing, public speaking, or communicating scientific information to an audience. A list of courses that will fulfill the Research Methods and Data Analysis and the Communications requirements is maintained by the graduate program office;
- 9 credits in either the base program or one of two options defined below;
- 3 elective credits from a list of approved electives maintained by the graduate program office; and
- 3 credits for the Capstone Project, AEE 596 (3). A minimum of 3 credits of AEE 596 is required, but the student's committee may require 3 additional credits be completed based on the project's complexity. No more than 3 credits of AEE 596 will count towards the minimum credit requirement for the degree; if students are required to complete 6 credits of AEE 596, then they must complete a minimum of 34 credits for the degree.

In addition to completing a minimum of 31 credits of required course work, M.Ed. candidates are required to:

- Conduct a Capstone Project, typically involving the development and/or evaluation of an educational curriculum, project, or program;
- Write a professional paper supporting and reflecting upon the Capstone Project;
- Conduct an oral defense of the Capstone Project and professional paper; and
- Submit at least one article to an appropriate forum (e.g. Extension- or education-related journal, trade publication, editor-only reviewed publication, or conference proceedings).

M.S. and M.Ed. Base Program and Options: Students may elect to pursue either AEE master's degree (M.S. or M.Ed.) as a generalist following a base curriculum or with one of two graduate options. Options involve more tailored course work and are included on the student's transcript and diploma after the primary degree title.

- The **generalist (base)** curriculum educates students in core areas of AEE, including leadership, formal education, non-formal program development, and evaluation. The base curriculum requires 9 credits of the following: AEE 450 (3), AEE 505 (3), and AEE 530 (3).
- The **Agricultural Education (AE) Option** allows students to select course work related to their specific interests including: educational program planning and instructional development; leadership within and administration of agricultural education programs; and change in agricultural education. The Agricultural Education option requires 9 credits, chosen from the following: AEE 413 (3-4), AEE 508 (3), AEE 524 (1-3), or WF ED 413 (3).
- The **Youth, Family, and Community (YFC) Option** allows students to select course work related to their specific interests including: program design, implementation, and evaluation; leadership development and civic engagement within communities; intergenerational programs; and volunteer program management. The Youth, Family, and Community option requires 9 credits, chosen from the following: AYFCE 535 (3), AYFCE 550 (3), AYFCE 555 (3), or AYFCE 845 (3).

Doctorate of Philosophy in Agricultural and Extension Education (AEE)

Ph.D. Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Letter of Introduction and Résumé. Applicants must submit a two-to three-page letter of introduction in which they describe their professional experience and education and delineate their career goals. A current résumé is also required.

Graduate Record Examination. Graduate Record Examination (GRE) scores are required for application. The GRE score is one of several variables taken into consideration for offers of admission to the AEE graduate program.

Official Transcripts. Official transcripts from all post-secondary institutions attended must be submitted. Applicants must provide evidence of either a baccalaureate or a master's degree in the agricultural sciences, human sciences, or related area.

Three Letters of Reference.

Professional Experience. A minimum of two years of appropriate professional experience is required either prior to admission or before the degree is awarded. An interview with the graduate faculty is recommended of all applicants prior to admission into a doctoral program.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Approximately 75 credits of graduate work beyond the baccalaureate degree are required. Approximately two-thirds of the total program must be in the major field. Courses in education or statistics may be counted in the major with prior approval of the doctoral committee. A minimum of 30 credits must be earned in residence.

Courses completed in the doctoral program in AEE should give students competence in at least one core area of expertise: educational processes; leadership development and communications; program development, and research. Students must complete the following course requirements, for a minimum of 26 credits:

- 3 credits, Foundations of AEE (AEE 501)
- 2 credits over two semesters in the doctoral program, AEE Colloquium (AEE 590)
- 15 total 500-level credits with at least one, three-credit 500-level course being completed from each of the four core areas, including: Educational Processes; Leadership Development and Communications; Program Development; and Research. A list of courses that will fulfill this requirement is maintained by the graduate program office;
- Three additional research credits beyond the course taken to meet the 3-credit core Research requirement, selected from among AEE 520, AEE 521, or AEE 522. These six Research credits must be earned during the academic year, not during summer session.
- 3 credits, Advanced Technical Writing and Editing (ENG 418).
- Up to a maximum of 12 credits of AEE 600/601/610/611.

Doctoral students develop an appropriate program of study to meet these requirements in consultation with their adviser and doctoral committee.

Official entrance into the Ph.D. program occurs upon successful completion of the candidacy examination. Ph.D. degree requirements include successful completion of the following: approved graduate course work, English Competence requirements, a comprehensive examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

All doctoral students in AEE are required to write an article or a paper for publication or presentation based upon (1) their dissertation or (2) their assistantship responsibilities as determined by the academic adviser and assistantship supervisor prior to the granting of a degree. The article or paper will be reviewed and approved by the student's graduate adviser. The article or paper will be submitted to a refereed or professional journal, a professional or research conference, and/or a popular magazine. If co-authored with a faculty member, the student's name will appear as the lead author.

Dual-Title Graduate Degree in Agricultural and Extension Education (AEE) and Comparative and International Education (CI ED)

M.S., M.Ed., and Ph.D. students with research and educational interests in schooling and education around the globe may apply to the Dual-Title Graduate Degree Program in Agricultural and Extension Education (AEE) and Comparative and International Education (CI ED). Comparative and international education is a field devoted to the systematic analysis of the operation and effects of the world's education systems. The goal of the dual-title graduate program is to enable graduate students from AEE to acquire the knowledge and skills of their primary area of specialization in AEE, while at the same time gain the perspectives, techniques, and methodologies of comparative and international education. Graduate study in this program seeks to create opportunities for a range of people—administrators and policy makers in social welfare, health education, and development; school leaders; and scholars of education. Graduates of the dual-title program in AEE and CI ED will be able to compare, analyze, and make policy recommendations for agricultural and extension education at both national and international levels.

Admission Requirements

Students must apply and be admitted to the graduate program in AEE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CIED dual-title program. Refer to the Admission Requirements section of theCIED Bulletin page. Doctoral students must be admitted into the dual-title degree program in CIED prior to obtaining candidacy in their primary graduate program.

Dual-Title M.S. and M.Ed. in AEE and CIED Degree Requirements

To qualify for this dual-title degree, students must satisfy the requirements of the AEE Master of Science or Master of Education degree program, listed above. In addition, they must satisfy the CIED program requirements for the dual-title master's degree. Refer to the Degree Requirements section of the CIED Bulletin page. Some courses may satisfy both the graduate primary program requirements and those of the CIED program. Final course selection is determined by the student after consulting, in advance, with their AEE and CIED advisers.

For the dual-title M.S. degree in AEE and CIED, the thesis must reflect the student's education and interest in both AEE and CIED. For the dual-title M.Ed. in AEE and CIED, the student's capstone experience and professional paper must reflect the student's education and interest in both AEE and CIED. All members of the student's committee for both the M.S. and the M.Ed. must be members of the Graduate Faculty. The master's committee must include at least one Graduate Faculty member from CIED. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. A Degree Committee form should be filed upon selection of the committee members.

Dual-Title Ph.D. in AEE and CIED Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in AEE, listed above. In addition, students must complete the degree requirements for the dual-title in CIED, listed on theCIED Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from AEE and must include at least one Graduate Faculty member from the CIED program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both AEE and CIED. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an AEE and CIED dual-title Ph.D. student must include at least one member of the CIED Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in CIED, the member of the committee representing CIED must be appointed as co-chair. The CIED representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in AEE and CIED. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in Agricultural and Extension Education (AEE) and International Agriculture and Development (INTAD)

M.S. and Ph.D. students with research and educational interests in international agriculture extension and education may apply to the Dual-Title Graduate Degree Program in Agricultural and Extension Education and International Agriculture and Development. The goal of the dual-title graduate program is to enable graduate students from AEE to acquire the knowledge and skills of their primary area of specialization in AEE, while at the same time gaining the perspective and methods needed to work internationally. Graduate study in this program seeks to prepare students to assume leadership roles in developing contemporary curricula and programs, conducting high-quality research and development activities, and disseminating new knowledge in these areas in both national and international settings. Students are required to write research proposals and expected to write grants to support their research activities reflecting both research areas of the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student.

Admission Requirements

Students must apply and be admitted to the graduate program in AEE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of theINTAD Bulletin page. Doctoral students must be admitted into the dual-title degree program in INTAD prior to obtaining candidacy in their primary graduate program.

Dual-Title M.S. in AEE and INTAD Degree Requirements

To qualify for this dual-title degree, students must satisfy the requirements of the AEE Master of Science degree program, listed above under "Degree Requirements – Master of Science. In addition, they must satisfy the INTAD program requirements for the dual-title master's degree. Refer to the Master's Degree Requirements section of the INTAD Bulletin page. Some courses may satisfy both the graduate primary program requirements and those of the INTAD program. Final course selection is determined by the student after consulting, in advance, with their AEE and INTAD advisers.

For the dual-title M.S. degree in AEE and INTAD, the thesis must reflect the student's education and interest in both AEE and INTAD. All members of the student's committee must be members of the Graduate Faculty. The master's committee must include at least one Graduate Faculty member from INTAD. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. A Degree Committee form should be filed upon selection of the committee members and must be approved by the INTAD Academic Program Committee Co-chair.

Dual-Title Ph.D. in AEE and INTAD Degree Requirements
To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in AEE, listed above. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from AEE and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both AEE and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond thenormal period allowable.

In addition to the general Graduate Council requirements for doctoral committees , the doctoral committee of an AEE and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in AEE and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring 2018
Blue Sheet Item #: 46-06-000
Review Date: 4/10/2018
Faculty linked: 5/12/14

Aerospace Engineering (AERSP)

Program Home Page

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Degrees Conferred:

Ph.D., M.S., M.Eng.

The Graduate Faculty

Opportunities for graduate study are available in the following areas: low-speed aerodynamics, airplane and helicopter aerodynamics; V/STOL aircraft, turbulence, astrodynamics, turbomachinery, air breathing propulsion, aeroacoustics, gas dynamics, stability and control of aerospace vehicles, aerospace structures, structural dynamics, aeroelasticity, rotorcraft engineering, computational fluid dynamics, experimental fluid dynamics, space propulsion, space vehicle dynamics, and high-performance computing.

Admission Requirements

Applicants must submit official scores from the Graduate Record Examinations (GRE) for admission to the graduate program and consideration for financial assistance. In addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin, the department poses a number of specific requirements. The entering M.Eng. or M.S. student must hold a bachelor's degree in engineering, physical science, or mathematics, and may be required to complete (without degree credit) undergraduate course work in fluid and solid mechanics and intermediate mathematical analysis, if not already completed. The department will consider students with a 3.0 junior/senior grade-point average (GPA) on a 4.0 scale; students with special backgrounds, abilities, or interests may request a waiver to this GPA requirement. The best-qualified applicants will be accepted up to the number of spaces that are available. Admission to the Ph.D. program requires satisfactory completion of a master's program in engineering, physical science, or mathematics. Admission to the Ph.D. program prior to completion of a master's degree may be considered upon the student passing the Ph.D. candidacy exam. A student must have completed at least 18 course credits beyond the baccalaureate degree in order to take the Ph.D. candidacy exam, and is not granted official status as a doctoral candidate until the master's degree is complete and the candidacy exam has been passed. Application materials are available at: www.aero.psu.edu.

M.Eng., M.S., and Ph.D. Core Requirements

1. Basic field theories. Complete two courses for 6 credits, one from a prescribed list in each of two of the following categories: fluid mechanics, solid mechanics, or system dynamics.
2. Numerical/computational methods. Complete one 3-credit course that addresses the numerical analysis of differential equations, from a prescribed list.
3. Applied mathematics. Complete one 3-credit, 500-level course from a prescribed list.
4. Teaching assistants and teaching aides who have classroom or laboratory instructional responsibilities must satisfactorily complete ENGR 588. Those with responsibilities limited to grading, holding office hours, and offering problem sessions must take ENGR 588 or a grading seminar.

Master of Engineering Degree Requirements

The M.Eng. degree is a nonthesis professional master’s degree. A total of 30 credits are required, including courses in the core requirements. A minimum of 18 credits must be taken at the 500-level are required. At least 18 credits in Aerospace Engineering courses are required, and a student may count a maximum of 9 credits of 400-level course work toward the degree. Each student must complete the capstone course.

Master of Science Degree Requirements

A total of 30 credits is required, including courses in the core requirements. Twelve credits must be in Aerospace Engineering courses with at least 6 credits at the 500 level. A student may count a maximum of 6 credits of 400-level course work toward the degree. Six credits of thesis research are also required. A completed M.S. thesis and its public presentation are required for graduation.

Doctoral Degree Requirements

There is no foreign language requirement for the Ph.D. degree; however, students must demonstrate proficiency in reading, writing, and speaking English through an examination administered by the department. This must be completed to satisfy the Graduate School's requirement before taking the comprehensive exam. The candidate's doctoral committee decides which, if any, courses are required in addition to those specified in the core requirements; this typically involves 24 course credits beyond the M.S. degree. Ph.D. candidates must also demonstrate evidence of experimental experience.

Over the course of a Ph.D. program, the department and doctoral committee administer three examinations: The candidacy examination is given as a preliminary aptitude test before the end of the second semester following admission to the program. A comprehensive examination, which covers the major and minor fields of study, is administered after the candidate has substantially completed the required course work. The final oral examination, which is related mainly to the dissertation, is given after the candidate has satisfied all other degree requirements. All Ph.D. students must maintain continuous registration until the thesis is approved. A completed Ph.D. dissertation and its public defense are required for graduation.

Student Aid

Graduate assistantships and other forms of financial aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

AEROSPACE ENGINEERING (AERSP) course list

Last Revised by the Department: Summer 2015

Blue Sheet Item #: 44-01-000

Review Date: 08/25/2015

African American and Diaspora Studies

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Degree Conferred

Students electing this program through participating departments will earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (graduate program name) and African American and Diaspora Studies.
The following graduate program offers a dual-title degree in African American and Diaspora Studies: Art Education, English, History, and Philosophy.

The Graduate Faculty

The Program

The primary objective of the dual-title degree program in African American Studies is to expand teaching, research, and scholarship on the nearly one billion people of African descent scattered across several regions of the world. As a program committed to integrating knowledge produced across disciplines and to crediting the importance of historical considerations, it will reinforce and broaden the knowledge that students acquire and that scholars typically cultivate in the traditional disciplines. This is accomplished through partnerships with allied disciplines, such as History, Political Science, Philosophy, English, Comparative Literature, and Art Education. Graduate students are trained to describe, analyze, and evaluate the practices, phenomena, and policies that both issue from and structure the experiences and possibilities of African-descended peoples in the Americas and in African diasporic populations around the world. Students in more traditional disciplines such as English or History who want to acquire formal knowledge about African Americans and the African Diaspora beyond what is offered by their home departments will be able to acquire that knowledge through the seminars offered in this program. The program aims to produce Penn State doctoral graduates with a competitive advantage for African American and Diaspora Studies-related employment in academia and elsewhere.

Admission Requirements

For admission to the dual-title Ph.D. degree under this program, a student must first apply and be admitted to an approved partnering graduate program. Once accepted by the partnering graduate program, the student can apply to the African American and Diaspora Studies Admissions Committee, which will be composed of graduate faculty in the Department of African American Studies. The application must include a statement of purpose that addresses how the student's research and professional goals intersect with the objectives of the dual-title graduate degree program in African American and Diaspora Studies. The Admissions Committee reviews applications and recommends students for admission to the dual-title PhD program in African American and Diaspora Studies.

Students may apply to the dual-title program when they request admission to the partner department, or at any time prior to taking the candidacy exam in the primary graduate program, provided that they secure the approval of the graduate director of the partner department. Practically speaking, this will likely mean applying to the dual-title program before completing the second year of study in the partner department. Students applying to the dual-title degree program should be aware that participating in a dual-title program may require additional time to complete the degree; students should plan ahead to secure sufficient funding.

The African American and Diaspora Studies dual-title graduate degree program will follow the timetable and admission requirements of its partnering graduate programs.

GPA and GRE Requirements

Applicants entering with only an undergraduate degree should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale), and, where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken. Exceptions to the minimum GPA requirement may be made for students with special backgrounds, abilities, and interests. Each applicant must submit the scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application.

Degree Requirements

The minimum course requirements for this dual-title Ph.D. degree are as follows:

15 credits of course work related to African American and Diaspora Studies, all at the 500 level or above. Of these 15 credits, 9 must come from the required core course sequence in African American and Diaspora Studies, which comprises the following courses:

AFRICAN AMERICAN STUDIES (AF AM)

501. Seminar in African American and Diaspora Studies (3 crs)
502. Blacks in the African Diaspora (3 crs)
503. Sexual and Gender Politics (3 crs)

Students must also take 6 elective credits, all of which must come either from the list below or otherwise have the prior approval of African American and Diaspora Studies supervising faculty. Over time, additional courses may be added to the list of acceptable electives. The director of graduate studies in the Department of African American Studies will maintain a comprehensive list of approved courses. Particular courses may simultaneously satisfy requirements in History and in African American and Diaspora Studies. Students who already hold a master's degree from another institution may petition to have up to 6 equivalent course credits recognized.

AFR 501. Key Issues in African Studies (3)

PHIL 539. Critical Philosophy of Race (3)

HIST 547. Slavery in the Americas (3)

HIST 549. Topics in African-American History (3)

HIST 551. The African American Freedom Struggle in the Twentieth Century (3)

HIST 572. Race and Empire in the Americas, Caribbean & Pacific (3)

ENGL 565. Period Studies in African-American Literature (3)

ENGL 566. Genre Studies in African-American Literature (3)

ENGL 567. Thematic Studies in African-American Literature (3)

ENGL 568. Gender Issues in African-American Literature (3)

Language Requirements

Communication and foreign language requirements will be determined by the academic advisers from the primary department.

Candidacy

The dual-title field must be fully integrated into the candidacy exam for the doctoral program. In addition, candidates for the dual-title Ph.D. in African American and Diaspora Studies will be required to present to their committee a portfolio of work in African American and Diaspora Studies which includes a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's interest in questions taken up by scholars of African American and Diaspora Studies.

Doctoral Committee Composition

For the dual-title Ph.D. degree, at least one member of the committee must be a member of the African American and Diaspora Studies graduate faculty. The doctoral committee for a dual-title doctoral degree student must include a minimum of four faculty members, i.e., a chair and at least three additional members, all of whom must be members of the Graduate Faculty, and one of which must be on the Graduate Faculty in the Department of African American Studies. If the chair is not faculty in African American Studies, then the committee member representing African American Studies must be appointed as co-chair. At least one regular member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This committee member is referred to as the "Outside Field Member." In cases where the candidate is also pursuing a dual-title field of study, the dual-title representative to the committee may serve as the Outside Field Member. Additionally, in order to avoid potential conflicts of interest, the primary appointment of at least one regular member of the doctoral committee must be in an administrative unit that is outside the unit in which the dissertation adviser's primary appointment is held (i.e., the adviser's administrative home; in the case of tenure-line faculty, this is the individual's tenure home). This committee member is referred to as the "Outside Unit Member." In the case of co-advisers, the Outside Unit Member must be from outside the administrative home(s) of both co-advisers. In some cases, an individual may have a primary appointment outside the administrative home of the student's dissertation adviser and also represent a field outside the student's major field of study; in such cases, the same individual may serve as both the Outside Field Member and the Outside Unit Member.

Comprehensive Exams

The African American and Diaspora Studies graduate faculty member on the student's committee is responsible for developing and administering the African American and Diaspora Studies portion of the student's comprehensive exams. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student's thematic or regional area of interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam will include the following components: broad history of the field, contemporary theory and debates, and either sexual and gender politics or a topic related to the student's specific area of interest.

Dissertation

The candidate must complete a dissertation and pass a final oral defense of that dissertation on a topic that reflects their original research and education in both the primary discipline and African American and Diaspora Studies in order to earn the dual- title Ph.D. degree.

Student Aid

Graduate assistantships and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin.*

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-07-001

Review Date: 06/11/2013

Faculty linked: 5/12/14; department head updated: 8/22/16

African Studies

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Degrees Conferred

Students electing this degree program through participating programs earn a degree with a dual title at the Ph.D. level, i.e., in (graduate program name) and African Studies.

The following graduate program offers a dual degree in African Studies: Ph.D. in Comparative Literature, French, Geography, and Political Science.

Graduate Faculty

Program Objectives of the Dual-Title Doctoral Degree Program in African Studies

The primary objective of the dual title degree program in African Studies is to expand teaching, research and scholarship on Africa and African societies at Penn State. This is accomplished by providing multidisciplinary training for Penn State doctoral students, who are undertaking graduate studies on Africa-related topics in a number of allied disciplines, such as geography, history, political science, sociology, comparative literature, public health, forestry, agricultural sciences, and international studies. The program complements training on Africa for graduate students in other areas such as business, law, and engineering. The program provides these various disciplines with an intellectual and physical location at which their African scholarship can be put to the most effective use for graduate students. The program uses the research projects and institutional networks of core and affiliate African Studies graduate faculty to provide research opportunities and linkages in Africa for Penn State doctoral students. The program aims to produce Penn State doctoral graduates, who have a comparative advantage for African Studies-related employment in academia, bilateral and multilateral agencies and international think-tanks.

Admission Requirements

Students must apply and be admitted to the primary graduate program and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to the major program and include remarks in their statement of purpose that address the ways in which their research and professional goals reflect an interest in African Studies-related research.

To be enrolled in the Dual Title Doctoral Degree Program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in their primary program.

General Graduate Council requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

The Dual-Title Doctoral Degree in African Studies is awarded to students who are admitted to a Ph.D. program that has adopted the dual-title degree program in African Studies. The minimum course requirements for the dual-title Ph.D. degree in African Studies are as follows.

- Course work and other requirements of the primary program.
- AFR 501(3)
- 18 credits of Africa-related coursework at the 400 or 500-level; a minimum of 6 of these credits must be taken from a list of courses maintained by the African Studies program chair.
- As many as 6 of the 18 credits may come from the primary program as approved by the student's academic advisers in the primary program and the African Studies Program.
- No more than 6 credits may be taken at the 400-level and no more than 6 combined credits may come from individual studies courses and/or foreign studies courses.
- Communication and foreign language requirements will be determined by the student and the academic advisers from the primary program and the African Studies Program.

The choice of electives in African Studies is to be proposed by the student subject to approval by the academic advisers from the primary program and the African Studies Program. The suite of selected courses should have an integrated, intellectual thrust, which probes a thematic, national or regional issue and that is complementary to the student's specialty in the primary program.

Language Requirement

The language requirement for the dual-title degree program is determined by the academic advisers in the primary program and the African Studies Program, in accordance with the existing language requirements of the primary program.

Candidacy Examination

The dual-title degree is guided by the Candidacy Exam procedure of the primary program. The candidacy exam for the dual-title degree may be given after at least 18 post-baccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the primary program. There will be a single candidacy examination, containing elements of both the major discipline and African Studies.

Doctoral Committee Composition

The doctoral committee of a dual-title doctoral degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty. The committee must include at least one member of the African Studies graduate faculty. The chair of the committee is typically from the primary program. If the chair is not also a member of the graduate faculty in African Studies, the member of the committee representing African Studies should be appointed as co-chair.

Comprehensive Examination

After completing all course work, doctoral candidates for the dual-title doctoral degree in the primary discipline and African Studies must pass a comprehensive examination that includes written and oral components. Written components are administered on a candidate's primary discipline and in African Studies. The African Studies representative on the student's doctoral committee develops questions for and participates in the evaluation of the comprehensive examination. The African Studies component of the exam is based on the student's thematic, national or regional area of interest and specialization in African Studies.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both the primary discipline and African Studies.

Last Revised by the Department: Spring Semester 2012
Blue Sheet Item #: 40-07-013
Review Date: 06/12/2012
Faculty updated: 5/27/16

Agronomy (AGRO)

Program Home Page

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814-863-1017

Degrees Conferred:

Ph.D., M.S.
Dual-Title M.S. in Agronomy and International Agriculture and Development
Dual-Title Ph.D. in Agronomy and International Agriculture and Development

The Graduate Faculty

The Program

The Agronomy program is administered in the Department of Plant Science, College of Agricultural Sciences. Each student will be associated with an adviser who may provide financial support, research facilities, and/or office space. Applicants are encouraged to explore, study, and research opportunities by contacting faculty who may be prospective advisers.

This program provides opportunities for candidates interested in Agronomy to become a professional leader and an independent scholar. Faculty in this program are competent to prepare candidates in the subfields of Agronomy including: plant ecology, plant genomics, plant breeding, plant physiology, and field and forage crop management.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, are required for admission. At the discretion of the graduate standards committee, a student may be admitted for graduate study in the program without these scores.

Prerequisites for major work in Agronomy vary with the area of specialization and the degree sought, but courses in chemistry, mathematics, physics, geology, basic and applied biological sciences, and English communication skills are required. A baccalaureate degree in basic or applied natural sciences is preferred for M.S. degree applicants.

A minimum junior/senior grade-point average 3.00 (on a 4.00 scale) is required in all courses in the biological and physical sciences regardless of when taken. Exceptions to these requirements may be made for students with special backgrounds, abilities, and interests.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 31 credits at the 400, 500, 600, or 800 level is required, with least 18 credits at the 500 and 600 level, combined, including:

- 12 credits of 400- or 500-level formal courses in the major field (at least 6 credits at the 500-level)
- 6 credits of 400- or 500-level formal courses in a minor or general studies area
- 3 credits in statistical methods at the 500-level
- AGRO 501 (1 cr.)
- AGRO 555 (2 cr.)
- AGRO 590 (1 cr.)
- 6 credits of thesis research (AGRO 600 or 610)

Students are required to participate in AGRO 590 each semester they are registered, but can only count a maximum of 1 credit of AGRO 590 towards the degree. In addition, M.S. students are required to complete 1 credit of Supervised Experience in College Teaching (AGRO 602); however, this 1 credit cannot be counted towards the degree requirements. The remaining elective credits may be chosen from a list of approved electives maintained by the program office.

The thesis must be accepted by the advisory committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

While a minimum number of courses for the degree is not specified, the doctoral advisory committee has the responsibility of specifying courses and credits essential for the education and development of the candidate. Students are expected to be educated in depth in a specific subfield of agronomy and to have a perspective of the general field. Normally, 55 to 60 credits in formal course work beyond the B.S. degree are required including:

- 12 credits of 500-level formal courses beyond the B.S. degree
- A minor or general studies course work
- 6 credits in statistical methods beyond the B.S. degree, of which a minimum of 3 credits must be at the 500 level
- AGRO 501 (1 cr.)
- AGRO 590 (1 cr.)
- 12 credits of dissertation research (AGRO 600 or 610)

Doctoral candidates are required to participate regularly in a departmental seminar and to register for at least 2 credits of the seminar during the Ph.D. program. However, only 1 credit of AGRO 590 can be counted towards the degree. In addition, Ph.D. students are required to complete 2 credits of Supervised Experience in College Teaching (AGRO 602); however, these 2 credits cannot be counted towards the degree requirements.

The communication requirement for the Ph.D. degree may be met by completing at least 6 credits of course work in an area of English communications approved by the student's doctoral committee.

Every student has a close professional relationship with his or her faculty adviser. While research that is done for the thesis will be on subjects that fall within the ongoing research program of the adviser, students are encouraged to propose research projects that are of interest to them. The department encourages professional development of students through participation in meetings of relevant professional societies and organizations.

Dual-Title Graduate Degree in Agronomy (AGRO) and International Agriculture and Development (INTAD)

Graduate students with research and educational interests in international agriculture may apply to the dual-title degree program in Agronomy and International Agriculture and Development. The goal of the dual-title degree in AGRO and INTAD is to enable graduate students from AGRO to acquire the knowledge and skills of their primary area of specialization in AGRO, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, engineering, outreach, and project management anywhere in the world. Students acquire a broad perspective on how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can effectively engage in agricultural development activities within various countries and regions.

Admission Requirements

Students must apply and be admitted to the graduate program in AGRO and the Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of the INTAD Bulletin page. Doctoral students must be admitted into the dual-title degree program in INTAD prior to obtaining candidacy in their primary graduate program.

Degree Requirements for AGRO/INTAD Dual-Title M.S.

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree, listed above. In addition, students must complete the degree requirements for the dual-title M.S. in INTAD, listed on the INTAD Bulletin page. Up to 6 credits of INTAD approved courses can be applied to fulfilling AGRO program requirements. Final course selection must be approved by the student's advisory committee.

Degree Requirements for AGRO/INTAD Dual-Title Ph.D.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed above. In addition, students must complete the degree requirements for the dual-title Ph.D. in INTAD, listed on the INTAD Bulletin page. Some courses may satisfy both AGRO program requirements and those of the INTAD program. Up to 6 credits of INTAD approved courses can be applied to fulfilling AGRO program requirements. Final course selection must be approved by the student's committee.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from AGRO and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. There will be a single candidacy examination, containing elements of both AGRO and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an AGRO and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in AGRO and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

AGRONOMY (AGRO) course list *See also*
Soil Science
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DATE LAST REVIEWED: 5/11/04

Last Revised by the Department: Summer Session 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/17

Faculty linked: 5/12/14

Contact info updated: 7/22/16

American Studies (AMSTD)

Program Home Page

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Degrees Conferred:

M.A., Ph.D.
Integrated B.A./M.A.

The Graduate Faculty

The M.A. Degree Program

The M.A. degree program, offered at Penn State Harrisburg, emphasizes the study of American society and culture. It serves students who want to investigate the American experience and apply their studies in a variety of professions, including education, government, communications, and museums. It is the distinguishing characteristic of the program that the large majority of its course offerings are taught by faculty trained in the discipline of American Studies and these courses have the AM ST prefix for "American Studies." The program offers a number of concentrations including folklore, cultural history (politics, popular culture, media studies), international American Studies, material and visual culture (art, architecture, craft, landscape, food, clothing, medicine), public heritage (museums, historic preservation, archiving, cultural resource management), race and ethnicity, and regional studies.

The campus is located in a rich cultural region, which includes Amish Farmlands, Gettysburg, Hershey, Steelton, Ephrata, Carlisle, York, and Harrisburg. Additionally, proximity to the major cities of Philadelphia, Pittsburgh, Baltimore, Washington, D.C., and New York offer a host of research options for students. Strong ties with local educational and cultural institutions, including the Pennsylvania Historical and Museum Commission, State Museum of Pennsylvania, Landis Valley Musuem, Hershey Museum, National Civil War Museum, and the Dauphin County Historical Society, Cumberland County Historical Society, and other public heritage resources provide excellent learning opportunities for students.

The M.A. degree can be earned by full- or part-time study. Most 500-level courses are offered in the evening as the program strives to meet students' needs.

Admission Requirements

The M.A. degree program in American Studies accepts students from a wide array of disciplines--particularly art, history, English, sociology, and anthropology--but recommends educational preparation related to the interdisciplinary study of American culture. An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. All applicants must submit: a completed Graduate School online application form with the application fee; two official transcripts of all colleges and universities attended (minimum of 2.75 junior/senior grade-point average on a 4.00 scale); two letters of recommendation from individuals who can attest to the student's ability to handle graduate study; a statement of intent (approximately 500 to 1,000 words outlining their preparation for study, proposed fields of study, and career goals); and a sample of written work (seminar paper or equivalent research paper) as evidence of their American research and writing skills.

Students applying for scholarships and assistantships are requested to submit general examination scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application. The GRE is recommended, but not required, for admission.

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

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

Degree Requirements

The student is required to take a minimum of 30 credits (non-thesis)-33 (thesis) in American Studies, including at least 18 credits in the 500 series; AM ST 500, 591, and AM ST 580 or 600 are required. AM ST 500 should be taken within the first two semesters of study; AM ST 591 should be taken in the last two semesters of study. Usually in the last semester of study, students are required to complete their program with a major paper by taking AM ST 580 (Project) or thesis, in which case AM ST 600 is taken. The choice of AM ST 580 to fulfill graduation requirements is for an original scholarly master's paper or project. One to 6 credits in AM ST 580 can be earned; the typical number of credits for the culminating project is 3. The choice of AM ST 600 is for a thesis and is taken for 6 credits. The thesis must follow the guidelines established by the Thesis Office of the Graduate School (see http://www.gradsch.psu.edu/current/thesis.html).

Advanced undergraduate courses (400-level) that have not counted toward a student's undergraduate degree may be considered for transfer into the graduate student's requirement of 30 credits of American Studies with permission of the program and approval of the Graduate School. At least 20 of the 30 credits must be earned at the Harrisburg location where the program is offered. Courses not having an American Studies designation but which are relevant to American Studies may be considered for inclusion in the student's requirement of 30 credits of American Studies with permission of the program.

Integrated B.A./M.A. in American Studies

The American Studies Program offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students enrolled in the American Studies major to obtain both the B.A. and the M.A. degrees in American Studies within five years of study. The first two years of undergraduate coursework typically include the University General Education requirements and lower-level courses. In the third year, students typically take upper-division coursework in American Studies and define areas of interest. The fourth year involves graduate-level American Studies coursework including required courses in American Studies Theory and Methods (AM ST 500). The fifth and final year of the program typically consists of graduate coursework in American Studies including Seminar (AM ST 591) and identification of a research project that will culminate in the completion of a M.A. project (AM ST 580) or thesis (AM ST 600).

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program will help the student more clearly define his/her area of interest and expertise in the broad field of American Studies. As a result, long-range academic planning for exceptional students pursuing doctoral degrees or other professional goals after leaving Penn State will be greatly enhanced. For most students, the total time required to reach completion of the higher degree will be shortened by about a year. The student will have earlier contact with the rigors of graduate study and with graduate faculty. The resources of the Graduate School are accessible to students accepted into the IUG program. Students in their third and fourth year of study with

IUG status benefit from their association with graduate students whose level of work parallel their own.

For the IUG American Studies B.A./M.A. degree, a minimum of 123 credits are required for the B.A. and a minimum of 30–33 credits for the M.A. (30 for non-thesis; 33 for thesis). Twelve credits at the 400 level or higher, in consultation with the adviser, can apply to both the B.A. and M.A. degrees; at least 6 of these 12 credits must be at the 500 level.

If for any reason a student admitted to the B.A./M.A. program is unable to complete the requirement for the Master of Arts degree program in American Studies, the student will be permitted to receive the B.A. degree assuming all degree requirements have been satisfactorily completed.

Admission Requirements

The number of openings in the integrated B.A./M.A. program is limited. Admission will be selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the American Studies B.A. program and meet the admission requirements of the American Studies M.A. program.
2. Must apply and be admitted to the Graduate School.
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
4. Must have completed at least one 400-level American Studies course (AM ST prefix) with a grade of A.
5. Must submit transcript(s) of previous undergraduate work, recommendations from two faculty members, writing sample, and statement of goals.
6. Must have an overall GPA at or above 3.3 (on a 4.0 scale) in undergraduate coursework and a GPA at or above 3.5 in all coursework completed for the American Studies major.
7. Must present a plan of study approved by the student's adviser in the application process.

Course Load

As many as 12 of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs. The courses to be double counted are:

AM ST 491W (two seminars on different topics)—6 credits during the student's fourth (senior) year
AM ST 500 –3 credits during the student's fourth (senior) year
AM ST 591—3 credits during the student's fifth year

With the approval of the student's adviser, students may take American Studies courses from the 100 to 400 levels at Penn State campuses other than Harrisburg, but 500-level courses must be taken at the Harrisburg campus.

Sample Sequence of Course Work

A typical sequence of coursework for the integrated program would appear as follows (AM ST 491W, AM ST 500, and AM ST 591 are applied to both undergraduate and graduate degree programs):

YEAR	FALL		SPRING	
3rd (Junior)	AM ST 100	3	AM ST supporting course	3
	AM ST supporting course	3	400-level AM ST course	3
	BA Requirement: Other Cultures	3	400-level AM ST course	3
	BA Requirement: Knowledge Domain	3	Elective	3
	Elective	3	Elective	
	Total	15	Total	15
4th (Senior)	**AM ST 491W***	3	**AM ST 491W***	3
	400-level AM ST course	3	400 level AM ST course	3
	400-level AM ST supporting course	3	**AM ST 500***	3
	Elective	3	500 level AM ST course	3
	Elective	3	Elective	3
	Total	15	Total	15
5th (Graduate)	500-level AM ST course	3	500-level AM ST course	3
	500-level AM ST course	3	AM ST 580 or AM ST 600	3-6
	500-level AM ST course	3	**AM ST 591***	3
	Total	9	Total	9-12

*Satisfies requirements for both the undergraduate and graduate program for a total of 12 credits

As stated in the Graduate Bulletin, a minimum grade-point average of 3.00 for work done at the University is required for graduation and to maintain good academic standing. See http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=masters.

The Ph.D. Program

The Doctor of Philosophy Program in American Studies represents the study of the United States as an academic field with its own developed theories, methods, and applications. Taking advantage of its location in a capital region with internationally known heritage sites and American Studies resources such as the Gettysburg Battlefield, Three-Mile Island, Hershey, Steelton, Anthracite Coal Region, and Amish Country, it emphasizes critical cultural inquiry and the application of American Studies to public heritage, public policy, and cultural resource management--including governmental work, museums, cultural agencies, education, archives and records management, public policy, and communications. A foundation for this application is an understanding of the American experience developed within the intellectual legacy of American Studies.

Graduates of the program are typically oriented toward public practice as well as scholarship in American Studies--integrating perspectives on United States history, culture, and society. Students have opportunities for internships and field experiences outside the classroom. In addition to preparation for academic teaching and writing, the program is distinctively concerned among other doctoral departments of American Studies with the production of public scholars and leadership careers outside of academe. The program strives to cover America broadly in its national and international contexts, work with local resources and institutions, and to develop a focus on cultural expression and identity, including areas of material and visual culture; folk and popular culture; race, ethnicity, and gender; and literature, performance, and media.

The program requires enrollment as a full-time student for at least two consecutive semesters--9 credits per semester (summer sessions not included). A doctoral student is required to complete the program, including defense and acceptance of the doctoral dissertation, within eight years after admission to candidacy.

Admission Requirements

Applicants for the Doctor of Philosophy in American Studies must hold a master's degree in American Studies, or a related field emphasizing American cultural scholarship and public heritage work such as history, English, sociology, political science, folklore, cultural studies, performance studies, ethnic studies, gender studies, communications, art history, museum and library studies, education, and cultural resource management.

Students are required to submit the following:

- a completed Graduate School online application with the application fee;
- two transcripts of all undergraduate and graduate course work;
- scores from the Graduate Record Examination (GRE);
- three letters of reference attesting to both academic and professional capabilities. (At least two of these letters should be from academic sources, such as professors or academic advisers);
- a letter of 500 to 1000 words outlining significant scholarly and applied experience, career goals, commitment to American Studies as a field, and academic objectives;
- a recent personal curriculum vitae;
- a paper from a graduate course taken previously or publication demonstrating research and compositional skills.

Admission is highly competitive and the best-qualified students will be admitted subject to space availability and compatibility of the student with the program's research mission. Successful applicants with an M.A. typically have a GPA of 3.5 or above (on a 4.0 scale) in their graduate work.

International Students

International applicants must hold the equivalent of an American master's degree. They must submit official or attested university records, with certified translations if the records are not in English. Notarized copies are not sufficient.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 500 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

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

Residency

Over some twelve-month period during the interval between admission to the Ph.D. program and completion of the Ph.D. program, the candidate must spend at least two semesters (summer sessions are not included) as a registered full-time student (9 credits per semester) engaged in academic work at Penn State Harrisburg.

The Curriculum

Students progress through the following phases and take courses designated by their doctoral committee as part of their study for the Ph.D.

Candidacy

In this initial phase, the student must (1) make up any deficiencies in graduate courses in American Studies noted in the letter of acceptance, and (2) complete with a grade of B or better the following courses--AM ST 500 (Theory and Method), two sections of AM ST 502 (Problems in American Studies) on different topics, AM ST 591 (Seminar), and (3) pass a candidacy examination. Admitted students who have met all course prerequisites begin the core courses with AM ST 500 (Theory and Method). Students who have already taken AM ST 500 within three years of admission may begin their program of study with AM ST 502 (Problems in American Studies).

The candidacy examination is administered by a special committee appointed by the director of the doctoral program. After the exam is passed, a student is advanced to doctoral candidacy. General guidance of a doctoral candidate is the responsibility of a doctoral committee consisting of four or more active members of the Graduate Faculty, which includes at least two faculty members in the major field of American Studies. The dissertation adviser must be a member of the doctoral committee. The dissertation adviser usually serves as chair, but this is not required. If the candidate is also pursuing a dual-title field of study, a co-chair representing the dual-title field must be appointed. In most cases, the same individual (e.g., dissertation adviser) is a member of the Graduate Faculty in both the major and dual-title fields, and in such cases may serve as sole chair.

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

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

If the candidate has a minor, that field must be represented on the committee by a “Minor Field Member.” The doctoral committee is appointed by the Graduate School dean through the Office of Graduate Enrollment Services, upon recommendation of the head of the major program, soon after the student is admitted to candidacy. The dean may on occasion appoint one or more members of the committee in addition to those recommended by the head of the program.

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

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

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

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

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

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

The Comprehensive Examination

Students must be registered as a full-time or part-time degree student for the semester (excluding summer session) in which the comprehensive examination is taken. The timing of the examination is after coursework in subfields is completed. The written examination consists of three parts and is administered by the student's doctoral committee. One is in the area of Theory and Method and an additional two subfields of study from a list of five areas covered in the program. The five subfields of specialization are:

1. Public Heritage, Cultural Resource Management, and Museum Studies;
2. Folk and Popular Culture (material and visual culture, literature and media, language, performance, media, and music);
3. Interdisciplinary History and Politics (history of ideas, philosophy, and politics; biography and oral history; everyday life and socioeconomic studies; government, public policy, and diplomacy);
4. Society and Ethnography (race, ethnicity, class, gender, age; religion and belief; comparative culture and transnationalism);
5. Regional, Environmental, Urban, and Local Studies.

Additional subfields of study within American Studies may be selected with the approval of the student's doctoral committee. An oral defense of the comprehensive examination is scheduled after the written examination, at which time it is customary for the candidate to present the dissertation proposal.

Although the exact number of courses required in each subfield may vary among students, typically four per subfield are required. Doctoral committees meet with students at least once each academic year. Written and oral comprehensive examinations in the three areas are given at the end of the study period.

The Dissertation

Under guidance from the doctoral committee, the candidate prepares a detailed research proposal that serves as the basis for the written dissertation covering an aspect of American Studies. The dissertation should represent a significant contribution to knowledge, show familiarity with the intellectual heritage of American Studies, be presented in a scholarly manner, reveal an ability on the part of the candidate to do independent research of high quality, and indicate considerable experience in using a variety of research techniques and forms of primary evidence. The contents and conclusions of the dissertation must be defended at the time of the final oral examination. Once the research proposal is approved, the student can enroll in AM ST 600 (Thesis in American Studies) for on-campus work or AM ST 610 (Thesis Research Off-Campus). The writing and defense of this original contribution to the theory and practice of American Studies is the capstone to the Ph.D. program. A student must be registered continuously for each Fall and Spring semester, beginning with the first semester after the comprehensive examination requirement and residency requirement have been met, until the dissertation is accepted and approved by the dissertation committee. To maintain continuous registration, candidates may register for noncredit AM ST 601 (Ph.D. Dissertation Full-Time) or 611 (Ph.D. Dissertation Part-Time), with payment of the special dissertation preparation fee; students who want to combine course work with dissertation preparation must register for AM ST 600 or 611 (not 601 which is for full-time dissertation preparation) plus course registration at the regular per-credit fee. For more information on academic procedures, see http://bulletins.psu.edu/bulletins/whitebook/academic_procedures.cfm

The final examination of the doctoral candidate is an oral examination (defense) administered and evaluated by the entire doctoral committee. This oral defense is open to the public and related in large part to the dissertation, but it may cover the candidate's whole program of study. The Committee may restrict part of the defense to its members and the candidate. The candidate must be registered as a full-time or part-time degree student for the semester in which the oral defense is held.

Grade-Point Average and Time Limit

A minimum grade-point average of 3.0 (on a 4.0 scale) for work done in the American Studies doctoral program at the University is required for doctoral candidacy, for admission to the comprehensive examination, the final oral examination, and for graduation.

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

Financial Aid

A limited number of scholarships, loans, and grants are available from the University. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find available options from the University, contact the Financial Aid Office at 717-948-6307. For more information, see php.scripts.psu.edu/dept/iit/hbg/academics/gradaid.php

Graduate School Funding Programs

Full-time incoming doctoral students starting in the fall semester with a record of scholarly excellence may qualify for a University Graduate Fellowship, Bunton-Waller Graduate Scholar Awards, and other programs. Interested students should contact the program chair, who is responsible for nominating students. For more information, see www.gradsch.psu.edu/prospective/funding/programs.html

Capital College Funding Programs

Full-time incoming graduate students may qualify for a Capital College Assistantship and other programs. Students must be nominated for an assistantship by the program chair. For more information, see php.scripts.psu.edu/dept/iit/hbg/academics/gradaid.php

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

AMERICAN STUDIES (AM ST) course list

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 42-01-121

Review Date: 08/20/13

Faculty linked: 8/14/14

Animal Science (AN SC)

Program Home Page

Terry D. Etherton, *Head of the Department of Animal Science*
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814-863-2102

Degrees Conferred:

Ph.D., M.S., M.P.S.

The Graduate Faculty

Students may specialize in animal care and management, breeding and genetics, growth and development, lactational biology, nutrition, or reproductive biology. Well-equipped research laboratories and various agricultural animals, as well as small-animal models and wildlife species, are available.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Prerequisite to graduate work is the completion of an undergraduate major in animal science, dairy science, poultry science, or a related biological science.

Scores from the Graduate Record Examinations (GRE) are required for admission (average percentile at least 50 percent in verbal, quantitative, and analytical components). The quantitative reasoning component is recommended, but the program will accept scores from the mathematical reasoning component. Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission on a competitive basis.

Exceptions to admission requirements may be made for students with special backgrounds, abilities, and interests.

Degree Requirements

The M.P.S. is a professional program designed to prepare individuals for specialist and management positions in county agricultural extension, government, or industry and does not require a thesis. The academic M.S. and Ph.D. programs require a thesis and are designed for those primarily interested in education and research. The requirements of these programs are detailed in the departmental publication "Graduate Student Handbook in Animal Science." The communication or foreign language requirement for the Ph.D. degree may be satisfied by competence in either one foreign language or communication skills.

Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the STUDENT AID section of the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ANIMAL SCIENCE (AN SC) course list

Last Revised by the Department: Summer Session 2008

Blue Sheet Item #: 36-04-063/063A

Review Date: 1/15/08

Faculty linked: 5/12/14

Anatomy (ANAT)

Program Home Page

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Hershey, PA 17033
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Degrees Conferred:

Ph.D., M.S., Dual-Title Ph.D. in Anatomy and Clinical and Translational Sciences

The Graduate Faculty

The Program

The Anatomy (ANAT) Graduate Program provides students curricular training with a unique focus on human anatomy, health and disease, and the opportunity for concentrated research in a related discipline such as biochemistry, cell biology, embryology, genetics, immunology, neuroscience, pharmacology, physiology, structural biology, and virology. Students receive rigorous training that provides the skills necessary to be leaders in biomedical research and other endeavors that benefit from a rigorous scientific background, including education, law, journalism, and public policy. A dual-title degree in Anatomy and Clinical and Translational Sciences expands the educational experience of students training in anatomical science to include training, via a unique curriculum and research focus, for career paths that involve clinical trials or clinical research programs.

The first-year Fall curriculum provides 12 credits of the necessary core material that encompasses human gross anatomy, human embryology, and human microscopic anatomy (histology) for the anatomy degree and includes: 1) ANAT 503, 2) ANAT 512, 3) ANAT 505, and 4) ANAT 506. In addition, the Fall curriculum includes a one-credit Colloquium which introduces the student to professionalism, scientific communication, and addresses manuscript evaluation and writing, as well as scientific methodology and techniques that will be discussed in subsequent coursework. The professionalism elements reinforce ethics courses but focus on regulatory issues of animal or patient use and research. The first-year Spring curriculum includes one 3-credit course focusing on neuroanatomical studies (NEURO 511). In addition, during the first year, students complete three research rotations that expose them to the wide range of research interests of The Pennsylvania State University graduate faculty from both basic and clinical science departments at the College of Medicine in Hershey. These rotations serve to inform the students with regard to choosing a thesis or dissertation adviser and forming a master's or doctoral committee. In addition students are advised to take ethics, statistics and electives. The doctoral students also complete their candidacy examination which entails an oral presentation and a written examination on anatomical coursework. In the Fall of the second year, the students are engaged in 2 credits of Supervised Teaching (ANAT 602) that allows them to have a full complement of experiences in lecturing, dissecting, preparation of exams, and tutoring students. In addition, the requirements involve a 6-credit BMS course on Biomedical Sciences that encompasses 6 modules providing underlying principles of basic cellular processes of medical sciences.
Successful completion of the Program results in conferral of the master's or doctoral degree in Anatomy.

The Anatomy Graduate Program is an interdepartmental program that engages faculty from 4 basic science and 9 clinical science departments. This broad-reaching Program provides students a wide ranging understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is the hallmark of biomedical sciences in the 21st century.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

1. Completed official Penn State Graduate School Application for Admission; Master's or Doctoral Degree
2. Graduate Record Examinations (GRE) general test
3. Three letters of recommendation
4. Statement of goals including a) your reasons for applying to the Anatomy Graduate Program, b) particular areas of research interests if known, and c) long-term career goals
5. Post-secondary course work must include biochemistry and molecular biology or genetics.

Dual-Title Ph.D. Degree in Anatomy and Clinical and Translational Sciences Admission Requirements

Potential Dual-Title trainees will express an interest in the Dual-title Degree as early as during the recruitment process for the Anatomy Graduate Program, and may apply for the dual-title Ph.D. in Anatomy and Clinical and Translational Sciences following admission to the Graduate School and to the Anatomy Program and prior to taking the candidacy examination in Anatomy, no later than the end of the third semester of graduate study in Anatomy. Students interested in the Dual-Title Degree will be considered for admission to the Clinical and Translational Sciences Program by a committee consisting of the Clinical and Translational Sciences Program co-directors and faculty affiliated with the Clinical and Translational Sciences Dual-Title Program. To apply, the student must submit the following documentation to the Clinical and Translational Sciences Dual-title Program:

1. A statement of interest, including the applicant's reasons for pursuing a career that includes clinical/translational science.
2. A letter from the candidate's research mentor which endorses the candidate's participation in the Clinical and Translational Sciences Dual-title Program.
3. A letter of support from the head of the candidate's primary program. If the candidate has not yet selected a research mentor, the program head's letter should describe the program's support of the candidate's desire to incorporate clinical/translational research in the candidate's training plans.
4. A description of the candidate's academic performance to date.

Degree Requirements

Master's Degree Requirements

1. Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.
   The Anatomy Program actively recruits students to earn an M.S. degree. To receive an M.S. degree in Anatomy, at least 30 credits are required (400-, 500-, 600-, or 700-level) with a minimum of 18 credits from courses at the 500 and 600 level courses combined.
   1. **Required Program Courses**: ANAT 503 (6 credits); ANAT 512 (2 credits); ANAT 505 (2 credits); and ANAT 506 (2 credits). In addition one semester of ANAT 590 (1 credit assigned an "R" grade), 1 semester of a Biomedical Ethics course (1 credit), and 10 credits of elective course work must be completed. NEURO 511 (3 credits) is highly recommended as an elective, but is optional.
   2. **Required Program Courses**: ANAT 600 (6 credits).

   Students must complete original laboratory research that culminates in a thesis. The thesis must be accepted by the advisers and/or committee

members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. Additionally, all requirements listed in the Graduate Bulletin for the M.S. degree must be fulfilled.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

During the Fall semester of the first year of study, Ph.D. students are required to take ANAT 503 (6 credits); ANAT 505 (2 credits); ANAT 506 (2 credits); ANAT 512 (2 credits); ANAT 590 (1 credit assigned an "R" grade). In the Spring semester, students are required to take NEURO 511 (3 credits); PHS 500 (1 credit); and ANAT 596 (1-3 credits). In addition, each student must complete research rotations, as well as elective courses that may include statistics or other electives. Each student for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.
At the end of the first year, admission to Ph.D. candidacy is determined by performance in course work, laboratory rotations, and the ANAT Graduate Program Candidacy examination. Students join their research laboratory by the end of the summer of the first year.

Doctoral Committee

The Doctoral committee is formed upon entry into the dissertation laboratory, and must comply with the Graduate Council doctoral committee requirements. The committee must include three Anatomy Graduate Program faculty, with at least *two* faculty members in the major field.

During the second year, students take BMS 501 (3 credits), BMS 502 (3 credits), and ANAT 602 (2-3 credits for participation in structured teaching), and elective courses (including statistics and ethics if not otherwise completed) that are selected in consultation with the candidates' dissertation adviser and doctoral committee.

Ph.D. candidates must pass a written comprehensive examination in the format of a grant application prior to the end of the fifth semester of enrollment. As part of this examination, the candidate also gives an oral presentation of this proposal to the candidate's doctoral committee.

It is expected that the Ph.D. candidate will have at least one paper submitted for publication in a major peer-reviewed scientific journal prior to the final oral examination (the dissertation defense). A dissertation must be prepared and defended by each Ph.D. candidate. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.
The Clinical and Translational Sciences Dual-title Program requires a minimum combined total of 18 required elective credits, including a minimum of 2 credits of CTS 590; 6 credits of CTS 595A, CTS 595B, or BMS 571; a maximum of 3 credits of electives at the 400-level; and a minimum of 15 credits of electives at the 500-, 700- or 900- level. The electives are selected from an approved list of courses available at the Clinical and Translational Sciences Dual-title Program office. Reciprocity between the Dual-title Ph.D. Program and the Anatomy Graduate Program allows for up to 7 of the elective credits required for the Clinical and Translational Sciences degree to be met simultaneously (ethics, statistics, and 1 elective).
Anatomy graduate students accepted to the Clinical and Translational Sciences Dual-Title Program will take the candidacy examination at the end of the third semester of graduate training: (1) to allow exposure to the Clinical and Translational Sciences Curriculum in the Spring semester of the first year and Fall semester of the second year, which will prepare the students for the integrated content of the dual-title candidacy exam, and 2) to allow sufficient time to identify and assure commitment of an appropriate dissertation adviser who embraces the dual-title program of the student. During the candidacy examination, the student will also be assessed for candidacy to the dual-title program, and at least one member of the candidacy committee must come from the dual-title program. Faculty members who hold appointments in both programs may serve in a combined role.
In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an Anatomy and Clinical and Translational Sciences dual-title doctoral degree student must include at least one member of the Clinical and Translational Sciences graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.
The committee chair will be a member of the Graduate Faculty in the primary area of study. Faculty members who hold appointments in both the primary area of study and the CTS program may serve in a combined role. If the committee chair does not serve in this combined role, the faculty member representing the CTS program must be designated co-chair of the committee. The CTS representative(s) will be expected to assist in constructing and evaluating comprehensive examination questions that cover the secondary area of study.
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and expertise in both Anatomy and Clinical and Translational Sciences. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Other Relevant Information

This program is offered only through the College of Medicine at the Penn State Milton S. Hershey Medical Center.

Student Aid

Graduate assistantships available to students in this Program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ANATOMY (ANAT) course list

Last Revised by the Department: Summer Semester 2016

Blue Sheet Item #: 44-07

Review Date: 6/28/16

Faculty linked: 8/14/14

Anthropology (ANTH)

Program Home Page

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Degrees Conferred:

Ph.D., M.A.
M.D./Ph.D.
Integrated B.A. in Anthropology and B.A. in Classics and Ancient Mediterranean Studies/ M.A. in Anthropology
Integrated B.S. in Anthropological Science and B.A. in Classics and Ancient Mediterranean Studies/ M.A. in Anthropology
Dual-Title Graduate Degree (M.A./Ph.D.) in Anthropology and Demography
Dual-Title Graduate Degree (Ph.D.) in Anthropology and Bioethics
Dual-Title Graduate Degree (M.A./Ph.D.) in Anthropology and Human Dimensions of Natural Resources and the Environment (HDNRE)

The Graduate Faculty

The Program

The Department of Anthropology at Penn State integrates social, ecological, and evolutionary approaches to understand variability in the human condition through time and across space. We offer an integrated program of graduate study at both the Ph.D. and M.A. level focusing on specialized training in human and behavioral ecology, cultural anthropology, anthropological demography, archaeology, archaeometry, genetics, human evolution, and the behavioral and evolutionary biology of human and non-human primates. Students also have the option of enrolling in dual-title Ph.D. graduate programs in Demography, Human Dimensions of Natural Resources and the Environment (HNDRE), and Bioethics, and dual-title M.A. programs in Demography and HDNRE. The Department also offers two Integrated Undergraduate/Graduate (IUG) programs (B.A/M.A. and B.S./B.A/M.A.): with the Department of Classics (CAMS). In addition, the Department of Anthropology also offers a joint M.D./Ph.D. degree program with the College of Medicine.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Entrance to the Anthropology graduate program occurs in the fall semester. Applications must be received by the department no later than December 1 for fall admission. The Department of Anthropology requires Ph.D. program applicants to submit official transcripts from all post-secondary institutions attended, Graduate Record Examinations (GRE) scores (verbal, quantitative, and analytical), a statement of purpose, a CV and at least three letters of recommendation from persons familiar with the applicant's academic performance. A Master's degree is not required to apply to the Ph.D. Program. The department does not admit students to the terminal Master's degree, but does allow students to apply for a Master's degree through admission to the IUG (Integrated Undergraduate and Graduate) program and Ph.D. degree program.

Students who are applying to the Integrated Undergraduate and Graduate (IUG) program must complete the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the Anthropology IUG graduate program. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Criteria for admission include a minimum GPA of 3.4 in their majors, strong recommendation letters from faculty, and an excellent proposal for a research project with a specific adviser who has agreed to guide the student through to the completion of the M.A. thesis or scholarly paper. In consultation with this adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

M.D./Ph.D. Admission Requirements

Prospective students interested in simultaneously pursuing a M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint-degree program. Admissions requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program section of the Penn State College of Medicine website. Applicants must also meet the admission requirements of the Graduate School and the Ph.D. admission requirements listed above, however, the requirement for GRE scores is waived for students applying to the joint degree program.. The M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the M.D. and Ph.D. programs. After the review committee has accepted an applicant to the joint degree program, s/he must apply to the Graduate School for admission to the graduate program. Applicants not accepted into the joint-degree program may be referred to either the M.D. or Ph.D. program, depending on their qualifications.

Applicants to this program generally have very strong grades and MCAT scores, as well as a strong and sustained background in research. Applicants must be able to clearly articulate reasons for pursuing the joint degree. Letters of recommendation from faculty who have advised the applicant in research and who can comment on the applicant's passion and potential for research are strongly encouraged.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with least 18 credits at the 500 and 600 level, combined. All Master's students are required to take the three core theory seminars (ANTH 560 Ecology Evolution and Human Behavior, ANTH 571 Principles of Human Evolutionary Biology, ANTH 588 Method and Theory in Archaeology) for a total of nine credits and two core methods seminars ANTH 572, Advances in Anthropolgical Methods and ANTH 573, Anthroplotgical Research Practicum, for a total of 6 credits. Students are also required to enroll in the literature review seminar (ANTH 541), for a total of 2 credits. Students can choose to complete a thesis or a scholarly paper as the culminating experience for the degree. Students who choose to complete a thesis must take a minimum of 6 thesis research credits (ANTH 600 or 610). The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School. Students in the non-thesis track must complete 18 credits at the 500 level, and must write a satisfactory scholarly paper, while enrolled in ANTH 596. All entering graduate students are expected to complete online training in Scholarship and Research Integrity (SARI), also referred to as Responsible Conduct of Research (RCR), by no later than October 1 of their first semester in residence. Additional course work is tailored to the student's research interests after advance consultation with their adviser, and specific courses may be required by the adviser depending on the student's background and research plans.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The doctoral degree in Anthropology requires a minimum of 30 credits, 27 of which are required coursework. All first-year Ph.D. students are required to register for 9-12 credits per semester and complete 15 credits of course work, including the three core theory seminars (ANTH 560, ANTH 571, ANTH 588) and two research method seminars, ANTH 572 and ANTH 573. The core method and theory courses will serve as the basis for the Ph.D. candidacy exam, which will take place at the end of the first year. In the fall of the second year, all students in the Ph.D. program who have advanced to candidacy should enroll for a total of 9-12 credits per semester, including ANTH 509. ANTH 508, Visualizing Anthropological Data, is required for all Ph.D. students and may be taken at any point in the first two years. Students without suitable preparation in statistics may also be required to take a course at the 400 or 500 level at the adviser's discretion. A student's doctoral committee can require additional course work depending on the student's background and research plans. All Ph.D. students are required to enroll in a one-unit literature review seminar (ANTH 541), for one credit each semester during the first six semesters of study. All entering graduate students are expected to complete online training in Scholarship and Research Integrity (SARI), also referred to as Responsible Conduct of Research (RCR), by no later than October 1 of their first semester in residence. A student's doctoral committee can require reading knowledge and/or demonstrated working knowledge of a foreign language, specialized training in linguistics, or training in computer programming languages, depending on the student's research interests. This will be determined shortly after the committee is formed. For the Ph.D. degree, students must conduct significant original research that demonstrates the student's mastery of the field. The Ph.D. requirements include successful completion of coursework as stipulated by the department and doctoral committee, passing the candidacy exam, preparing a dissertation proposal, successfully passing the comprehensive exam/dissertation proposal defense, and writing and defending the subsequent dissertation. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense)

M.D./Ph.D. Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits outlined below. Degree requirements for the M.D. program are listed on the Penn State College of Medicine website. For students enrolled in the joint degree program, the requirement for ANTH 572 and 573 will be waived, and students will be required to complete 2 credits of ANTH 541 instead of 6. The College of Medicine will accept 8 credits of ANTH 600 in lieu of two months of elective rotations (MED 797). In addition, the College of Medicine waives the requirement for a Medical Student Research project for students in the M.D./Ph.D. program."

If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the Ph.D. degree if all the Ph.D. degree requirements have been satisfied.

In addition to the requirements for the doctoral committee for a Ph.D. student in the ANTH Graduate Program, at least one member of the dissertation committee must be on the M.D./Ph.D. Steering Committee. This member may serve other roles on the doctoral committee.

M.D./Ph.D. students must complete 25 credits. Candidates for the M.D./Ph.D. in ANTH will take all of the core courses for the ANTH Ph.D., as well as electives chosen by the ANTH M.D./Ph.D. student in consultation with their primary mentor. In the first semester of the second year at UP, all students in the ANTH Ph.D. program who have advanced to candidacy are required to take ANTH 509, the research methods seminar. ANTH 508, Anthropological Data Analysis and Visualization, is also required for all ANTH Ph.D. students and may be taken at any point in the first two years. Students without suitable preparation in statistics may also be required to take a course at the 400 or 500 level at the advisor's discretion. At any point during the first two years, M.D./Ph.D. students may be required to take up to 6 additional credits of advanced seminars, as directed by their advisor. The M.D./Ph.D. students pursuing the ANTH Ph.D. are also required to enroll in a one-unit literature review seminar (ANTH 541) for one credit each semester during the first two semesters of study. All entering graduate students are expected to complete online training in Scholarship and Research Integrity (SARI), also referred to as Responsible Conduct of Research (RCR), by no later than October 1 of their first semester in residence at University Park. In addition to taking the required core courses and the literature review course, six credits of elective courses may be required in consultation with the student's dissertation adviser and doctoral committee. Eight credits of ANTH 600/601 Thesis Research/Ph.D. Dissertation conducted over the four years of the graduate portion of the training program will be counted by the College of Medicine in lieu of two months of elective rotations (MED 797). The College of Medicine's requirement for a Medical Student Research project is also waived for all M.D./Ph.D. in ANTH candidates.

The doctoral committee of an M.D./Ph.D. student in ANTH will be formed upon successful passing of the ANTH candidacy examination and commencement of work under a primary mentor, no later than the end of the first semester of the second year of graduate study at UP. The doctoral committee must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty. The committee must include at least two members of the ANTH graduate faculty and one member of the M.D./Ph.D. steering committee. One member of the doctoral committee must represent a field outside the candidate's major field of study in order to provide a broader range of disciplinary perspectives and expertise. This person is the "outside field member." Additionally, one member of the committee must be an "outside unit member:" a member of the graduate faculty outside the adviser's administrative home (for a tenure-line faculty member this is the department that serves as their tenure home). The same person can be the outside field member and outside unit member.

The comprehensive examination for ANTH M.D./Ph.D. students will follow the same guidelines as for Ph.D. students in ANTH, except that the comprehensive examination must be held before the end of the second academic year at UP. The M.D./Ph.D. student must write a dissertation proposal in preparation for the comprehensive exam, and a final version of the dissertation proposal must be circulated by the student to all committee members at least four weeks in advance of the comprehensive exam. The comprehensive examination for M.D./Ph.D. students will be an oral examination, scheduled with the Graduate School at least two weeks ahead of time, which may be open to the public. The examination will consist of student presentation of their dissertation proposal, followed by questions and discussion. The student and the chair (or one of the co-chairs) is physically present at the exam, which is given and evaluated by the entire doctoral committee. A favorable vote of at least two-thirds of the members of the committee is required for passing. In case of failure, it is the responsibility of the doctoral committee to determine whether the candidate may take another examination. The results are reported to the Office of Graduate Enrollment Services and are entered on the candidate's official record.

The dissertation requirements for ANTH Ph.D. and ANTH M.D./Ph.D. students are the same: All Ph.D. candidates must conduct original research and prepare a dissertation that makes a significant contribution of new knowledge, is presented in a scholarly manner, and demonstrates an ability on the part of the candidate to do independent research of high quality. The contents and conclusions of the dissertation must be defended at the time of the final oral examination.

Students must present their dissertation in accordance with Graduate Council and Graduate School guidelines as described in the Thesis and Dissertation Guide.

Integrated Undergraduate and Graduate (IUG) Degree Requirements

The Department of Anthropology offers integrated undergraduate-graduate (IUG) degree programs (B.A./B.A./M.A. or B.A./B.S./M.A.) designed to allow academically superior students to obtain either a B.A. degree in Anthropology or a B.S. degree in Anthropological Science, a B.A. degree in Classics and Ancient Mediterranean Studies (CAMS), and an M.A. degree in Anthropology in five years of study.

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in Anthropology, B.A. in Classics and Ancient Mediterranean Studies, and B.S. in Anthropological Science are listed in the Undergraduate Bulletin. Degree requirements for the M.A. degree are listed below. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. The courses that are eligible to double count for both degrees are: ANTH 560, ANTH 571, ANTH 572, ANTH 573, and ANTH 588.

Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count towards the graduate degree. If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Dual-Title Graduate Degree (M.A./Ph.D.) in Anthropology and Demography

The Demography interdisciplinary program is designed to give students in-depth knowledge of the demographic dimensions of anthropological research, including studies of present populations as well as those of the past.

Admissions Requirements

Students must apply and be admitted to the graduate program in Anthropology and The Graduate School before they can apply for admission to the

dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Demography dual-title program. Refer to the Admission Requirements section of theDemography Bulletin page. Doctoral students must be admitted into the dual-title degree program in Demography prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Anthropology, listed above. In addition, students must complete the degree requirements for the dual-title in Demography, listed on theDemography Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Anthropology and must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Anthropology and Demography. Dual-title graduate degree students may requir e an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond thenormal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an Anthropology and Demography dual-title Ph.D. student must include at least one member of the Demography Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Demography, the member of the committee representing Demography must be appointed as co-chair. The Demography representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Anthropology and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree (M.A./Ph.D.) in Anthropology and Human Dimensions of Natural Resources and the Environment (HDNRE)

The HDNRE program, which involves four colleges including the College of the Liberal Arts, is oriented toward research that furthers our understanding of the human use of natural resources, a pressing concern for all of us in the twenty-first century. Topics of special concern for anthropologists are the (very) long-term impact of humans on natural settings, and the ways people have adapted to those changes in their surroundings.

Admissions Requirements

Students must apply and be admitted to the graduate program in Anthropology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the HDNRE dual-title program. Refer to the Admission Requirements section of theHDNRE Bulletin page. Doctoral students must be admitted into the dual-title degree program in HDNRE prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Anthropology, listed above. In addition, students must complete the degree requirements for the dual-title in HDNRE, listed on theHDNRE Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Anthropology and must include at least one Graduate Faculty member from the HDNRE program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements from both Anthropology and HDNRE. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an Anthropology and HDNRE dual-title Ph.D. student must include at least one member of the HDNRE Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in HDNRE, the member of the committee representing HDNRE must be appointed as co-chair. The HDNRE representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Anthropology and HDNRE. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Anthropology and Bioethics

The Bioethics program provides anthropology students with an opportunity to develop their knowledge of the social and ethical implications of their research. This combination – solid research experience with an intimate knowledge of the ethical dimensions of that work – is increasingly important in the workplace, and broadens the possibilities of employment beyond traditional anthropology positions.

Admissions Requirements

Students must apply and be admitted to the graduate program in Anthropology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Bioethics dual-title program. Refer to the Admission Requirements section of theBioethics Bulletin page. Doctoral students must be admitted into the dual-title degree program in Bioethics prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Anthropology, listed above. In addition, students must complete the degree requirements for the dual-title in Bioethics, listed on theBioethics Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Anthropology and must include at least one Graduate Faculty member from the Bioethics program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Anthropology and Bioethics. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond thenormal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an Anthropology and Bioethics dual-title Ph.D. student must include at least one member of the Bioethics Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Bioethics, the member of the committee representing Bioethics must be appointed as co-chair. The Bioethics representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Anthropology and Bioethics. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ANTHROPOLOGY (ANTH) course list

Last Revised by the Department: Fall 2018

Blue Sheet Item #: 47-01-000

Review Date: 8/28/2018

Faculty linked: 5/12/14

Applied Linguistics (APLNG)

Program Home Page

ROBERT SCHRAUF, *Department Head*
Department of Applied Linguistics
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Degree Conferred:

Ph.D.
Dual-Title Ph.D. Degree in Applied Linguistics and Asian Studies

The Graduate Faculty

The Program

The Ph.D. in Applied Linguistics helps prepare scholars who will conduct systematic examinations of individual and societal multilingualism in order to build and test theories of how linguistic systems develop, are acquired, used, and taught in global contexts. The Ph.D. degree program includes the foundational theory and research of linguistics, applied linguistics, second language acquisition, psycholinguistics, and sociolinguistics. It will prepare doctoral candidates to utilize a range of research perspectives, both qualitative and quantitative, e.g., sociocultural, historical, linguistic, stylistic, discourse analytical. Overall, the purpose of the research undertaken in graduate study in Applied Linguistics will be to illuminate, in all its complexity, the multiple dimensions of the study of language as a mode of social existence, communication, and cognition.

Admission Requirements

Applicants are required to submit transcripts of all previous course work from institutions of higher learning. In addition, scores from the Graduate Record Examinations (GRE) are required for applicants who have received a degree from an institution of higher education in the United States or abroad in which the medium of instruction is English. GRE scores are optional for applicants who have received a degree from an institution of higher education in which the medium of instruction is a language other than English. All applicants are required to submit three letters of reference (at least two from faculty with whom the applicant has studied) evaluating aptitude for doctoral study. Applicants must submit at least one sample of scholarly writing (published or unpublished research paper, thesis, etc.) and an academic statement describing their teaching and research experience and their specific professional goals and interests.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 600 for the paper-based test, 250 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. In addition, international applicants are encouraged to submit a cassette tape recording on which they describe their career goals and the reasons for wanting to pursue doctoral studies at Penn State.

Candidacy Evaluation

In the third semester (a minimum of 18 credits) of graduate study, all candidates must satisfactorily complete a candidacy evaluation in which they are required to present a portfolio of work completed in their program of study. The portfolio will include a transcript of the candidate's academic record, a program plan, samples of scholarly work in Applied Linguistics and related areas, and a brief description of the proposed dissertation research, showing relevant course work completed and projected. Following submission of this portfolio, the candidate will meet with the members of his/her doctoral committee for an oral candidacy evaluation. The purpose of this evaluation is threefold: (a) to determine whether the candidate has achieved a level of learning and understanding sufficient to justify acceptance as a doctoral candidate, (b) to discover what further study is required to bring the candidate to the competence required for the research being proposed, and (c) to secure approval of a program of course work and independent study to achieve the requisite competence. The particulars of each candidate's program of study and research are defined on the basis of the candidacy evaluation.

English Language Competence

During course work prior to the candidacy examination, candidates will be assessed for communicative competence in reading, writing, and speaking English. Should a higher level of competence be required, the candidate will be directed to the appropriate resources. International candidates will be advised that the passage of the minimal TOEFL requirement does not demonstrate the level of competence required for completion of the Ph.D. program.

English Language Competence

During course work prior to the candidacy examination, candidates will be assessed for communicative competence in reading, writing, and speaking English. Should a higher level of competence be required, the candidate will be directed to the appropriate resources. International candidates will be advised that the passage of the minimal TOEFL requirement does not demonstrate the level of competence required for completion of the Ph.D. program.

Additional Language Competence

All candidates must demonstrate competence in reading relevant research literature in one language other than English and intermediate speaking competence in an additional language. The additional language competence requirements may be demonstrated in a variety of ways.

Committee Composition

The doctoral committee will consist of four or more active members of the Graduate Faculty and must include at least two faculty in the major field. One member of the doctoral committee must be from outside of the candidate's field of study. Members of the Graduate Faculty with courtesy appointments in LALS who are members of the Applied Linguistics Graduate Faculty may serve as the chair of the doctoral committee with approval of the Director of LALS.

Comprehensive Examination

All doctoral candidates must pass a comprehensive examination designed to assess mastery of and ability to synthesize and integrate theoretical issues in Applied Linguistics. This examination is taken upon completion of all course work and the fulfillment of all degree requirements. The content and format of the comprehensive exam will be established by the members of the candidate's doctoral committee in accordance with degree requirements of LALS and consist of two course papers that are of publishable quality and two or three research papers based on questions developed by members of the doctoral committee. The original papers must be submitted by end of semester prior to that in which the student plans to take the comprehensive exam. The student will be given two months' time in which to complete and submit these exam papers. Within three weeks of submission of the exam papers, the student will take an oral exam based on the original research papers and the exam papers. Candidates who fail the examination on the first attempt may repeat it once. Candidates who fail the examination the second time will not be permitted to continue in the program.

Dissertation

Each doctoral candidate is required to conduct an original and independent research project representing a significant contribution to knowledge in the field of study. The project should be presented in a scholarly manner, show an ability on the part of the candidate to do independent research of high quality, and demonstrate considerable experience in using appropriate research techniques. The content and conclusions of the dissertation will be defended at the time of the final oral examination. A written dissertation proposal is required and must be approved at a proposal hearing by a majority vote of the candidate's

dissertation committee. A majority vote is also required for approval of the completed written dissertation at the final oral defense.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Dual-Title Graduate Degree in Applied Linguistics and Asian Studies

Graduate students with research and educational interests in international education may apply to the Applied Linguistics/Asian Studies Degree Program. The goal of the dual-title degree Applied Linguistics and Asian Studies is to enable graduate students from Applied Linguistics to acquire the knowledge and skills of their major area of specialization in Applied Linguistics while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent linguists who are experts in Asian Studies as well.The dual-title degree in Applied Linguistics and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Additional details of the dual degree program are available in separate documentation and from the Asian Studies Program (see http://asian.la.psu.edu/graduate.shtml).

Admission Requirements

For admission to the dual-title Ph.D. degree under this program, a student must first apply and be admitted to the Applied Linguistics graduate program. Once accepted into the Applied Linguistics program, the student can apply to the Admissions Committee of the Asian Studies. The Asian Studies Admissions Committee reviews applications and recommends students for admission to the Asian Studies program to the Graduate School. Students already in their first and second years of the Applied Linguistics graduate program may also apply to the dual-title program.

Applicants are required to submit transcripts of all previous course work from institutions of higher learning. In addition, scores from the Graduate Record Examinations (GRE) are required for applicants who have received a degree from an institution of higher education in the United States or abroad in which the medium of instruction is English. GRE scores are optional for applicants who have received a degree from an institution of higher education in which the medium of instruction is a language other than English.

There are no specific requirements for admissions into the dual-title program beyond the requirements of the Graduate School and Applied Linguistics, though applicants interested in the program should also make their interest in the dual-degree program known clearly on their applications and include remarks in their essays that explain their training, interests, and career goals in an area of Asian Studies.

General Graduate School requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

To qualify for an Asian Studies degree, students must satisfy the requirements of the Applied Linguistics program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies committee. Within this framework, final course selection is determined by the student, their Asian Studies advisor, and their Applied Linguistics program advisor.

Upon a student's acceptance by the Asian Studies Admissions Committee, the student will be assigned an Asian Studies academic advisor in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their advisor. The student and advisor will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the Applied Linguistics department and the Asian Studies program.

Requirements for the Applied Linguistics/Asian Studies Ph.D.

The doctoral degree in Applied Linguistics and Asian Studies is awarded only to students who are admitted to the Applied Linguistics doctoral program and admitted to the dual-title degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Applied Linguistics and Asian Studies are as follows:
60 credits beyond the master's degree, INCLUDING

- 1 credit of APLNG 580
- 6 credits in foundations courses, which may include but need not be limited to the following: APLNG 591, APLNG 597 (Special Topics)
- 6 credits in research methods, which may include but need not be limited to the following: APLNG 593, APLNG 597 (Language Analysis), APLNG 581, APLNG 586.
- 6 credits in Applied Linguistics electives, to be selected in consultation with the applied linguistics advisor
- 15 credits of Asia-related course work at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502. As many as 6 may come from Applied Linguistics, as approved by the student's doctoral advisor and the Asian Studies Program director of graduate studies. The remaining credits can be taken in ASIA or in any department other than Applied Linguistics.
- All-skills proficiency in one Asian language AND intermediate speaking competence in an additional language other than English

Particular courses may satisfy both the Applied Linguistics requirements and those of the Asian Studies program. Final course selection is determined by the student in consultation with their dual-title program advisors and their major program advisors.

APPLIED LINGUISTICS (APLNG) course list

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-089

Review Date: 01/12/2010

Faculty updated: 5/12/14

Statistics (STAT)

Program Home Page

DAVID HUNTER, *Head of the Department*
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Degrees Conferred:

- M.A.S.
- M.S., M.A.
- Ph.D.
- Integrated B.S. in Statistics and Master of Applied Statistics (M.A.S.)

The Graduate Faculty

The Graduate Faculty, World Campus

The Program

Graduate instruction and research opportunities are available in most areas of statistics and probability, including linear models, nonparametric statistics, robustness, statistical computing, analysis of count data, multivariate analysis, experimental design, reliability, stochastic processes and probability (applied and theoretical), distribution theory, statistical ecology, and biometrics.

Graduate students can gain practical experience in the application of statistical methodology through participation in the department's statistical consulting center and collaborative research activities. In addition, collaborative projects with other departments provide longer term experience and support for selected students. Most students gain valuable teaching experience by assisting in the teaching and grading of courses. In addition, Ph.D. candidates with proper qualifications can receive support for teaching undergraduate courses.

The Master of Applied Statistics (M.A.S.) program is a professional degree designed to provide training in statistics focused on developing data analysis skills, and exploration of all core areas of applied statistics, without going deeply into the mathematical statistics foundations. It aims to provide its graduates with broad knowledge in a wide range of statistical application areas.

The Doctor of Philosophy (Ph.D.), Master of Arts (M.A.), and Master of Science (M.S.) degrees in Statistics are designed for advanced studies in applied and theoretical statistics. Special emphases include biostatistics, statistical ecology, environmental statistics, genometrics, biometrics and statistical computation. The M.S. degree is appropriate preparation for the department's Ph.D. degree.

Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. Entering graduate students in statistics for whom English is not the first language are required to take the TOEFL (Test of English as a Foreign Language) examination. The results of this examination must be received by the Department of Statistics at least six months prior to the requested date of admission to the Graduate School and must pass the PSU test of spoken English in the first year of the program. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the Internet-based test (iBT). Applicants with lower scores may be considered for provisional admission.

While applications from all students (including those who already have done graduate work) are reviewed, completion of a standard calculus sequence is regarded as a prerequisite. Students with a 3.00 or better junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students hoping to earn a Ph.D. in statistics may apply directly to the Ph.D. program without need for a master's degree.

Degree Requirements

Professional Master of Applied Statistics Requirements

For the M.A.S. degree, a minimum of 30 credits and a minimum grade-point average of 3.0 are required for graduation. Of the 30 credits, 24 must be courses from the Statistics department and 21 must be at the 500 level. The candidate must complete 6 credits in applied statistics (STAT 501, STAT 502), 6 credits in mathematical statistics (STAT 414, STAT 415) and 3 credits in statistical consulting (STAT 580-581). For all M.A.S. students, the Stat 581 course will have a comprehensive written project report required as part of the course, which serves as the culminating experience. To complete the remaining credit requirements, a candidate can select 9-15 credits from the following applied statistics courses: STAT 464, STAT 480, STAT 500, STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, and STAT 510. In addition, students with suitable backgrounds may choose up to 6 credits from a departmental list of additional courses with approval from their adviser.

Master of Arts and Master of Science Degree Requirements

For the M.A. and M.S. degrees, a candidate must complete at least 30 credits, including at least 27 at the 500 or 600 level; 21 of the 27 500-level credits must be formal course work from the department of Statistics. A candidate must complete 6 credits in applied statistics (STAT 511, STAT 512), 6 credits in mathematical statistics (STAT 513, STAT 514), 3 credits in stochastic processes (STAT 515) and 3 credits in statistical consulting (STAT 580-581). The student must also pass a written master's qualifying examination taken at the end of the first year. Finally, an M.A. candidate must submit an acceptable master's paper to the department, and an M.S. candidate must submit a thesis.

Doctoral Degree Requirements

In addition to the course requirements for the M.A. and M.S. degrees given above, a Ph.D. candidate in Statistics must complete further courses in linear models (STAT 551), asymptotic tools (STAT 553), statistical inference (STAT 561), and advanced probability (STAT 517), as well as 15 credits of electives taken from STAT 518, STAT 544, STAT 545, STAT 552, STAT 562, STAT 564, STAT 565, and STAT 572, or other courses suggested by the Ph.D. committee and approved by the Graduate Studies Committee. The student also must pass a written Ph.D. qualifying exam, typically during the second year, and a comprehensive exam given at the end of the third year. The comprehensive exam will have a written component, whose content will be determined and administered by the student's Ph.D. graduate committee, and an oral component, which includes the presentation of a thesis research proposal. The candidate then must submit an acceptable Ph.D. thesis and defend it.

The Ph.D. in Statistics offers options in Biometrics, Biostatistics, Environmental Statistics, and Genometrics. The course and the examination requirements

remain the same under these options, however, the candidate must take 15 credits from a list of courses identified by the option.

Minor in Statistics Requirements

The Department of Statistics has three possible options for a Graduate Minor in Statistics:

- **Option 1**: STAT/MATH 414-415 and at least three 500-level courses from the department.
- **Option 2**: Five or more courses totaling 15 credits at the 500-level from the department. Stat 464 may also count toward the 15 credits.
- **Option 3**: Four 500-level courses totaling 12 credits from the department and one additional course of 3 credits approved by the department head or graduate studies chairman.

Please note: STAT 500 will not be counted toward the Graduate Minor in Statistics under any option.

For all options, a 3.5 GPA is required in the courses to be counted toward the minor. Completion of one of the options listed above, with the specified grade-point average, and the signature on the Graduate Minor Program form (www.stat.psu.edu/grad/degrees/Minor/Graduate_Minor_Application_Form.pdf) constitutes approval of the Minor in Statistics. The candidate must indicate the wish to have a Graduate Minor in Statistics when the diploma card is filed and indicate the semester the Ph.D. degree is expected.

Other Relevant Information

Students in the Statistics program may elect the dual-title degree program option in Operations Research for the Ph.D. and M.S. degrees. (*See also* Operations Research.)

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. GRE scores are required for consideration for assistantships.

Integrated B.S. in Statistics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Statistics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career-oriented students to obtain training in statistics focused on developing data analysis skills and exploration of core areas of applied statistics at the undergraduate and graduate levels. The M.A.S. degree is a professional master's degree that emphasizes applications and does not provide as much training in the mathematical and statistical theory. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analyst. Research divisions in the pharmaceutical industry, quality control and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data-intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process

The number of openings in the integrated B.S./M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Statistics B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program, including the two courses: STAT 414 and STAT 415 and the students must apply to the program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of the department's undergraduate program committee.
- Must be accepted into the M.A.S. program in Statistics.

For the IUG B.S./M.A.S. degree, 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve graduate-level credits (number of credits in parentheses) can apply to both B.S. and M.A.S. degrees; six of these are at the 500 level:

STATISTICS (STAT)
414. Introduction to Probability Theory (3)
415. Introduction to Mathematical Statistics (3)
501. Regression Methods (3)
502. Analysis of Variance and Design of Experiments (3)

Assuming all requirements for the B.S. are completed, students in the program can complete the B.S. degree and not advance to the M.A.S. Degree if they desire.

Degree Requirements

IUG Statistics B.S. prescribed Statistics courses (25 credits)

STATISTICS (STAT)
220. Basic Statistics (3)
414. Introduction to Probability Theory (3)
415. Introduction to Mathematical Statistics (3)
416. Stochastic Modeling (3)
464. Applied Nonparametric Statistics (3)
470W. Problem Solving and Communication in Applied Statistics (3)
480. Introduction to Statistical Analysis System (SAS) (1)
501. Regression Methods (3)
502. Analysis of Variance and Design of Experiments (3)

Note that students in IUG Statistics B.S. take STAT 501 and STAT 502 instead of STAT 460 and STAT 462 for the regular Statistics B.S.

IUG Statistics M.A.S. requirement (30 credits)

STATISTICS (STAT)
414. Introduction to Probability Theory (3)
415. Introduction to Mathematical Statistics (3)
501. Regression Methods (3)
502. Analysis of Variance and Design of Experiments (3)
580.** Statistical Consulting Practicum (2)
581.**Stastical Consulting Practicum II (1)

Electives (15 credits)
Select from STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, STAT 510 and the departmental list of additional courses for the M.A.S program with the approval of the adviser.

**For all students in the M.A.S program, the STAT 581 courses will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

Integrated B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in

five years. This integrated degree will enable a select number of highly qualified and career oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional masters degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process

The number of openings in the integrated B.A./B.S. in Mathematics and M.A.S. program is limited. Admission will be based on specific criteria and the recommendation of faculty. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.A./B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415 and the students must apply to the integrated program prior to completing 110 credits.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director.
- Must be recommended by the chair of Mathematics Department's undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must submit the GRE to the M.A.S. admissions committee.
- Must apply to the M.A.S. program in Statistics.

For the IUG B.A./B.S. in Mathematics and M.A.S. degree, 120 credits are required for the B.A./B.S. and 30 credits for the M.A.S. The following twelve graduate level credits (number of credits in parentheses) can apply to both B.A./B.S. and M.A.S. degrees, six of these are at the 500 level:

STATISTICS (STAT)
414. Introduction to Probability Theory (3)
415. Introduction to Mathematical Statistics (3)
501. Regression Methods (3)
502. Analysis of Variance and Design of Experiments (3)

Assuming all requirements for the B.A./B.S. in Mathematics are completed, students in the program can complete the B.A./B.S. degree and not advance to the M.A.S. degree if they desire.

Degree Requirements

IUG Math B.A./B.S. students must fulfill the Math B.A./B.S. requirement while counting these prescribed Statistics courses (15 credits)

STATISTICS (STAT)
220.* Basic Statistics (3)
414. Introduction to Probability Theory (3)
415. Introduction to Mathematical Statistics (3)
501. Regression Methods (3)
502. Analysis of Variance and Design of Experiments (3)

IUG M.A.S. Requirements (30 credits)

STATISTICS (STAT)
414. Introduction to Probability Theory (3)
415. Introduction to Mathematical Statistics (3)
501. Regression Methods (3)
502. Analysis of Variance and Design of Experiments (3)
580. Statistical Consulting Practicum (2)
581.** Statistical Consulting Practicum II (1)

Electives: (15 credits)
Select from STAT 464, STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, STAT 510 and the departmental list of additional courses for the M.A.S. program with the approval of the adviser.

For the IUG B.A./B.S. in Mathematics and M.A.S. degree, the four courses: STAT 414, STAT 415, STAT 501 and STAT 502 can apply to both the B.A./B.S. and M.A.S. degrees.

*Can be waived for students with an equivalent course, e.g., STAT 250 or STAT 301.

** For all students in the M.A.S. program, the STAT 581 course will have a comprehensive written project report required as part of the course, which serves as the culminating experience.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

STATISTICS (STAT) course list

LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

IUG PROGRAM - B.S. in Statistics and Master of Applied Statistics
Last Revised by the Department: Summer Session 2003
Blue Sheet Item #: 31-05-138

IUG PROGRAM - B.A./B.S. in Mathematics and Master of Applied Statistics
Last Revised by the Department: Fall Semester 2006
Blue Sheet Item #: 34-06-361 and 34-06-361A
Review Date: 4/11/06

REVISED BY SENATE: 1/5/06 [course number update]

Faculty linked: 8/18/14

Applied Psychological Research (APSYR)

Program Home Page

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Degree Conferred:

M.A.
Integrated B.S. in Psychology/M.A. in Applied Psychological Research

The Graduate Faculty

The Program

The Master of Arts program in Applied Psychological Research focuses on the development of research skills within the context of scientific training in psychology. The program requires 35 credits of course work (29 credits of core courses and 6 credits of electives).

The program is designed to meet the needs of students who plan careers in research or administration within human service or similar organizations, who plan to conduct research in other settings, or who plan to pursue doctoral study. Students can select electives and research experiences to reflect their individual interests in consultation with their adviser.

The program is intended for both part- and full-time students. Students are admitted for fall semester only. The deadline for admission is May 1.

Admission Requirements

Students will be admitted on a competitive basis and must submit the following:

- a completed online Graduate School application form with the application fee
- two official transcripts of all colleges and universities attended
- three professional letters of recommendation
- a brief (two-page) interest statement
- verbal, quantitative, and analytical scores on the Graduate Record Examinations

The applicant must have either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. The applicant must have completed at least 18 credits in psychology, and must have a cumulative grade-point average of 3.0 or above in the last 60 credits of coursework. The undergraduate work must include a statistics course and a psychology research methods course with grades of B or higher. A personal interview is required.

Psychology undergraduates may apply for admission to the Integrated Undergraduate-Graduate (IUG) degree program by no later than February 15th the spring of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Grade point average of 3.5 or above cumulative.
2. Completion of undergraduate statistics and an undergraduate research course with an A- or above in both.
3. Completing 18 credits or more in psychology with a psychology GPA of 3.67 or above.
4. Typical successful candidates will obtain GRE scores of 146 or above on both verbal and quantitative sections, with an analytical score of 3.5 or above.
5. Complete interviews with graduate faculty members.
6. Provide three professional letters of recommendation with at least two from academci references.

Transfer Credits

Penn State allows for the approval of up to 10 transfer credits to graduate programs.

Degree Requirements

The M.A. in Applied Psychological Research requires 35 credits of course work, including 6 credits of supervised research experience and a master's research paper.

Psychology Core Courses(29 credits) (provide a foundation in professional ethics, individual differences and cultural diversity, the scientific bases of behavior, and scientific research skills)

PSYCHOLOGY (PSYC)

- 500. Ethics and Professional Practice in Psychology (3)
- 501. Cultural Competency in Psychology (3)
- 502. Applied Social Psychology (3)
- 520. Research Methods (4)
- 521. Statistics (4)
- 524. Biological Basis of Behavior (3)
- 530. Research Paper (3)
- 594. Applied Psychological Research (6)

Elective Courses (6 credits) (should be selected in consultation with the student's adviser in support of the student's research focus) Applied Psychological Research students may take elective graduate-level (500 or above) courses in areas such as human factors or similar areas, with the guidance and approval, in advance, of their adviser, and subject to the permission of the degree program areas.

Possible elective courses include:

PSYCHOLOGY (PSYC)

- 514. Preventive Psychology (3)
- 515. Clinical Health Psychology (3)
- 516. Child Health Psychology (3)
- 525. Forensic Psychology (3)
- 526. Behavioral Systems in Criminal Justice (3)
- 535. Behavioral Management (3)

The following courses are offered through other Penn State Harrisburg graduate programs as electives for APSYR students.

ABA 522. Single Subject Research Designs
ADTED 550. Qualitative Research in ADTED

CMPSY 520. Research Methods II

APSYR students can take courses that are offered through the College of Medicine in Hershey (approximately 8 miles from Penn State Harrisburg) for elective credit, with the permission of their adviser and the College of Medicine. Course descriptions can be found at the following web site:
http://www.psu.edu/bulletins/whitebook/courses/hes.htm

PHS 500. RESEARCH ETHICS FOR CLINICAL INVESTIGATORS (1)
PHS 510. CLINICAL RESEARCH METHODS (3)
PHS 516. STATISTICAL GENETICS (3)
PHS 520. PRINCIPLES OF BIOSTATISTICS (3)
PHS 521. APPLIED BIOSTATISTICS (3)
PHS 522. MULTIVARIATE BIOSTATISTICS (3)
PHS 536. HEALTH SURVEY RESEARCH METHODS (3)
PHS 550. PRINCIPLES OF EPIDEMIOLOGY (3)
PHS 551. ADVANCED EPIDEMIOLOGICAL METHODS (3)
PHS 552. MOLECULAR EPIDEMIOLOGY OF CHRONIC DISEASE (3)
PHS 570. HEALTH ECONOMICS & ECONOMIC EVALUATION (3)
PHS 580. CLINICAL TRIALS: DESIGN & ANALYSIS (3)
PHS 581. CLINICAL TRIALS: CASE STUDIES (1)
PHS 594. RESEARCH TOPICS (3)

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

PSYCHOLOGY (PSYC) course list

Last Revised by the Department: Fall Semester 2014

Blue Sheet Item #: 43-04-109

Review Date: 01/13/2015

Faculty linked: 8/14/14

Coordinator updated: 5/12/16

Architecture (ARCH)

Program Home Page

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Degrees Conferred:

- M.Arch.
- M.S. in Architecture
- Integrated B.Arch./M.S. in Architecture
- M.S. Dual-Title Degree in Architecture and Human Dimensions of Natural Resources and the Environment (HDNRE)
- Ph.D. in Architecture
- Ph.D. Dual-Title Degree in Architecture and Human Dimensions of Natural Resources and the Environment (HDNRE)

The Graduate Faculty

The Programs

The M.Arch. program is a professional degree program focused on preparation to practice architecture for students who hold a bachelor's degree.

The M.S. in Architecture program is a research-focused degree program designed to offer students graduate level research inquiry into architecture for students who hold a professional baccalaureate or graduate degree in architecture.

The Integrated B.Arch./M.S. in Architecture program permits students to integrate the fifth year of the professional B.Arch. degree, pursued at Penn State, with the M.S. research degree into a continuous program of study culminating in the awarding of both degrees.

The dual-title M.S. in Architecture and Human Dimensions of Natural Resources and the Environment is a research-focused degree program that enables students from Architecture to acquire the knowledge and skills of their major area of specialization in Architecture, while at the same time gaining the perspective and methods of Human Dimensions of Natural Resources and the Environment.

The Ph.D. in Architecture program is a research-focused degree program for students with a research-focused master's degree who have previously studied the technical and professional aspects of architectural or landscape architectural practice and are primarily interested in strengthening the intellectual underpinnings of their work through significant and original theoretical inquiry.

The dual-title Ph.D. in Architecture and Human Dimensions of Natural Resources and the Environment is a research-focused degree program that enables students from Architecture to acquire the knowledge and skills of their major area of specialization in Architecture, while at the same time gaining the perspective and methods of Human Dimensions of Natural Resources and the Environment.

M.Arch. Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

The applicant's baccalaureate degree may be in a field other than architecture or be a non-professional baccalaureate degree in architecture. This M.Arch. program culminates in a professional degree, currently in candidacy status for National Architectural Accrediting Board (NAAB) accreditation.

A minimum grade-point average [GPA] of 3.0 on a 4.0 scale is required.

All applicants for admission to the M.Arch. degree program must submit the following:

- a completed Graduate School application, and payment of the non-refundable application fee.
- official transcripts from all post-secondary institutions attended.
- Graduate Record Exam [GRE] scores.
- names of three faculty members or professionals acquainted with the applicant's academic history who can be contacted and invited to provide reference letters.
- a statement of intent, which should be primarily a description of the applicant's professional goals, subjects of study, and the area(s) of anticipated architectural inquiry.
- a portfolio of creative and design work executed at the undergraduate level, under professional guidance or independently, provided that such work can be evidenced as executed by the applicant, is an important part of the graduate application. A minimum portfolio representation of one project for each year of academic undergraduate study, or its equivalent, is required.
- other evidence of academic excellence, such as awards, design and scholarly achievements, and other recognitions that the applicant wishes to have considered by the admissions committee.

M.S. in Architecture Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

All applicants must hold either (1) a professionally accredited baccalaureate degree in architecture or related field from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a professionally accredited bachelor's degree in architecture or related field from a regionally accredited U.S. institution; this degree must be from an officially recognized degree-granting institution in the country in which it operates. Alternatively, the applicant can hold (3) a baccalaureate degree from a regionally accredited U.S. institution plus a professionally accredited master's degree in architecture or related field or (4) a tertiary (postsecondary) degree that is deemed comparable to a bachelor's degree from a regionally accredited U.S. institution plus a professionally accredited master's degree in architecture or related field; these degrees must be from officially recognized degree-granting institutions in the country in which they operate.

A minimum grade-point average [GPA] of 3.0 on a 4.0 scale is required.

All applicants for admission to the M.S. in Architecture degree program must submit the following:

- a completed Graduate School application, and payment of the non-refundable application fee.
- official transcripts from all post-secondary institutions attended.
- Graduate Record Exam [GRE] scores.
- names of three faculty members or professionals acquainted with the applicant's academic history who can be contacted and invited to provide reference letters.
- a statement of intent, which should be primarily a description of the applicant's professional goals, subjects of study, and the area(s) of anticipated architectural inquiry.
- a portfolio of creative and design work executed at the undergraduate level, under professional guidance or independently, provided that such work can be evidenced as executed by the applicant, is an important part of the graduate application. A minimum portfolio representation of one project

for each year of academic undergraduate study, or its equivalent, is required.
- other evidence of academic excellence, such as awards, design and scholarly achievements, and other recognitions that the applicant wishes to have considered by the admissions committee.

Integrated B.Arch./M.S. in Architecture Admission Requirements

The Department of Architecture offers a limited number of academically superior students enrolled in the fourth year of the Bachelor of Architecture degree program the opportunity to enroll in an integrated program leading to both the B.Arch. and the M.S. in Architecture degrees. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to achieve greater depth and comprehensiveness than if the degrees are pursued sequentially, and to earn the two degrees in a shorter period of time. In particular, the program encourages the student to integrate the undergraduate thesis design project with the master's thesis, thereby achieving a greater depth of inquiry. The number of openings to this special program is limited; admission is by invitation of the faculty and is extremely selective.

Students must apply to and meet the admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master's degree. Applicants to the integrated program must be enrolled in the fourth year of a B.Arch. program or otherwise qualified to apply for admission to the fifth year of the B.Arch. program at Penn State. To be admitted, applicants must have a minimum 3.20 junior/senior overall grade-point average (on a 4.0 scale) as well as: (1) a minimum 3.20 GPA in architectural design courses (studio), and (2) a minimum 3.20 GPA in all course work except architectural design courses (studio). Students must be admitted to the IUG program no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree.

All applicants for admission to the Integrated B.Arch./M.S. in Architecture degree program must submit the following:

- a completed Graduate School application and payment of the application fee.
- names of three faculty members or professionals acquainted with the applicant's academic history who can be contacted and invited to provide reference letters.
- a statement of intent/plan of study, which should be primarily a description of the applicant's professional goals. The statement/plan shall clearly describe the student's proposed general thesis topic and a strategy for pursuing it, including a list of proposed courses and a list of faculty whom the student foresees as contributing to the course of study. The plan should be reviewed periodically with an adviser as the student advances through the program.
- a portfolio of creative and design work executed at the undergraduate level, under professional guidance or independently, provided that such work can be evidenced as executed by the applicant. A minimum portfolio representation of one project for each year of academic undergraduate study, or its equivalent, is required.

The best-qualified students will be accepted up to the number of spaces available for new students.

M.S. Dual-Title Degree in Architecture and Human Dimensions of Natural Resources and the Environment (HDNRE) Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to Penn State's Graduate School as well as to the Architecture graduate program (M.S. in Architecture degree). Once accepted into the Architecture program, the student can apply to the Admissions Committee of HDNRE. The HDNRE admissions committee reviews applications and recommends students for admission to the dual-title degree program to The Graduate School.

In addition to the admission requirements for the M.S. in Architecture degree program, the HDNRE program also requires a minimum baccalaureate Jr/Sr grade-point average of 3.0 on a 4.0 scale.

Ph.D. in Architecture Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

All applicants must hold either (1) a professionally accredited baccalaureate degree in architecture or landscape architecture from a regionally accredited U.S. institution and a master's degree in architecture or landscape architecture or related field or (2) a tertiary (postsecondary) degree that is deemed comparable to a professionally accredited bachelor's degree in architecture or landscape architecture from a regionally accredited U.S. institution and a master's degree in architecture or landscape architecture or related field; both degrees must be from an officially recognized degree-granting institution in the country in which they operate. Alternatively, the applicant can hold (3) a baccalaureate degree from a regionally accredited U.S. institution plus a professionally accredited master's degree in architecture or landscape architecture or (4) a tertiary (postsecondary) degree that is deemed comparable to a bachelor's degree from a regionally accredited U.S. institution plus a professionally accredited master's degree in architecture or landscape architecture; these degrees must be from officially recognized degree-granting institutions in the country in which they operate. Outstanding candidates who do not hold a professional architecture or landscape architecture degree but who satisfy all other entrance requirements may be admitted at the discretion of the program. Scores from the Graduate Record Examination (GRE) will be required for admission. An overall minimum grade-point average of 3.20 for graduate and undergraduate degrees is required for admission. Exceptions to the minimum 3.20 grade-point average may be made for students with special backgrounds, abilities, and interests at the discretion of the program.

All applicants for admission to the Ph.D. degree program must submit the following:

- a completed Graduate School application and payment of the application fee.
- official transcripts from all post-secondary institutions attended.
- Graduate Record Exam [GRE] scores.
- names of three faculty members or professionals acquainted with the applicant's academic history who can be contacted and invited to provide reference letters.
- a Ph.D. Essay that (1) articulates the reasons for pursuing graduate training; (2) demonstrates that the Ph.D. program has been carefully considered and a relevant faculty member has been identified; (3) presents a clear research focus; and (4) highlights how previous education, academic background, and/or professional experience provide a foundation for pursuing graduate training in this research field.
- a Curriculum Vitae.

Ph.D. Dual-Title Degree in Architecture and Human Dimensions of Natural Resources and the Environment (HDNRE) Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to Penn State's Graduate School as well as to the Architecture graduate program (Ph.D. in Architecture degree). Once accepted into the Architecture program, the student can apply to the Admissions Committee of HDNRE. The HDNRE admissions committee reviews applications and recommends students for admission to the dual-title degree program to The Graduate School.

In addition to the admission requirements for the Ph.D. in Architecture degree program, the HDNRE program also requires a minimum baccalaureate Jr/Sr grade-point average of 3.0 on a 4.0 scale. Students must apply and be admitted to the dual-title degree program in HDNRE prior to taking the candidacy exam.

M.Arch. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The professional M.Arch. may be completed in three years (seven semesters, with the fifth semester being a summer semester) of course work. The M.Arch. degree requires 40 credits of preparatory course work, plus 57 credits of core graduate course work for a total of 97 credits. Some or all of the preparatory course work may have been completed previously, in which case the total credits required for the degree may be reduced in an equivalent manner to a minimum of 57 credits of core courses. At least 36 credits must be at the 500 level, and at least 57 credits must be taken in residence at University Park. There will be a review of transcripts to assess the completion of materials covered in preparatory course work. Faculty will assess each accepted applicant's transcripts for possible course equivalents. If courses have been fulfilled with equivalent undergraduate or graduate course work, students will be eligible for advancement. Accordingly, time to complete degree requirements may be reduced. The culminating experience of the M.Arch. degree is a master's design

project, requiring the student to identify and formulate an area of inquiry and then to complete a research-intensive design project, documented in a volume that includes the design and the research. The capstone course ARCH 536 Design Inquiry is associated with this culminating experience, and students are required to complete two semesters of ARCH 536 for six credits each, for a total of 12 credits.

Preparatory Course Work:

- A E 211 Introduction to Environmental Control Systems (3)
- A E 421 Architectural Structural Systems I (3)
- A E 422 Architectural Structural Systems II (3)
- A E 424 Environmental Control Systems I (3)
- ARCH 501 Analysis of Architectural Precedents I (3)
- ARCH 502 Analysis of Architectural Precedents II (3)
- ARCH 503 Materials and Building Construction I (3)
- ARCH 504 Materials and Building Construction II (3)
- ARCH 521 Visual Communications I (2)
- ARCH 522 Visual Communications I (2)
- ARCH 531 Architectural Design I (6)
- ARCH 532 Architectural Design II (6)

REQUIRED COURSES:

ARCHITECTURE (ARCH)

- 510. Contemporary Architecture & Planning Theories (3)
- 533. Architectural Design III (6)
- 534. Architectural Design IV (6)
- 451. Architectural Professional Practice (3)
- 480. Technical Systems Integration (3)
- A total of 6 credits from ARCH 495 Internship; ARCH 496 Independent Study; ARCH 499 Foreign Study (6)
- 511. Theoretical Perspectives in Architecture (3)
- 520. Methods of Inquiry (3)
- 536. Design-Inquiry (12)
- 550. Ethics in Architecture (3)
- Electives (9)

M.S. in Architecture Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The culminating experience of the post-professional M.S. in Architecture program is a Master's Thesis, which requires the student to identify and formulate an area of inquiry within which he or she will be expected to do original research that tests a hypothesis, and to complete a written thesis that presents that research. The master's thesis committee must be composed of a minimum of three graduate faculty members, not less than two of whom shall be members of the Architecture graduate faculty. One of these two graduate faculty members shall serve as the chair of the committee and thesis adviser. One or more members of the committee may be members from another department. At the master's thesis defense, the student presents a summary of her/his thesis. This presentation and part of the following discussion are open to the public. The thesis may only pass with a unanimous affirmative decision of the thesis committee. The graduate officer or department head must attend the thesis defense and sign off on the thesis; if the graduate officer is the adviser or a committee member then the department head must attend the defense and sign off on the thesis, and vice versa. The M.S. in Architecture is a 30-credit program that requires 24 credits of course work and 6 credits of thesis. At least 18 credits must be at the 500 or 600 levels, and at least 20 credits must be taken in residence at University Park. The core courses consist of a total of 12 credits.

M.S. in Architecture Degree Required Courses:

- ARCH 511 Theoretical Perspectives in Architecture (3)
- ARCH 520 Methods of Inquiry (3)
- ARCH 536 Design Inquiry (6)
- ARCH 550 Ethics in Architecture (3)
- ARCH 600 Thesis (6)
- Electives (9)

Integrated B.Arch./M.S. in Architecture Degree Requirements

Students must complete the requirements for both the B.Arch. and the M.S. in Architecture degrees with the exception that not more than 12 credits earned in either degree program may be used to the meet the requirements of both degrees. A minimum of 50 percent of the courses proposed to count for both degrees must be at the 500 or 800 level. Courses that can be double-counted are: ARCH 451, ARCH 492, ARCH 511, ARCH 520, ARCH 536, and ARCH 550. A minimum total of 180 credits are required to complete the Integrated B.Arch./M.S. in Architecture program and earn both degrees. The student must maintain a minimum 3.2 overall GPA and shall achieve no less than a B grade in each required course.

If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

M.S. Dual-Title Degree in Architecture and Human Dimensions of Natural Resources and the Environment (HDNRE) Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Architecture program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the HDNRE committee. Within this framework, final course selection is determined by the student, the HDNRE adviser, and the Architecture program adviser.

Upon a student's acceptance by the HDNRE admissions committee, the student will be assigned a HDNRE academic adviser in consultation with the HDNRE chair. As students develop specific scholarly interests, they may request that a different HDNRE faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of Graduate Council, the Architecture program and the HDNRE Program.

The HDNRE program requires:
A candidate for the dual-title intercollege M.S.in HDNRE must complete 17 credits of course work beyond the bachelor's degree in addition to curricular requirements for the masters' degree in the student's primary program. The HDNRE requirement includes four core courses in the HDNRE curriculum: HDNRE 590 Colloquium (2 credits), HDNRE 574 Integrated Perspectives in Human Dimensions of Natural Resources and the Environment (3), HDNRE 575 Ethical Issues in Human Dimensions of Natural Resources and the Environment (3), and R SOC 555 Human Dimensions of Natural Resources (3). In addition, each HDNRE student will take either ANTH 559 Human Ecology (3) or FOR 565 GIS-Based Socio-Ecological Landscape Analysis (3), and one additional 3-credit course selected in consultation with the student's graduate committee. The HDNRE Colloquium (HDNRE 590) must be taken in each of the first two semesters of enrollment in the dual-title intercollege degree program.

Some courses may satisfy both the graduate major program requirements and those of the dual-title program. Final course selection is determined by the students in consultation with their dual-title program advisers and their major program advisers.

A thesis committee for the dual-title M.S. degree will consist of two graduate faculty members from Architecture and one graduate faculty member from the HDNRE Program. The thesis topic itself will be an integration of both Architecture and HDNRE.

Candidates for the dual-title Master of Science degree in Architecture and HDNRE will also be required to pass a final defense covering the general field of Architecture and HDNRE Program, with emphasis on the student's area of specialization. The defense is to be administered by the student's thesis committee.

The thesis may only pass with a unanimous affirmative decision of the thesis committee.

Ph.D. in Architecture Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

For the Ph.D. degree, students must conduct significant original research that demonstrates mastery of the field. The student's program of courses is developed in cooperation with the student's doctoral committee. It is recommended that it consist of approximately 30 credits of course work. This includes 12 credits of course work for students without a research-focused master's degree in architecture or landscape architecture or related field (a research-focused master's degree is typically an M.S. in Architecture or Landscape Architecture degree, but can also be a post-professional M.Arch. or M.L.A. degree). There will be a review of transcripts to assess completion of materials covered in course work. A faculty review committee will assess each accepted applicant's transcripts for possible course equivalents. At the conclusion of the student's course work, the Ph.D. student must pass a comprehensive examination that is developed and administered by the student's doctoral committee. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Ph.D. Dual-Title Degree in Architecture and Human Dimensions of Natural Resources and the Environment Degree Requirements (HDNRE)

To qualify for a dual-title degree, students must satisfy the requirements of the Architecture program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the HDNRE committee. Within this framework, final course selection is determined by the student, the HDNRE adviser, and the Architecture program adviser.

Upon a student's acceptance by the HDNRE admissions committee, the student will be assigned an HDNRE academic adviser in consultation with the HDNRE chair. As students develop specific scholarly interests, they may request that a different HDNRE faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of Graduate Council, the Architecture program and the HDNRE Program.

The HDNRE program requires:
A candidate for the dual-title intercollege HDNRE Ph.D. must complete, in addition to curricular requirements for the doctoral degree in the student's primary program, a minimum of 18 credits of HDNRE course work. This includes the required courses for the HDNRE M.S program: HDNRE 574 (3), HDNRE 575 (3), HDNRE 590 (3), R SOC 555 (3), either ANTH 559 (3) or FOR 565 (3), and one additional 3-credit elective. The HDNRE Colloquium (HDNRE 590) must be taken each of the first two semesters of enrollment in the dual-title intercollege degree program, and once more prior to graduation, for 3 total credits. Particular courses may satisfy both the graduate major program requirements and those of the HDNRE program. If an HDNRE M.S. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary course work must be selected, with the approval of the student's doctoral committee.

Some courses may satisfy both the graduate major program requirements and those of the dual-title program. Final course selection is determined by the students in consultation with their dual-title program advisers and their major program advisers.

There will be a single candidacy examination, containing elements of both Architecture and HDNRE. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyondthe normal period allowable.

The candidacy examination committee and the doctoral committee must include at least one graduate faculty member from HDNRE. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. The HDNRE representative on the candidacy examination committee will participate in constructing and evaluating the candidacy examination, and the HDNRE representative on the doctoral committee will participate in constructing and evaluating the comprehensive examination. If the chair of the doctoral committee is not also a member of the Graduate Faculty in HDNRE, the member of the committee representing HDNRE must be appointed as co-chair.

All Ph.D. students will be required to complete, present, and defend a dissertation that incorporates a topic related to both Architecture and HDNRE. Candidates for the dual-title Ph.D. degree in Architecture and HDNRE will be required to pass a final oral examination (the dissertation defense) covering the general field of Architecture and HDNRE, with emphasis on the student's area of specialization. The defense is to be administered by the student's doctoral committee. A favorable vote of a two-thirds majority is necessary for passing. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin. All applicants who are accepted are considered for departmental financial aid. Graduate Assistants must abide by the **course load guidelines outlined in the Graduate Bulletin.**

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ARCHITECTURE COURSES (ARCH)

Last Revised by the Department: Summer Semester 2016

Blue Sheet Item #: 44-07-000

Review Date: 06/28/2016

Faculty linked: 12/23/14

Art (ART)

Program Home Page

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Degrees Conferred:

M.F.A.

The Graduate Faculty

The Penn State School of Visual Arts offers the degree of Master of Fine Arts (M.F.A.) in Art, a 60-credit graduate program supporting artistic work, academic inquiry, and creative investigation in the areas of ceramics, drawing & painting, graphic design, new media, photography, and sculpture. While students situate themselves within one of these areas of concentration, the structure of the program encourages interplay between media and disciplines in support of each individual's graduate work.

Headed by a dedicated faculty of internationally acclaimed artists, the MFA program is recognized for emphasizing excellence in the study of visual art and fostering artistic production that engages critically with contemporary culture. By creating a rigorous yet supportive environment in the context of a major public research university, the program encourages expansive growth and innovative collaboration in studio practice. The regular interaction between studio and classroom creates a close-knit intellectual community that furthers critical thinking and creative connectedness. As the transformative power of art in today's society continues to evolve, the Penn State School of Visual Arts encourages artists to address contemporary social and cultural issues through creative production.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

The Master of Fine Arts program in art, with its emphasis on professional study, is designed for the mature individual who by previous training and study has sufficiently prepared for the undertaking. It is strongly suggested that applicants have a minimum of 12 credits of art history at the undergraduate level. Any qualified student holding a bachelor's degree from a U.S. regionally accredited institution or a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution may seek admission. The School of Visual Arts requires a minimum of 3.00 junior/senior grade-point average (on a 4.00 scale) for admission to the master of fine arts program. Exceptions to the minimum 3.00 average may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

In addition to the previous requirements, all applicants must submit:

1. A portfolio of his/her work to illustrate his/her preparation for graduate study. A portfolio of digital images, rather than actual work, is required. A selection of no fewer than twenty examples should be presented. The majority should be in the area of the applicant's interest.
2. A statement of professional aims. This statement should include the applicant's intentions for his/her proposed study. Some indications of his/her philosophy, beliefs, and goals in regard to education and art should give evidence that he/she is prepared to undertake the work outlined for the Master of Fine Arts program.
3. Three letters of reference attesting to the applicant's scholarship and ability to work independently.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The School of Visual Arts requires a minimum total of 60 credits at the 400, 500, or 800 level, with a minimum of 24 credits at the 500 level, for the Master of Fine Arts degree. Not more than 10 credits may be transferred from other accredited graduate institutions, subject to restrictions outlined in the Transfer Courses section of the Graduate Bulletin. Of the 60 credits required for graduation, candidates are expected to complete the following distribution of credits: 30 credits in a major area of concentration, 12 credits in art history and critical studies, 10 credits in related areas, and 8 credits in graduate seminar (ART 505).

Additional M.F.A. Requirements

In addition to course work, M.F.A. candidates must pass a candidacy review, which is usually held at the end of the second semester of study, submit an artist's statement, pass the M.F.A. comprehensive oral examination and produce an M.F.A. exhibition. The approval of the M.F.A exhibition by a candidate's committee represents the culminating experience of the program.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ART (ART) course list

Last Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07-000

Review Date: 6/26/2018

Faculty updated: 5/12/14

Art History (ART H)

Program Home Page

CRAIG ZABEL, *Head of the Department*
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Degrees Conferred:

Ph.D., M.A.

The Graduate Faculty

Graduate work is offered in the following areas: Ancient, Byzantine, Medieval, Renaissance, Baroque, Modern, Contemporary, American, African, and Asian art and architectural history.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) Aptitude Test (verbal, quantitative, and analytical) are required for admission to the Department of Art History. Special emphasis will be given to the verbal part of the GRE scores. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

Candidates with a 3.00 junior/senior grade-point average and a minimum of 21 credits in art history will be considered for admission to the master's program. Lacking these, a promising candidate may be accepted on condition that deficiencies be remedied, but without graduate degree credit. Applicants to the Ph.D. program must have an M.A. in art history or a closely related field. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

Master's Degree Requirements

Candidates for the M.A. degree are required to complete a minimum total of 36 credits (including a master's thesis or paper), divided as follows:

- ART H 551 (3 credits), to be taken during one's first fall semester
- 9 credits at the 400 level, of which 3 credits must be taken in each of the following three areas: (1) African/Asian/Oceania/Pre-Columbian Americas, (2) Ancient, Byzantine/Medieval, (3) Renaissance/Baroque/Modern/Contemporary
- 9 credits of 500-level seminars in art history (ART H 551, and ART H 596 may not be used to fulfill this requirement). Each seminar in this 9-credit requirement must be taken with a different faculty member.
- 9 additional credits in art history at the 400 or 500 level. With the approval of one's adviser and the graduate officer, 3 credits of this requirement may be a course at the 400 or 500 level outside the Department of Art History.
- 6 credits of ART H 600 for a master's thesis or 6 credits of ART H 596 for a master's paper. ART H 596 may be used only by a master's candidate for a master's paper; all other individual studies should use ART H 496.

In addition, candidates must demonstrate a reading proficiency in two foreign languages. One of these languages must be German, and the other being French, Italian, or Spanish. On the recommendation of a student's adviser, and with the approval of the graduate officer, a student may substitute one of the above-named languages with another foreign language deemed appropriate for a specialized field. Proficiency in one language must be demonstrated before the end of one year of study. A reading knowledge of the second language must be demonstrated before the end of the second year. A master's examination must also be passed before completing the M.A. degree.

Doctoral Degree Requirements

Thirty additional credits, not including doctoral dissertation research, are required for the Ph.D. At least 24 of these credits must be in art history and 3 to 6 must be in a related area outside art history. At least 9 of the art history credits must be at the 500 level, exclusive of Art History 510 and Art History 596. At the discretion of the candidate's doctoral committee, the candidate may be required to take additional specialized courses pertaining to his or her major area of study. A reading competency in two foreign languages must be demonstrated before the end of one year of study. Two languages relevant to the student's areas of study and will be determined through consultation with the student's faculty adviser, subject to the approval of the Graduate Officer. For the Ph.D., a candidacy examination, a comprehensive examination, and a final oral examination must be successfully completed in addition to the student's doctoral dissertation.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ART HISTORY (ART H) course list

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-07-000

Review Date: 06/30/2015

Faculty linked: 5/12/14

Asian Studies (ASIA)

On-cho Ng, *Head of Department of Asian Studies*
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Degrees Conferred:

Students electing this program through their primary graduate programs will earn a Ph.D. in (graduate program name) and Asian Studies.

The following graduate programs offer dual-title degrees in Asian Studies: Applied Linguistics, Comparative Literature, History, and Political Science.

The Graduate Faculty

Program

The primary objective of the dual-title degree program in Asian Studies is to engage critically and substantively with the teaching, research, and scholarship of Asia, a diverse area with a population of some 4.5 billion. The program integrates knowledge and methodology across disciplines through partnerships with the departments of History, Political Science, Comparative Literature, and Applied. Graduate students are trained in such a way that they are equipped to represent, understand, analyze, and appraise the crucial and current scholarly issues in Asian Studies in the context of their disciplinary foci. The program aims to produce doctoral graduates with a competitive advantage for employment that relates to Asia in academia and other professional fields.

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled, in addition to satisfying the degree requirements for the dual-title in Asian Studies, listed below. The requirements for the dual-title Ph.D. include Asia-related coursework, Asia-related components to the candidacy and comprehensive exams, strong all-skills proficiency in one Asian language and either two-years' college study (or equivalent) of another Asian language or else an alternative proficiency appropriate to the student's field; and the completion of an Asian Studies-related dissertation.

Admission Requirements

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the Asian Studies dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Asian Studies dual-title program. Doctoral students must be admitted into the dual-title degree program in Asian Studies prior to taking the candidacy examination in their primary graduate program. Applicants should have a junior/senior cumulative average of a 3.00 (on a 4.00 scale) and appropriate course background. Prospective students seeking admission to the dual-title degree program will write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary and Asian Studies-related research.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in Asian Studies, listed below. The requirements for the dual-title Ph.D. include Asia-related coursework, Asia-related components to the candidacy and comprehensive exams, strong all-skills proficiency in one Asian language and either two-years' college study (or equivalent) of another Asian language or else an alternative proficiency appropriate to the student's field; and the completion of an Asian Studies-related dissertation.

Ph.D. Requirements

Coursework: 15 credits of Asia-related coursework at the 400 or 500 level. At least 9 of these 15 credits will be from ASIA 501 and 502, and ad hoc 597 seminars on individual topics. The remainder of the credits may come from Asian Studies or from the student's primary graduate program, as approved by the student's doctoral adviser and the Asian Studies program director of graduate studies.

Language requirement: Students will show strong all-skills proficiency in one Asian language and either two years' college study (or equivalent) of another Asian language or else an alternative proficiency appropriate to the student's field.

The candidacy examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Asian Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both the primary graduate degree program and Asian Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an Asian Studies dual-title doctoral degree student must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair. The Asian Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in both their primary graduate program and Asian Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Asian Studies (ASIA) course list

Last Revised by the Department: Fall Semester 2018

Blue Sheet Item #: 47-01-000

Review Date: 8/28/2018

Faculty last updated: 12/3/13

Astronomy and Astrophysics (ASTRO)

Program Home Page

DONALD P. SCHNEIDER, *Head of the Department of Astronomy and Astrophysics*
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Degrees Conferred:

Ph.D., M.S., Dual-title Ph.D. in Astronomy and Astrophysics and Astrobiology

The Graduate Faculty

The Program

The graduate program in Astronomy and Astrophysics prepares students for careers in astronomy, space science and education. Graduate instruction and research opportunities are available in theoretical, observational, and instrumental astronomy and astrophysics. Currently active areas of theoretical research include high-energy astrophysics (including theory of neutron stars, black holes, and gamma ray bursts), relativity and cosmology, stellar dynamics and planet formation, and computational methodology. Observational areas include spectroscopic and photometric observations of high-redshift quasars, galaxies and the intergalactic medium; gamma-ray bursts; X-ray and visible light studies of quasars, starburst and other active galaxies; visible light studies of nearby galaxies and their stellar populations; infrared study of brown dwarfs and protoplanetary disks; spectroscopy and modeling of binary, magnetically active, pre- and post-main sequence stars; spectroscopic searches for planetary systems. Instrumental areas include: development of X-ray telescopes and detectors; and high-precision visible and near-infrared light spectrographs. Department faculty members participate in several university cross-disciplinary organizations: Astrobiology Research Center, Center for Astrostatistics, Center for Exoplanets and Habitable Worlds, and the Institute for Gravitation and the Cosmos.

The department played a seminal role in and leads many science investigations using two NASA-launched satellites, the Chandra X-ray Observatory and the Swift panchromatic gamma-ray burst mission, and the innovative 9-meter Hobby-Eberly Telescope located at the McDonald Observatory in Texas. Faculty and students also observe with other space-based observatories (GALEX, Hubble Space Telescope, Spitzer Space Telescope, XMM-Newton) and ground-based telescopes (Gemini and other national facilities, Magellan, Keck, South Africa Large Telescope, Very Large Telescopes). Physics faculty members closely associated with the Department are involved in particle and gravitational wave observations using the Auger, AMANDA, Ice Cube, and LIGO instruments. The Department has extensive computing facilities, and research is also conducted with university and national supercomputing resources.

Graduate students also have ample opportunity to acquire experience in undergraduate teaching and public outreach.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE), including the Physics test, are required for admission.

Normally, students admitted to the program are required to have a bachelor's degree in physics and/or astronomy with a grade-point average of at least 3.0 in their junior/senior courses in physics, astronomy, math, and related subjects. Typical GRE scores for entering students are 720 or more on the general test, and 680 or more on the Physics test. The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult theEnglish Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information. Applicants to the Astronomy and Astrophysics program must have a minimum TOEFL score of 590 on the paper-based test, or a total score of 96 with a 23 on the speaking section for the Internet-based test (iBT).

Degree Requirements

In the Bulletin listing, under Degree Requirements, add the following as the first paragraph: “Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

A minimum of 37 credits are required for the Ph.D., including 30 credits of 3-credit courses, 3 credits of ASTRO 596 for directed research in the second year, 3 credits of ASTRO 589 Seminars in current research, 1 credit of ASTRO 590 Colloquium, and 1 credit of ASTRO 602 for supervised teaching; however the 1 credit for ASTRO 602 cannot be counted towards the minimum credits required for the degree. The ten 3-credit courses must include ASTRO 501, ASTRO 502, at least four additional ASTRO 500-level courses, and at least two PHYS 500-level courses. One 400-level class may be substituted for a course that is not one of the ASTRO 500-level courses. A GPA of 3.2 in the ten 3-credit courses is required.

The Candidacy Examination is an oral examination covering any area of astronomy. Students who fail the Examination may make a second attempt. At the Comprehensive Examination, the student presents a significant body of original research conducted at Penn State. This Examination tests the student's mastery of the chosen field of research. The student prepares an extended written report and oral presentation, and answers questions on the research and closely related areas. Graduation requires the completion of a dissertation of original research and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

The Master of Science degree requires completion of the Ph.D. course requirements (except the 3 credits of ASTRO 589) with 3.00 grade point average, passage of the Candidacy Exam, and submission of an acceptable scholarly paper, completed while enrolled in ASTRO 596.

Dual-Title Ph.D. in Astronomy and Astrophysics and Astrobiology

Admissions Requirements

Students must apply and be admitted to the graduate program in Astronomy and Astrophysics and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Astrobiology dual-title program. Refer to the Admission Requirements section of the Astrobiology Bulletin page. Doctoral students must be admitted into the dual-title degree program in Astrobiology prior to taking the candidacy examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Astronomy and Astrophysics, listed above. In addition, students must complete the degree requirements for the dual-title in Astrobiology, listed on the Astrobiology Bulletin page. The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Astronomy and Astrophysics and must include at least one Graduate Faculty member from the Astrobiology program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Astronomy and Astrophysics and Astrobiology. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an Astronomy and Astrophysics and Astrobiology dual-title Ph.D. student must include at least one member of the Astrobiology Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Astrobiology, the member of the committee representing Astrobiology must be appointed as co-chair. The Astrobiology representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Astronomy and Astrophysics and Astrobiology. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Graduate Teaching Assistantships, externally funded graduate Research Assistantships, and/or University fellowships are typically provided to student admitted and continuing in good standing. Many students also apply for externally funded fellowships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ASTRONOMY AND ASTROPHYSICS (ASTRO) course list

Last Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07-000

Review Date: 6/26/2018

Faculty linked: 5/27/14

Business Administration (B A)

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Degrees Conferred:

Ph.D., M.S., M.B.A, M.D./M.B.A., J.D./M.B.A.
Dual-title Ph.D. and M.S. in Business Administration and Operations Research

The Graduate Faculty, Ph.D. program

The Graduate Faculty, MBA programs

The Programs

The Master of Business Administration program is a professional degree designed to prepare individuals for managerial positions in business, government, and nonprofit institutions. The M.B.A. curriculum blends technical rigor, managerial theory, and integrative learning experiences through case studies and other teaching methods. A managerial communications course is fully integrated into the program.

The Master of Science in Business Administration program is highly flexible and designed for advanced study in a specialized field. The M.S. program is directed toward the development of competency within a defined area of management. Fields such as accounting and management science are examples of career opportunities requiring specialized knowledge and skill, including research.

The Doctor of Philosophy degree in the Business Administration program offers advanced graduate education for students focused on research careers at leading business schools. The faculty of the college views the Ph.D. as evidencing scholarship at the highest level.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants to the M.B.A. program are required to take the Graduate Management Admission Test (GMAT); whereas applications to the doctoral program are required to take either the GMAT or the Graduate Record Examination (GRE). The program does not admit applicants for the terminal Master of Science (M.S.) degree.

Criteria for evaluating applicants include professional and academic accomplishments, GMAT/GRE scores, recommendations, and personal data from application forms that provide indications of future academic and professional accomplishment.

Work on the M.B.A. degree may be started fall semester only. Ph.D. candidates may begin either the fall or spring semester. However, only rarely are admissions for the Ph.D. programs granted for spring semester. Individuals from all undergraduate disciplines are encouraged to apply.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The M.B.A. program consists of two distinct portions: (1) preprogram competency expectations, including accounting, economics, mathematics, and statistics; and (2) a minimum of 54 credits at the 400, 500, or 800 levels, with a minimum of 18 at the 500 or 800 level and at least 6 credits at the 500 level. Of the minimum 54 credits, 32 credits are required core courses: BA 512 (2 cr.), BA 533 (2 cr.), BA 571 (2 cr.), BA 800 (2 cr.), BA 801 (2 cr.), BA 802 (1 cr.), BA 804 (2 cr.), BA 805 (1 cr.), BA 810 (2 cr.), BA 811 (2 cr.), BA 815 (2 cr.), BA 817 (4 cr.), BA 821 (2 cr.), BA 831 (2 cr.), BA 832 (1 cr.), BA 835 (2 cr.), and BA 836 (cr.). The remaining 22 elective credits must be chosen from a list of approved elective courses maintained by the graduate program office.

The culminating experience for the M.B.A. is BA 571, Strategic Management. This course is designed to bring together the many functional areas previously studied and integrate them into a strategic analysis of the entire firm.

Admission to the M.S. program is only available to students previously admitted to the Ph.D. program, with the approval of the Director of the Ph.D. program. The M.S. degree requires a minimum of 30 credits at the 400, 500, 600, or 800 level in business administration or related areas, including a thesis or scholarly paper. Students who complete a thesis must take at least 18 credits at the 500 or 600 level, with a minimum of 6 credits in thesis research (BA 600 or 610). The thesis must be accepted by the committee members, the head of the graduate program, and the Graduate School. Students who choose the non-thesis option must take at least 18 credits at the 500 level, and complete a satisfactory scholarly paper while enrolled in BA 596.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Competency Expectations: Entrance into the doctoral program in business administration does not require the completion of an undergraduate degree specifically in business. While almost any major at the undergraduate level may be acceptable, graduate study in business administration does presume a minimum level of competency in mathematics, statistics, and computing. No transcript credit is required for entering doctoral candidates in these areas, except where specified by particular fields of specialization. However, it must be emphasized that lack of minimum competency in mathematics, statistics and computing could be a significant disadvantage to the candidate.

Breadth Requirement: All candidates are expected to develop a broad understanding of the functions of the business organization. To achieve breadth, all Ph.D. candidates must show competency by completing 12 credits at the 400, 500, or 800 level in a minimum of two of the approved fields of study within the Smeal College of Business and/or in Economics in the College of the Liberal Arts. The 12 credits in the breadth requirement must be taken in fields outside or separate from a candidate's primary, supporting, and research competency fields.

Primary Field Requirements: All candidates are required to achieve competency in a primary field of business administration. The primary field is the sphere of scholarship that commands the most extensive and intensive portion of a program and is the area in which the student's dissertation research is conducted and the doctoral committee chair is selected. Primary fields may be selected from the following: accounting; finance; insurance and real estate; management and organization; marketing; and supply chain and information systems.

Graduate work in a selected primary field may require competency in prerequisite areas, including undergraduate work in the field itself as well as prior work

in mathematics, statistics, computer science, economics, and social and behavioral sciences. The prerequisite work will be specified by each primary field.

Supporting Field Requirements: All candidates must select a supporting field of study from business administration or related outside areas. Those spheres of scholarship complement the candidate's primary field. Supporting fields from business administration include all the primary fields. Outside supporting fields include, but are not limited to, anthropology, civil engineering, computer science, economics, industrial engineering, mathematics, political science, psychology, sociology, and statistics.

Research Methods Field: All candidates must develop a broad understanding of the scientific research process and in-depth competency in the research methods used in the primary field. Each candidate's doctoral committee shall specify a minimum of 4 courses/12 credits at the 400, 500, or 800 level (beyond the M.B.A. core courses) to constitute a supporting field in research methods. These courses should cover specific methods and tools relevant for research in the primary fields. A member of the doctoral committee shall be designated to represent the research methods field and shall be responsible for evaluating the candidate's competence in the field.

Research Paper and Presentation Requirement: To introduce students early to the research process, each Ph.D. student must complete a written research paper within two years after admission to the Ph.D. program. The student must then present the paper at an open departmental workshop or seminar within one semester after the paper is approved by the department committee and chair. The student must work under the guidance of a Research Paper Supervisor (who may or may not later be the dissertation adviser). The research paper supervisor mentors the student, possibly suggesting the research topic, monitoring progress, providing ideas and feedback, and helping the student develop appropriate research, writing, and presentation skills. The paper must substantially represent the student's work, and must be written by the student. The paper must clearly define and motivate the problem being addressed, contain a comprehensive literature review, and present the research contributions and conclusions. Approval of written paper and presentation can be used as a means to satisfy the University's English competence and communication requirement (to be completed before the comprehensive examination).

Dissertation: To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Other Degree Programs

Dual-Title Ph.D. and M.S. in Operations Research

Ph.D. and M.S. students in Smeal College of Business can elect to participate in the Operations Research dual-title graduate program. Operations Research is the use of scientific methodology in the formulation, analysis, and solution of problems of decision making.

Admissions Requirements: Students must apply and be admitted to the graduate program in Business Administration and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page Doctoral students must be admitted into the dual-title degree program in Operations Research prior to obtaining candidacy in their home department.

Degree Requirements: To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Business Administration, listed above. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page.

For the dual-title M.S. degree in Business Administration and Operations Management, the thesis or scholarly paper must reflect the student's education and interest in both Business Administration and Operations Research. The master's committee must include at least one Graduate Faculty member from Operations Research. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Business Administration and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Business Administration and Operations Management. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Business Administration and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Business Administration and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

FIVE-YEAR SCIENCE B.S./M.B.A. PROGRAM

This program is the result of collaboration between the Eberly College of Science and Smeal College of Business. With the accelerated nature of the program, students can earn a B.S. degree in science and an M.B.A. degree in five calendar years after graduation from high school. For the first three and one-half years, including the first semester of the M.B.A. curriculum, students are enrolled as undergraduates in the Eberly College of Science. For the remaining three semesters, participants are graduate students formally enrolled in the Smeal College of Business M.B.A. program. Successful completion of this program results in a B.S. degree in Science awarded by the Eberly College of Science during year four and an M.B.A. from the Smeal College of Business at the end of year five.

Students must apply to the program via the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the Business Administration graduate program for the Master of Business Administration degree. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Students must fulfill all requirements for each degree in order to be awarded that degree. Degree requirements for the B.S. degrees can be found in the Undergraduate Degree Program Bulletin Degree requirements for the M.B.A. degree are listed in the Master's Degree Requirements section above.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. The credits that can be double-counted are: BA 500 (2 cr.), BA 501 (2 cr.), BA 511 (2 cr.), BA 512 (2 cr.), BA 515 (2 cr.), BA 531 (2 cr.).

If students accepted into the IUG program are unable to complete the M.B.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

JOINT DEGREE OFFERING WITH PENN STATE LAW

Smeal College of Business, University Park campus
Penn State Law

Degrees Conferred:

J.D. (Penn State Law) / M.B.A. (The Smeal College)

Joint degree program. Smeal College of Business and the Penn State Law offer a joint degree program leading to the degrees of Juris Doctor (J.D.) and Master of Business Administration (M.B.A.). We live in a global society where complex legal structures interact with dynamic and powerful market forces. Individuals with backgrounds in both business and law have a distinct advantage in understanding this interaction and are uniquely positioned for success in our modern society. The Juris Doctor/Master of Business Administration (J.D./M.B.A.) joint degree program provides outstanding, highly motivated students the opportunity to combine a Juris Doctor degree from Penn State Law with an M.B.A. degree from Penn State's internationally ranked Smeal MBA Program (Smeal). Participants in this program earn both a Juris Doctor degree and a Master of Business Administration in four years compared to the five years required to earn the two degrees separately.

Admission to the program. In order to be admitted to the program, students may: (a) first be admitted and enrolled in either Smeal College or Penn State Law and subsequently admitted to the other program; or (b) be admitted to the joint program prior to commencing studies at Penn State. Each program will make a separate admission decision. Students admitted to both programs will be admitted as joint degree candidates.

Admission Requirements

Candidates must apply to Penn State Law and Smeal separately and must meet each school's requirements. The admission requirements for the Master of Business Administration degree are listed above. Admissions requirements and applications for admission for Penn State Law are available at the J.D. Admissions section of the Penn State Law website. Students must be admitted to the program prior to taking the first course they intend to count towards the M.B.A. degree.

Credit Requirements: Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on thePenn State Law website. Degree requirements for the M.B.A. degree are listed in the Master's Degree Requirements section above.

Double Counting of Credits: M.B.A. A maximum of 16 credits from Penn State Law course work may be double counted toward the M.B.A. degree at Smeal. Courses for which such credit may be applied shall be subject to approval by Smeal based on relevance to the MBA program. Students must obtain a grade satisfactory to Smeal for any J.D. course work to be credited toward the M.B.A. degree.

Double Counting of Credits: J.D. A maximum of 12 credits for M.B.A. course work may be double counted for credit toward the J.D. degree at Penn State Law. Courses for which such credit may be applied shall be subject to approval by the Penn State Law faculty. Students must obtain a grade satisfactory to Penn State Law for any M.B.A. course work to be credited toward the J.D. degree.

Advising of Students: All students in the program shall have two advisers, one from Smeal and one from Penn State Law. Periodic interaction between the two advisers is encouraged.

Graduation: If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.B.A. degree if all the M.B.A. degree requirements have been satisfied.

JOINT DEGREE OFFERING WITH THE PENN STATE HERSHEY COLLEGE OF MEDICINE

Hershey College of Medicine, Hershey campus
Smeal College of Business, University Park campus

Degrees Conferred: M.D. (Hershey) / M.B.A. (The Smeal College)

Joint degree program. Smeal College of Business and the Penn State Hershey College of Medicine offer a joint degree program leading to the degrees of Medical Doctor (M.D.) and Master of Business Administration (M.B.A.). The objective of the program is to produce highly qualified clinicians who also understand the challenges of running a business. The Medical Doctor/Master of Business Administration (M.D./M.B.A.) joint degree program provides outstanding students the opportunity to combine a Medical Doctor degree from the College of Medicine, a highly respected medical college and medical center, with an M.B.A. degree from Penn State's internationally ranked Smeal MBA Program (Smeal). Participants in this program earn both a Medical Doctor degree and a Master of Business Administration in five years compared to the six years required to earn the two degrees separately.

Admission to the program. In order to be admitted to the program, students must first be admitted and enrolled in the COM as a medical student and subsequently admitted to Smeal. Each program will make a separate admission decision. Students admitted to both programs will be admitted as joint degree candidates.

Students currently enrolled at the College of Medicine in the M.D. program may apply to the M.D./M.B.A. program during their first three years at the College of Medicine by applying to the M.B.A. program, as described in the Admissions Requirements section above.

Admission Requirements

The admission requirements for the Master of Business Administration degree are listed above. Admissions requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program section of the Penn State College of Medicine website. Students must be admitted to the program prior to taking the first course they intend to count towards the M.B.A. degree.

Credit Requirements: Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on theCollege of Medicine website. Degree requirements for the M.B.A. degree are listed in the Master's Degree Requirements section above.

Sequence: Students may choose to conduct their study in either of the two sequences shown below. Each "Year" refers to the traditional academic year beginning in late August and concluding in May. The College of Medicine students can expect to take courses during the summer. The Smeal College of Business does not offer any classes over the summer term.

Years 1-3: M.D. foundation and advanced course work at the College of Medicine.

Year 4: M.B.A. foundation course work at the University Park location.

Year 5: Combination of M.D. and M.B.A. course work at the University Park location.

Double Counting of Credits: M.B.A.: 15 credits from the College of Medicine course work may be double counted toward the M.B.A. degree at Smeal. Courses for which such credit may be applied shall be subject to approval by Smeal based on relevance to the M.B.A. program. Students must obtain a grade satisfactory to Smeal (High Pass or Low Pass) for any M.D. course work to be credited toward the M.B.A. degree.

Double Counting of Credits: M.D.: A maximum of 45 credits for M.B.A. course work may be double counted for credit toward the M.D. degree at the COM. Courses for which such credit may be applied shall be subject to approval by the College of Medicine faculty. Students must obtain a grade satisfactory to the College of Medicine (a grade of "C" or higher) for any M.B.A. course work to be credited toward the M.D. degree.

Advising of Students: All students in the program shall have two advisers, one from the Smeal College of Business and one from the College of Medicine. Periodic interaction between the two advisers is encouraged.

Graduation: If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the M.B.A. degree if all the M.B.A. degree requirements have been satisfied.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, other awards are available to graduate students in Smeal College of Business. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ACCOUNTING (ACCTG) course list

Dr. Dan Givoly, *Chair*; 814-865-0041

BUSINESS ADMINISTRATION (B A):
The following courses require matriculation into the MBA program at University Park campus and are considered part of the MBA core curriculum:

- 512. RISK & DECISION (2)
- 533. ECONOMICS FOR MANAGERS (2)
- 571. STRATEGIC MANAGEMENT (1-3) (CAPSTONE)
- 800. MARKETING MANAGEMENT (1-3)
- 801. MANAGEMENT (2)
- 802. TEAM PROCESSES AND PERFORMANCE (1-3)
- 804. ETHICAL LEADERSHIP (2)
- 805. NEGOTIATION THEORY AND SKILLS (1-3)
- 810. SUPPLY CHAIN AND OPERATIONS MANAGEMENT (1-3)
- 811. FINANCIAL ACCOUNTING (1-3)
- 815. BUSINESS STATISTICS FOR CONTEMPORARY DECISION MAKING (2)
- 817. LEADERSHIP COMMUNICATIONS (1-3)
- 821. INTRODUCTION TO MANAGERIAL ACCOUNTING (2)
- 831. INTRODUCTION TO FINANCE (1-3)
- 832. GLOBAL BUSINESS ENVIRONMENT (1)
- 835. GLOBAL PERSPECTIVES (10
- 836. INTERNATIONAL IMMERSION (2)

Courses outside the MBA core:

- 528. BUSINESS SIMULATION (1-3)
- 545. BUSINESS, GOVERNMENT & INTERNATIONAL ECONOMICS (2)
- 565. STRATEGIC LEADERSHIP (1-3)
- 574. BUSINESS RESEARCH (1-3)
- 596. INDIVIDUAL STUDIES (1-9)
- 599. FOREIGN STUDY - BUSINESS ADMINISTRATION (1-12)

BUSINESS LAW (B LAW)
525. BUSINESS LAW FOR INNOVATION & COMPETITION (2)

BUSINESS LOGISTICS (B LOG) course list

Dr. John E. Tyworth, *Chair*; 814-865-1866

E-BUSINESS (EBIZ) course list

ENTREPRENEURSHIP (ENTR)
500. INNOVATION AND ENTREPRENEURSHIP (1-3)

FINANCE (FIN)
515. NITTANY LION FUND MANAGER (3)
555. GLOBAL FINANCE (1-3)
570. FINANCIAL MODELING (2)

Dr. William A. Kracaw, *Chair*; 814-863-0486

INFORMATION SCIENCES AND TECHNOLOGY (IST) course list

INSURANCE (INS) course list

Dr. Austin Jaffe, *Chair*; 814-865-1190

INTERNATIONAL BUSINESS (I B)
555.GLOBAL FINANCE (1-3)

Dr. Fariborz Ghadar, *Director*, 814-865-0544

MANAGEMENT AND ORGANIZATION (MGMT)
561. GLOBAL STRATEGY AND ORGANIZATION (1-3)
565. POWER & INFLUENCE (2)

Dr. Dennis Gioia, *Chair*; 814-865-2194

MANAGEMENT INFORMATION SYSTEMS (M I S) course list

MANAGEMENT SCIENCE AND INFORMATION SYSTEMS (MS&IS) course list

John E. Tyworth, *Chair*, 814-865-1866

MARKETING (MKTG) course list

Dr. Hans Baumgartner, *Chair*; 814-863-3559

OPERATIONS AND INFORMATION SYSTEMS MANAGEMENT (OISM) course list

OPERATIONS MANAGEMENT (OPMGT) course list

REAL ESTATE (R EST)
515. PROPERTY RIGHTS IN A GLOBAL ECONOMY (2)

Dr. Austin Jaffe, *Chair*; 814-865-1190

SUPPLY CHAIN MANAGEMENT (SCM) course list

Last Revised by the Department: Summer Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Faculty link: 5/27/14

Business Administration (B ADM)

Program Home Page

ALFRED G. WARNER, *Academic Director of the M.B.A. Program*
Penn State Behrend
5101 Jordan Road
Erie, PA 16563

Degree Conferred:

M.B.A.

Graduate Faculty

The Program

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

Admission Requirements

Admission is granted only to candidates who demonstrate high promise of success for graduate work. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Applicants are required to take the Graduate Management Admissions Test (GMAT)* administered by the Pearson VUE on behalf of the Graduate Management Admission Council (GMAC).

Admission decisions are based on the following: undergraduate grade-point average; the degree of correspondence between the applicant's objectives and those of the program; three letters of reference; and GMAT score. Favorable consideration will be given to applicants who have significant work experience. A minimum GMAT score of 450 is required. However, admission is competitive and higher scores may be required, depending on the qualifications of the applicants. Admission is open during the fall and spring semesters, as well as during the summer session.

Applicants must demonstrate proficiency in writing by having earned a grade of B or higher in a college English composition or writing course or by achieving a score of four or higher on the GMAT Analytical Writing Assessment. Students who fail to meet at least one of these two criteria must complete a college English composition or writing course and earn a grade of B or higher or retake the GMAT test and score four or higher on the Analytical Writing Assessment. This requirement must be satisfied during either the first semester or summer session of the student's matriculation.

*GMAT Waivers will be considered in the following circumstances:
- The applicant has a completed master's degree, MD, JD or Ph.D. form a regionally accredited institution
- The applicant has post-graduate full-time professional work experience of 7 years or more
- The applicant has post-graduate full-time work experience of 3 to 7 years and an Undergraduate GPA of 3.3 or higher
- The applicant has less than three years of post-graduate full time work experience and an Undergraduate GPA of 3.6 or higher.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The Master of Business Administration degree program consists of two parts:

Demonstration of subject matter competence*:* Students are expected to demonstrate fundamental competence in accounting, finance, economics, management, marketing, operations management, and statistics prior to taking the Required Courses. Applicants who have, within seven years prior to the date of their admission to degree candidacy, completed a baccalaureate degree in business from a regionally accredited institution that includes introductory courses in these disciplines will be considered to have demonstrated competence as long as the previously completed courses carry grades of B or higher. An applicant who, within seven years prior to his or her admission to degree candidacy, completed a baccalaureate degree in a non-business field from a regionally accredited institution that includes equivalent undergraduate or graduate courses carrying a grade of B or higher will also be considered to have demonstrated competence. Applicants who attained currency of knowledge through relevant business experience or continuing professional education in one or more of the subject areas may demonstrate competence through examination.

Required Courses (21 credits): These courses provide greater depth of knowledge in the subject areas included. This component of the MBA program consists of seven 3-credit courses that cover advanced topics in cost management, managing effective organizations, quantitative methods for business, leadership and ethics, corporate finance, marketing strategy, and strategic management and business policy. The program capstone is B ADM 514 (3 credits), which is a semester long industry and business analysis problem, culminating in a final, integrated paper.

All students are required to complete the following courses: B ADM 510, B ADM 512, B ADM 513, B ADM 514, B ADM 526, B ADM 532 and B ADM 554 unless they can demonstrate advanced knowledge of the course subject matter through prior course work, extensive experience and/or advanced professional education. Students who believe they have knowledge of a required course must submit a written request and documentation describing their knowledge of the course subject matter. If approved, the student will substitute an additional elective course for the required course.

Elective Courses (9 credits): All students are required to take 9 credits of elective courses covering advanced topics of their choice. MBA students may apply a maximum of 6 credits of approved 400-level course work toward elective requirements. Course work at the 400 level must be approved by the director of the MBA program and cannot have been used for another degree.

Transfer Credits: Students may transfer a maximum of 10 credits from another regionally accredited graduate program or recognized degree-granting institution to fulfill elective and/or required courses. Application of transfer credits to the student's academic program must be approved by the director of the MBA program and be in compliance with Graduate School requirements described in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses
Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer Session 2016
Blue Sheet Item #: 44-07-000
Review Date: 06/28/2016
Faculty linked: 8/14/14

Business Administration (BADMN)

Program Home Page

Oranee Tawatnuntachai, Director
Penn State Harrisburg, School of Business Administration
777 W. Harrisburg Pike
E-355 Olmsted Building
Middletown, PA 17057-4898
717-948-6140
mbahbg@psu.edu

Degree Conferred:

M.B.A.

The Graduate Faculty

The Program

The M.B.A. program is intended to provide graduates with a foundation for personal and professional growth and lifelong learning; a firm grounding in the academic disciplines underlying the field of business; participative strengths; and decision making, problem solving, and critical thinking skills. Major emphasis is placed on the social, legal, and ethical context of business—particularly ethical values needed in the conduct of business. Program faculty place high value on teaching and currency of curriculum, an emphasis on oral and written communication, collaborative learning, and cross-functional integration of concepts.

Locations

The degree is offered in its entirety on the Penn State Harrisburg campus located in Middletown, PA. To provide flexibility for students, some courses are also offered online or in a hybrid format (i.e., a blend of resident instruction and online). Students should contact the program office for information on specific semester course offerings.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

The admission decision is based on the applicant's entire admission portfolio consisting of undergraduate degree, post baccalaureate course work, either the Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) scores, professional experience, letters of recommendation, and statements provided in the application. An applicant with significant work experience may be admitted with a lower GMAT or GRE score, while an applicant with limited work experience may be admitted with a higher GMAT or GRE score and an outstanding undergraduate background.

Standardized Test Requirements Waiver: The GMAT or GRE requirement may be waived for the following applicants:

- Graduates from business, engineering, science or related fields with a cumulative undergraduate GPA of at least 3.5 from accredited U.S. schools.
- Members of Beta Gamma Sigma, the international business honors society.
- Ph.D., J.D., M.D., or Master's degree holders in business, engineering, science or related fields from accredited U.S. schools.

Please note that there is no GMAT or GRE waiver for applicants seeking graduate assistantships.

Please visit the GMAT website or the GRE website for information about these examinations.

The candidate must apply for admission to the program via the Graduate School application for admission. The candidate is required to submit:

- a completed online application form with application fee
- official transcripts from all post-secondary institutions attended
- GMAT or GRE test scores (the test must have been taken within the past five years)
- two letters of recommendation
- resume

For complete admission information and the latest updates on admission requirements and procedures, please consult the Penn State Harrisburg website.

International Students

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Application Dates

Candidates may enter the program at the beginning of the fall or spring semester, or the summer session. To allow time for applications to be processed, all information, including the GMAT or GRE score, must be received by the admissions office no later than:

- Fall Semester - July 18
- Spring Semester - November 18
- Summer Session - April 18

Applicants from outside the United States must follow the early admission dates in order to allow the necessary clearances and paperwork to be processed in time. International application deadline dates are:

- Fall Semester--May 31
- Spring Semester--September 30
- Summer Session--February 28

To be considered for a graduate assistantship, applicants must submit a complete application by March 1. Students on graduate assistantships must adhere to the course load policy listed in the Bulletin.

Preparation for the Program

Credits obtained to fulfill program preparation and foundation courses cannot be applied towards the requirements for the degree.

Analytic Skills Requirement: Students must demonstrate competence in analytic skills. This requirement can be satisfied in one of two ways: (1) by satisfactory completion of a college-level mathematics course; or (2) by successful completion of a proficiency examination in mathematics approved by the M.B.A. program. This requirement must be satisfied by the first semester or summer session of the student's matriculation, and completed with a grade of C or higher.

Computer Skills Requirement: Students are required to demonstrate proficiency in the use of computer applications. This requirement can be satisfied through a college-level computer applications course within the past five years with a grade of a B or higher, or by documented, significant, computer-related work experience. If this requirement has not been met prior to admission, a college-level computer course such as MIS 204 or CMPSC 203 is required. Course work must be completed by the first semester or summer session of the student's matriculation with a grade of B or higher.

Communications Skills Requirement: Successful completion of the M.B.A. program requires the ability to think clearly, and to write and speak persuasively. Part of this requirement can be satisfied by achieving a score of "4" or higher on the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) Analytical Writing Assessment. If this score is not achieved, students must satisfy this requirement through additional course work in writing skills such as ENGL 202D or other work developed in consultation with the M.B.A. program. This requirement must be satisfied by the first semester or summer session of the student's matriculation. All courses taken must be completed with a grade of B or higher. The speech component of this requirement is satisfied through individual and group presentations in MNGMT 511 and other courses in the M.B.A. program.

Foundation Courses:
The M.B.A. program is grounded in the academic disciplines of accounting, finance, economics, marketing, management, and information sciences, among others, in order to provide students with the conceptual foundation required for competent pursuit of more advanced studies in business administration as well as the ethical and legal management of profit and non-profit organizations. This background can be provided by course work taken at the graduate level or as part of a baccalaureate degree from a regionally accredited U.S. institution or a tertiary (post-secondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. All courses must have been completed with a grade of B or higher, within seven years prior to admission to the M.B.A. program. Course work not meeting the tests of relevancy, quality, or currency must be taken at the graduate level prior to starting the relevant prescribed courses and electives. Time limits may be waived by the M.B.A. program on the basis of post-graduation training or current and relevant work experience. Courses available at Penn State Harrisburg that provide the necessary foundation for graduate business study include: ACCT 501, BUS 505, BUSEC 502, MNGMT 511; either MNGMT 522 or MNGMT 523; and MRKT 513.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The M.B.A. degree requires 30 credits of course work at the graduate level (500- or 800-level). These credits are distributed over two clusters of courses: Prescribed Courses and Elective Courses/Tracks.

Prescribed Courses: 21 credits in ACCT 540, BUS 510, BUS 515, BUS 588, either FINAN 521, or FINAN 530, INFSY 540, and MRKT 514. The prescribed courses develop key competencies in functional areas of business and BUS 588, the required capstone course, integrates knowledge from all functional areas. The capstone project, completed while the student is enrolled in BUS 588, is a feasibility study incorporating firm-level business strategies leading to sustainable competitive advantage.

Elective Courses/Tracks: 9 credits. Students may elect courses in clusters of "Tracks" organized around a common theme designed to be integrative and cohesive. The Tracks provide competencies and skill sets for decision making in seven areas: (1) The Accounting Track is designed to offer additional courses for students having prior academic preparation in accounting to enable them to satisfy the educational requirements for Certified Public Accountant (CPA) licensure in Pennsylvania and most other states; (2) the Business Analytics Track is intended to enhance data analytical skills enabling managers to synthesize data to make strategic decisions; (3) the Finance Track provides advanced corporate finance and investment knowledge enabling managers to apply various financial tools in decision making; (4) the Information Systems Track is designed to provide competencies enabling managers to develop and implement information technology; (5) the Strategic Leadership and Innovation Track is intended to further sharpen leadership and management skills; (6) the Supply Chain Management Track provides competencies needed to develop improvement and innovation in organizational supply chains; and (7) the General Business Track is provided for students who wish to develop a broad generalist program, or who have a particular personal or professional goals not met by one of the other tracks.

The list of courses required for each track and additional approved elective courses is maintained by the graduate program office.

Transfer Credit and Course Substitutions

Transfer Credits: Penn State allows a maximum of 10 transfer credits of high-quality work to be applied toward the requirements for a graduate degree, subject to restrictions outlined in the Transfer Courses section of the Graduate Bulletin.

Course substitutions: Some students enter the program with advanced course work in one or more subject areas (e.g., a degree in accounting plus a C.P.A.) making some prescribed course work redundant. Except for BUS 588 which must be taken at Penn State Harrisburg, students may petition or be advised by the program to replace up to 6 credits in Prescribed Courses with an equivalent number of credits of more advanced graduate courses in the same subject area. Courses must have been completed within five years prior to the date of first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official transcript of a regionally accredited U.S. institution or recognized degree-granting international institution.

Joint Degree Offering with the Penn State Dickinson Law

Penn State Harrisburg, The Capital College, School of Business Administration
Penn State Dickinson School of Law

Degrees Conferred:
J.D. (Dickinson Law)
M.B.A. (The Capital College)

Joint Degree Programs

Penn State Dickinson Law and the School of Business Administration at Penn State Harrisburg offer cooperative programs leading to the degrees of Juris Doctor (J.D.) granted by the Penn State Dickinson Law and the Master of Business Administration (M.B.A.) granted by Penn State Harrisburg, The Capital College. This joint degree opportunity facilitates the completion of both a law degree and a professional master's degree in business administration.

Admission Requirements

Applicants to the joint degree program must apply and be admitted first to Dickinson Law. Subsequently, the student is recommended for and applies for admission to the Graduate School for the Master of Business Administration graduate program. Admissions requirements and applications for admission for Dickinson Law are listed in theJ.D. Admissions section of the Dickinson Law website. The admission requirements for the Master of Business Administration are listed above.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on thePenn State Dickinson Law website. Degree requirements for the M.B.A. degree are listed in the Degree Requirements section above. Nine credits of course work at The Dickinson School of Law may be double-counted toward the M.B.A. degree, subject to program approval. Students must obtain a grade satisfactory to the M.B.A. program in order for the credits to be double-counted for credit toward the J.D. degree at the Dickinson School of Law subject to the approval of the School of Law.

Advising of Students

All students in the joint degree program have two advisers, one in the School of Business Administration and one from the faculty at Penn State Dickinson Law. Because the joint degree program is designed to be taken in synchrony with the objective that both degrees will be earned simultaneously, students who do not demonstrate progress toward completion of both degrees may be denied continuation in the joint degree program. Such a decision will rest jointly with the faculties of the M.B.A. program and the J.D. program. Students can graduate with one degree before the other as long as they have completed all of the requirements for the degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.B.A. degree if all the M.B.A. degree requirements have been satisfied.

Tuition

Penn State Dickinson Law and Penn State Harrisburg will each charge their own tuition to students in the joint degree program.

Additional Information

For more information and the latest updates on the joint degree program, contact Penn State Dickinson Law or the M.B.A. program at Penn State Harrisburg.

Integrated B.S. in Accounting/M.B.A. Program

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Accounting candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Accounting and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Accounting degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed above. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit a resume, a personal statement including career goals and how the M.B.A. will enhance their career goals, official transcripts of all post-secondary coursestaken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent: ACCTG 211 [4], ECON 102 [3], ENGL 015 or 030 [3], FIN 301 [3], MATH 110 or 140 [4], MGMT 301 [3], MKTG 301 [3] and STAT 200 [4] c SCM 200 [4].

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Accounting are listed in theUndergraduate Bulletin. Degree requirements for the M.B.A. degree are listed above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted. The M.B.A. courses that could possibly be double-counted include ACCT 504, ACCT 510, ACCT 532, ACCT 545, ACCT 561, ACCT 571, ACCT 572, ACCT 573, and FINAN 521.

Integrated B.S. in Finance/M.B.A. Program

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Finance candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Finance and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Finance degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed above. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit a resume, a personal statement including career goals and how the M.B.A. will enhance their career goals, official transcripts of all post-secondary coursestaken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent: ACCTG 211 [4], ECON 102 [3], ENGL 015 or 030 [3], FIN 301 [3], MATH 110 or 140 [4], MGMT 301 [3], MKTG 301 [3] and STAT 200 [4] c SCM 200 [4].

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Finance are listed in theUndergraduate Bulletin. Degree requirements for the M.B.A. degree are listed above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted. The M.B.A. courses that could possibly be double-counted include ACCT 540, FINAN 518, FINAN 522, FINAN 523, FINAN 526, FINAN 527. FINAN 530, FINAN 531, and INFSY 540.

Integrated B.S. in Information Systems/M.B.A. Program

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Information Systems candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Information Systems and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Information Systems degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed above. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit a resume, a personal statement including career goals and how the M.B.A. will enhance their career goals, official transcripts of all post-secondary coursestaken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent: ACCTG 211 [4], ECON 102 [3], ENGL 015 or 030 [3], FIN 301 [3], MATH 110 or 140 [4], MGMT 301 [3], MKTG 301 [3] and STAT 200 [4] c SCM 200 [4].

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Information Systems are listed in theUndergraduate Bulletin. Degree requirements for the M.B.A. degree are listed above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted. The M.B.A. courses that could possibly be double-counted include FINAN 521, INFSY 540, INFSY 547, INFSY 555, INFSY 560, INFSY 565, INFSY 566, and INFSY 570.

Integrated B.S. in Management/M.B.A. Program

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Management candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Management and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Management degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed above. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit a resume, a personal statement including career goals and how the M.B.A. will enhance their career goals, official transcripts of all post-secondary coursestaken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program, unless students have not completed 24 or more credits at Penn State, in which case they must take the GMAT and earn a score of at least 450. If students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent: ACCTG 211 [4], ECON 102 [3], ENGL 015 or 030 [3], FIN 301 [3], MATH 110 or 140 [4], MGMT 301 [3], MKTG 301 [3] and STAT 200 [4] c SCM 200 [4].

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Management are listed in theUndergraduate Bulletin. Degree requirements for the M.B.A. degree are listed above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted. The M.B.A. courses that could possibly be double-counted include INFSY 540, MNGMT 505, MNGMT 514, MNGMT 515, MNGMT 520, MNGMT 570, MRKT 514, and MRKT 570.

Integrated B.S. in Marketing/M.B.A. Program

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Marketing candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Marketing and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Marketing degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed above. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit a resume, a personal statement including career goals and how the M.B.A. will enhance their career goals, official transcripts of all post-secondary coursestaken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance

into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent: ACCTG 211 [4], ECON 102 [3], ENGL 015 or 030 [3], FIN 301 [3], MATH 110 or 140 [4], MGMT 301 [3], MKTG 301 [3] and STAT 200 [4] c SCM 200 [4].

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Marketing are listed in the Undergraduate Bulletin. Degree requirements for the M.B.A. degree are listed above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted. The M.B.A. courses that could possibly be double-counted include BUS 515, INFSY 540, MRKT 514, MRKT 571, MRKT 572, MRKT 585, and MRKT 587.

Integrated B.S. in Project and Supply Chain Management/M.B.A. Program

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Project and Supply Chain Management candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Project and Supply Chain Management and the Master of Business Administration. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Business Administration degree, the students will be permitted to receive the Bachelor of Science in Project and Supply Chain Management degree assuming all the undergraduate degree requirements have been satisfactorily completed.

Admission Requirements

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the M.B.A., listed above. Students should mention in the notes section that the application is for the IUG program in Business Administration. Students must submit a resume, a personal statement including career goals and how the M.B.A. will enhance their career goals, official transcripts of all post-secondary coursestaken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.B.A. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent: ACCTG 211 [4], ECON 102 [3], ENGL 015 or 030 [3], FIN 301 [3], MATH 110 or 140 [4], MGMT 301 [3], MKTG 301 [3] and STAT 200 [4] c SCM 200 [4].

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Business Administration.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Project and Supply Chain Management are listed in the Undergraduate Bulletin. Degree requirements for the M.B.A. degree are listed above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with culminating experience for the graduate degree cannot be double-counted. The M.B.A. courses that could possibly be double-counted include ACCT 540; FINAN 530; INFSY 540; SCIS 525, SCIS 540, SCIS 546, SCIS 565 and SCIS 570.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*.

A limited number of scholarships, fellowships, and research grants are available, as well as several graduate assistantships. For more information on these, contact the School of Business Administration.

Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options available to you, contact the Financial Aid Office, 717-948-6307.

Graduate Assistantships

Full-time graduate students who are interested in an assistantship should contact the program director. Students must be nominated for an assistantship by their program director. Students on graduate assistantships must adhere to the course load policy listed in the Bulletin.
Students applying for an assistantship should submit scores from the Graduate Management Admissions test, or similar examinations by the deadline.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ACCOUNTING (ACCT) course list

BUSINESS (BUS) course list

FINANCIAL ANALYSIS (FINAN) course list

INFORMATION SYSTEMS (INFSY) course list

MANAGEMENT (MNGMT) course list
MARKETING (MRKT) course list
SUPPLY CHAIN (SC&IS) course list

Last Revised by the Department: Fall Semester 2017
Review Date: 8/22/2017
Editorial changes completed: 3/4/2013
Faculty linked: 8/14/14

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Biobehavioral Health (BB H)

Program Home Page

Jennifer Graham-Engeland, Professor in Charge of the Graduate Program
Department of Biobehavioral Health
219 Biobehavioral Health Building
814-863-7256

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

The graduate program in Biobehavioral Health (BB H) is an interdisciplinary graduate program provided by the College of Health and Human Development and involving faculty from its departments. The focus of the program is on the interaction of biological, behavioral, sociocultural, and environmental variables in the etiology and prevention of health problems and in the promotion of healthy human development. The program is designed to cultivate competence in basic and applied research, in the evaluation of biobehavioral health intervention strategies, and in university teaching. Graduates are prepared for research, teaching, or policy roles in health care settings, private and public research laboratories, government agencies, and universities including medical schools.

Special resources available in the college that students may draw upon and potentially participate in for their research programs include a Health and Human Development Consultation Center, Nutrition Clinic, and Speech and Hearing Clinic; Centers for Gerontology, the Study of Child and Adolescent Development, Developmental and Health Genetics, Locomotion Studies, Worksite Health Enhancement, and Developmental and Health Research Methodology; special laboratories in Behavioral Endocrinology, Biomechanics, Human Performance, Motor Behavior, and Nutrition; and extensive computer resources. Additional resources, including elaborate mainframe and super computer capabilities, are available in other parts of the University.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Scores from the Graduate Record Examinations (GRE), or from the Medical College Admission Test (MCAT), are required for admission. Applicants should have a minimum grade-point average of 3.00 (A=4.00), an above-average score on the GRE or MCAT, and three supporting recommendations. At the discretion of the graduate program, exceptions may be made to these requirements for students with special backgrounds, abilities, and interests. Admission will be offered to candidates who are the best qualified, in the judgment of the faculty, taking all factors in to account.

Entering students should have a basic background in biological sciences, the behavioral sciences, or a combination of the two. In addition, they should have a basic background in quantitative methods. In exceptional cases, superior students who do not meet these requirements may be admitted provisionally, while correcting their deficiencies. This must occur during their first two semesters in the program.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Master of Science degree candidates must take five core courses in biobehavioral health and 12 additional credits in methods individually designed in consultation with and with the approval of their adviser and committee. All M.S. degree candidates must complete a formal master's thesis or a master's paper. Candidates selecting the thesis option must complete an additional 6 credits of master's thesis research (BB H 600) for a total of 33 credits. Candidates selecting the paper option must complete an additional 6 credits of individual studies (BB H 596) in lieu of the 6 thesis credits. The master's thesis will typically describe original research. The master's paper may describe original research, but may also involve a substantial review of the literature, or a substantial description of a new research-related procedure. The choice of thesis or paper options will be made by the student in consultation with the adviser. The student's advisory committee judges the quality and acceptability of the paper or thesis. Additionally, the thesis must be submitted to, and accepted by the Graduate School.

M.S. program course requirements: BB H core courses (15 credits: BB H 501, BB H 502, BB H 503, BB H 504, BB H 505); other methods courses (12 credits minimum: courses at the 400 or 500 level to be selected in consultation with the student's adviser); research credits (6 credits minimum or 6 thesis credits).

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

All doctoral students must take five core courses in Biobehavioral Health and 12 additional credits in research methods individually designed in consultation with and with the approval of the student's adviser and committee to develop doctoral-level competence in biobehavioral health and one or more related specialized areas.

Communication and Language Requirement. Doctoral students must demonstrate competency in spoken English as judged by the faculty and in technical writing as demonstrated in research papers and/or publications. In addition, they must demonstrate competence in one of the following areas: (1) a foreign language; (2) computer science; (3) college teaching; (4) logic or philosophy of science.

Dual-Title Ph.D. in Bioethics

Admission Requirements
Students must apply and be admitted to the graduate program in Biobehavioral Health and the Graduate School before they can apply for admission to the dual-title degree program in Bioethics. Students must apply and be admitted to the dual-title degree program in Bioethics prior to taking the candidacy exam. In addition, applicants should have a junior/senior cumulative average of at least 3.0 (on a 4.0 scale) and an appropriate background in undergraduate coursework. Prospective dual-title students will write a statement of purpose that addresses the ways in which their research and professional goals reflect an interest in interdisciplinary bioethics research.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Biobehavioral Health Ph.D. students may pursue additional training in bioethics through the dual-title Ph.D. program in Bioethics. To qualify for the dual-title degree, students must satisfy the requirements of the Biobehavioral Health Ph.D. program. In addition, they must satisfy the requirements described below, as established by the Bioethics program committee. Within this framework, final course selection is determined by the student, their Biobehavioral Health adviser, and their Bioethics program adviser.

Additional course work
The dual-title Ph.D. in Biobehavioral Health and Bioethics requires eighteen credits of course work beyond the requirements for the Ph.D. in Biobehavioral Health, as follows:

- 7 required credits (BIOET 501, BIOET 502, and BIOET 590), plus at least 3 additional BIOET credits at the 500 level.
- 8 additional credits from a list of approved electives at the 400 and 500 level, with at least two credits at the 500 level.

Candidacy. In accordance with Graduate Council policy, there will be a single candidacy examination, assessing candidacy for both the primary program and the dual-title program. At least one member of the candidacy committee must come from the Bioethics program. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.

Comprehensive exam. The doctoral committee of a Biobehavioral Health and Bioethics dual-title doctoral degree student must include at least one member of the Bioethics graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. If the chair of the committee is not also a member of the graduate faculty in Bioethics, the member of the committee representing Bioethics must be appointed as co-chair. The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their primary field.

Dissertation and dissertation defense. A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student's doctoral committee. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Clinical and Translational Sciences

Admission Requirements
Doctoral students with research and educational interests in clinical and translational science may apply for the Dual-Title Ph.D. degree in Biobehavioral Health and Clinical and Translational Sciences following admission to the Graduate School and Biobehavioral Health graduate degree program and prior to taking the candidacy examination in Biobehavioral Health. An admissions committee comprised of faculty affiliated with the dual-title program will evaluate applicants. Applicants must have a graduate GPA of at least 3.5 in a research area related to human health. Prospective dual-title program students will write a statement of purpose that addresses the ways in which their research and professional goals will be enhanced by an interdisciplinary course of study in clinical and translational sciences.

Degree Requirements
Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

This dual-title degree program emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences, and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary mentor in the graduate program in Biobehavioral Health and another individual serving as the secondary mentor in an area covered by the dual-title program who is a member of the Clinical and Translational Sciences faculty.

The Dual-Title Ph.D. Degree in Biobehavioral Health and Clinical and Translational Sciences requires: 1) completion of the Biobehavioral Health Ph.D. degree requirements, 2) CTS 590 (1 credit each semester for two semesters) and CTS 595 (a minimum of 6 credits), and 3) 18 elective credits that meet CTS program requirements, up to 12 credits of which may be double-counted from the BB H required course work. The 18 elective credits will be chosen from an approved list of courses maintained by the CTS program, covering the areas of epidemiology, bioinformatics, experimental design and interpretation, statistics, the regulatory environment, and scientific communication.

In accordance with Graduate Council policy, the candidacy committee must include at least one member of the Clinical and Translational Sciences graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. There will be a single candidacy examination which will include content from both the Graduate Program in Biobehavioral Health and the Clinical and Translational Sciences programs. The candidacy exam must be taken within four semesters (summer sessions do not count) of entry into the doctoral program.

The student's doctoral committee must include at least one member of the Clinical and Translational Sciences graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. If the chair of the committee is not also a member of the graduate faculty in Clinical and Translational Sciences, the member of the committee representing Clinical and Translational Sciences must be appointed as co-chair. The fields of Biobehavioral Health and Clinical and Translational Sciences will be integrated in the student's comprehensive examination.

All students are required to conduct dissertation research that contributes fundamentally to the fields of Biobehavioral Health and Clinical and Translational Sciences. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

BIOBEHAVIORAL HEALTH (BB H) course list

Last Revised by the Department: Spring Semester 2016

Blue Sheet Item #: 44-06-000

Review Date: 4/5/2016

Faculty linked: 5/27/14

Biogeochemistry

Program Home Page

MARY ANN BRUNS, *Program Coordinator*
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ANGELA PACKER, *Administrative Assistant*
507 Deike, Department of Geosciences
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Degree Conferred:

Students electing this degree program through participating programs earn a degree with a dual title in the Ph.D., e.g., Ph.D. in (graduate program name) and Biogeochemistry.

The following graduate programs offer dual degrees in Biogeochemistry: Biochemistry, Microbiology, and Molecular Biology; Chemistry; Ecology; Environmental Engineering; Geosciences; Materials Science and Engineering; Plant Pathology; and Soil Science.

The Graduate Faculty

The Program

The Biogeochemistry Dual-Title Degree Program is administered by the Department of Geosciences with support from the Department of Ecosystem Science and Management for the participating graduate programs. A program committee with representatives from participating departments maintains program definition, identifies courses appropriate to the program, and recommends policy and procedures for the program's operation to the dean of the Graduate School and to the deans of the participating colleges.

The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences, College of Agricultural Sciences, College of Engineering, Eberly College of Science, and the Intercollege Graduate Degree Programs.

The program enables students from several graduate programs to gain the perspectives, techniques, and methodologies of Biogeochemistry, while maintaining a close association with major program areas of study. For admission to pursue a dual-title degree under this program, a student must apply to (1) the Graduate School and (2) one of the participating major graduate programs; and then subsequently to (3) the Biogeochemistry program committee. Students may only apply to the dual-title program once they have been accepted into a major program. Once a student has been accepted to a major program, application to the dual-title degree program can occur immediately or at a later time, such as upon matriculation. The application to the dual-title degree program, however, must be accepted before the candidacy examination in the major program is scheduled.

Admission Requirements

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Candidates must submit transcripts of their undergraduate and graduate course work, a written personal statement indicating their interests in the interdisciplinary arena of Biogeochemistry and their career goals they hope to serve by attaining a Biogeochemistry dual-title, and a statement of support from their dissertation adviser, if assigned. A strong undergraduate preparation in the basic sciences is expected, with evidence of an interest in multiple disciplines.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the major graduate program in which they are enrolled, in addition to the minimum requirements of the Biogeochemistry program. Students are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program (i.e., Soil Science, BMMB, Material Science & Engineering, Chemistry, Ecology, Environmental Engineering, Geosciences, or Plant Pathology) and a secondary adviser in an area within a field covered by the dual-title program who is a member of the Biogeochemistry graduate faculty. The major program adviser normally will also be a member of the Biogeochemistry graduate faculty. The two faculty advisers can represent different academic programs, but this is not required, as faculty from a scientifically diverse department could represent very different areas of expertise.

To fulfill the course requirements for the dual-title in Biogeochemistry, students must complete a total of 15 graduate credits chosen in consultation with the adviser from an approved list of courses in the areas of biochemistry and microbiology, environmental chemistry, environmental engineering, geochemistry, materials science and engineering, and soil science.

All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. In all cases, the result of a single candidacy exam for both entrance to the student's major Ph.D. program and this dual-title program will be reported to the Graduate School. The candidacy examination committee must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyondthe normal period allowable.

The student's doctoral committee must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the committee representing the student's major degree program is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The field of Biogeochemistry must be integrated into the comprehensive examination.

A Ph.D. dissertation that contributes fundamentally to the field of Biogeochemistry is required. A public oral presentation of the dissertation is required, which may be part of the final defense within the major degree program.

Ph.D. candidates must complete a dissertation on a topic that contributes fundamentally to the fields of both the student's major degree program and Biogeochemistry. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin. A limited number of Research Assistantships are also available through the Biogeochemistry Dual-Title Degree Program.

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-03

Review Date: 11/15/16

Faculty linked: 5/27/14

Biotechnology (BIO T)

Program Home Page (Opens New Window)

WENDY HANNA-ROSE, Interim *Department Head, Biochemistry and Molecular Biology*

LOIDA J. ESCOTE-CARLSON, *Lead Program Chair*
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Degree Conferred:

- Master of Biotechnology
- Integrated B.S. in Biotechnology - Master of Biotechnology in Biotechnology Program

The Graduate Faculty

The Program

The Master of Biotechnology degree program is offered through a collaboration of the Department of Biochemistry and Molecular Biology and the Huck Institutes of the Life Sciences. It is a multidisciplinary program involving faculty members from different academic departments in Penn State University as well as ad hoc mentors from the academic faculty and from industry. The Master of Biotechnology curriculum is designed to give students broad knowledge and training in the scientific and practical aspects of biotechnology. It involves innovative, hands-on, and multidisciplinary learning approaches to educate and train students in the science behind biotechnology, its business and legal aspects, and the ethical and social issues that it brings about. In addition, the courses and the activities required of all students in this program develop transferable professional skills such as team-working and communication skills, which are very important in industry in particular. Graduates of this program are expected to have the knowledge and training for diverse career options: as academic educators, as scientists in both academic and industry settings, as members of decision-making business and management teams in government and biotechnology industries, as bioentrepreneurs, and as members and leaders of governmental, public, and private organizations that deal with social, ethical and legal issues in biotechnology. Because of their broad knowledge in biotechnology, graduates of this program are expected to fill a niche in industry where knowledge and ability to interphase and communicate with various functional groups within the organization are required.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

The program is appropriate for students with a baccalaureate degree in biological sciences, chemistry, or engineering or other baccalaureate degrees that include sufficient credits from relevant courses in the life sciences. Applicants must have a minimum junior/senior grade point average of 3.00 (on a 4.00 scale). Graduate Record Examinations (GRE) scores are required for verbal, quantitative, and analytical writing. Typically, students are admitted as part of a cohort to commence studies in the Fall. The best-qualified applicants will be accepted up to the number of spaces available for new students.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits at the 400, 500, or 800 level is required for completion of the degree, 18 credits of which must be from courses in the 500 or 800 level, with a minimum of 6 credits at the 500 level. Students are required to take 16 to 18 credits from core courses listed below. Additional credits are from industry internship or cooperative education (co-op) and elective courses. A list of approved elective courses is maintained by the graduate program office. All Master of Biotechnology candidates are required to write a research paper based on a research project conducted in an academic, government, or industry research laboratory as the culminating experience for the degree. The research paper is completed while the student is enrolled in MCIBS 594.

Core Courses

BIOCHEMISTRY AND MOLECULAR BIOLOGY (BMB)

- 400. MOLECULAR BIOLOGY OF THE GENE (2)

BIOLOGICAL ENGINEERING (BE)

- 468. MICROBIOLOGICAL ENGINEERING (alternative course to BIOTC 479) (3)

BIOTECHNOLOGY (BIOTC)

- 479. METHODS IN BIOFERMENTATIONS (3)

MOLECULAR, CELLULAR AND INTEGRATIVE BIOSCIENCES (MCIBS)

- 571. CURRENT ISSUES IN BIOTECHNOLOGY (2)
- 590. COLLOQUIUM (2)
- 591. ETHICS IN THE LIFE SCIENCES (1)
- 593. MOLECULAR BIOLOGY LABORATORY (3)
- 594. RESEARCH PROJECT IN BIOTECHNOLOGY (3-6)

Electives

These courses are chosen from offerings in various academic departments based on students' interest or track and career objectives. These also include MCIBS 595 (Internship) and any 596 (Individual Studies) course under a faculty member whose research relates to a student's area of interest. A list of approved elective courses is maintained by the graduate program office.

Integrated B.S. in Biotechnology - Master of Biotechnology in Biotechnology Program

The integrated B.S. in Biotechnology-Master of Biotechnology degree program is designed to enable qualified undergraduate students in the B.S. Biotechnology program to graduate in five years with the Master of Biotechnology degree.

Student must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Biotechnology are listed in theUndergraduate Bulletin. Degree requirements for the Master of Biotechnology in Biotechnology degree are listed above. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.BIOT. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

The courses that will double count for both degrees are:

- B M B 400. Molecular Biology of the Gene (2)
- BIOTC 479 or BE 468. Methods in Biofermentation (3)
- MCIBS 571. Current Issues in Biotechnology (2)
- MCIBS 590. Colloquium (2)
- MCIBS 591. Ethics in the Life Sciences (1)
- MCIBS 593. Molecular Biology Laboratory (3)

B.S. Biotechnology Requirements:

Total credits required: 125

The recommended academic plan for completion of the requirements in B.S. Biotechnology can be found in this link: http://bmb.psu.edu/undergraduate/form-center/academic-plans

Master of Biotechnology Requirements:

Total credits required: 30 (18 of which must be from 500-level or higher courses)

- Required courses: 16-18 credits
- Electives: 12-14 credits

Admission Requirements for the IUG Program

Students must apply to the program via the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the Biotechnology graduate program for the Master of Biotechnology degree, listed above. Students shall be admitted to an IUG program no earlier thatn the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

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

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

M.BIOT.--Additional Specific Requirements

A minimum of 30 credits at the 400, 500, or 800-level is required for completion of the Master of Biotechnology program, 18 credits of which must be from courses at the 500 or 800 level, with a minimum of 6 credits at the 500 level. A minimum of 16 credits is required in core courses, including a minimum of 3 credits in MCIBS 594 Research Topics, where students complete the final research paper. All Master of Biotechnology candidates are required to write a research paper based on a research project conducted in an academic research laboratory or in industry as the culminating experience for the degree

BIOCHEMISTRY, MICROBIOLOGY, and MOLECULAR BIOLOGY (BMMB) course list

BIOTECHNOLOGY (BIOTC) course list

INTEGRATIVE BIOSCIENCES (IBIOS) course list

Last Revised by the Department: Fall 2018

Blue Sheet Item #: 47-01-000

Review Date: 8/28/2018

Faculty linked: 5/27/14

Bioengineering (BIOE)

Program Home Page

William Hancock, *Professor and Chair of the Intercollege Graduate Degree Program in Bioengineering*
205 Hallowell Building
Phone: 814-865-1407
Fax: 814-863-0490

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

This intercollege program provides graduate-level training in engineering and the life sciences, and their integration. Students graduating from this program will have acquired expertise in the application of engineering principles to fundamental problems in biology, clinical problems in medicine, or in the development of new biomedical instrumentation. They are also expected to produce scholarly work to be published in peer-reviewed journals and presented at national conferences. Graduate curricula and student assessment in bioengineering is under the direction of the program chair and a graduate curriculum committee that is composed of graduate faculty representing several departments in the Colleges of Engineering, Health and Human Development, Science, and Medicine.

Opportunities for specialized research are offered by graduate faculty working on electrical, mechanical, and biophysical properties of biological materials and the application of this knowledge to understanding molecular, cellular, tissue, and organ level processes involved in health and disease. Specific applications include: artificial organs, biomaterials, bioMEMs, nanotechnology, biophotonics, cellular and medical imaging, cardiovascular engineering, cell signaling and protein dynamics, mechanobiology, neural interfaces, tissue engineering and regenerative medicine. Extensive computer facilities and specialized equipment are available to support a combination of studies that employ experimental observations and their analysis through mathematical modeling and computer simulations.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Students with a degree in engineering, physics, or the life sciences are eligible for admission. All students must have a strong background in physics and mathematics. This background should include chemistry, calculus-based physics, and mathematics through calculus and differential equations. Students who lack this background may still be considered for provisional admission but will have to make up any deficiency early in their graduate program. These remedial courses will be required in addition to the stated graduate program course requirements. Students with a 3.0 junior/senior grade-point average and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to the minimum average may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

Scores from the Graduate Record Examinations (GRE) are required for admission. However, at the discretion of the program a student may be admitted for graduate study in the Bioengineering program without these scores.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits are required for a Master's Degree in Bioengineering, with at least 24 credits at the 500, 600, or 800 level. Students must take the following: at least 12 credits of lecture- or laboratory-based coursework at the 500-level, an additional 6 credits of lecture- or laboratory-based coursework at the 400- or 500-level, a 1-credit research ethics course (BIOE 591), a 1-credit graduate seminar for every semester in attendance, and a minimum of 6-credits of 600-level thesis research.

Courses: Upon entering the program, a student, along with his/her research adviser, will select an academic advisory committee consisting of three members of the Intercollege Graduate Degree Program (IDGP) in Bioengineering Graduate Faculty (including the adviser). Working with this committee, students will select courses appropriate to their research and their professional goals. Students must select at least 18 credits of lecture- or laboratory-based courses that include at least 12 credits at the 500-level and the remaining credits at the 400- or 500-level. Coursework must include at least 6 credits each in bioengineering, life sciences, and technical/quantitative electives. In addition, students will register for the graduate program seminar series during each of the semesters in attendance and will complete a 1-credit research ethics course (BIOE 591). Students will select additional coursework and research credits from a list of approved electives maintained by the program office, as appropriate, to obtain the total minimum of 30 credits.

Graduate credits earned at other institutions but *not* used to earn a degree may be used to satisfy master's degree requirements, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin*.

Thesis: A thesis is required for the M.S. degree. This thesis will be defended in front of the student's academic advisory committee. The thesis must be accepted by the academic advisory committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Courses: Upon entering the program, a student, along with his/her research adviser, will select an academic advisory committee consisting of three members of the IDGP in Bioengineering Graduate Faculty (including the adviser). Working with this committee, students will select courses appropriate to their research and their professional goals. Students must select courses totaling at least 6 credits each in bioengineering, life sciences, and technical/quantitative electives. At least 12 credits must be lecture- or laboratory-based (not independent study) and at the 500-level. Students must then complete at least 6 additional credits at the 500-level in courses relevant to their research. In addition to these minimum 24 course credits, students will register for the graduate program seminar series for every semester until passing the comprehensive exam and will complete a 1 credit graduate course in bioengineering ethics (BIOE 591). The total minimum number of course credits to be completed is 29, which includes 24 course credits (with at least 18 course credits at the 500-level and the remaining credits at the 400-level or above), 1 credit of bioengineering ethics, and at least 4 graduate seminar credits. 600-level research credits are assigned every semester in attendance. Graduate credits earned at other institutions, including those used toward a degree, may be used to satisfy some of the Ph.D. degree requirements at Penn State, but in these cases credits are not transferred. Regardless of previous courses taken, every doctoral student must take a minimum of 6 course credits at the 500-level at the University Park campus.

Supporting courses are available at University Park in anatomy, biochemistry, biology, biophysics, chemistry, laboratory animal medicine, materials science, mathematics, physics, physiology, and the engineering departments.

Exams: After completion of the first year, completion of at least 18 graduate credits and within three semesters (not including summer) of entry into the doctoral program, all students must complete and pass the candidacy exam, which consists of a written research proposal and oral defense of that proposal on a topic other than the subject of the student's dissertation. This exam also tests for English competency, which is a Graduate Council requirement. A comprehensive examination consisting of a written research proposal and oral defense of that proposal on the student's Ph.D. dissertation topic is administered by the student's doctoral committee, typically at the end of second year of residency. A final oral examination based on a defense of the

doctoral dissertation is required of all candidates. This exam occurs typically after the fourth or fifth year of residency and consists of a formal public seminar followed by a closed meeting of the doctoral committee and the candidate.

In preparation for the comprehensive exam, students, along with their adviser, will choose a doctoral committee in accordance with Graduate Council policy. The doctoral committee consists of a minimum of four members of the Graduate Faculty including the adviser who serves as the chair. The adviser must be a member of the Intercollege Graduate Degree Program (IGDP) in Bioengineering. At least three committee members must be members of the IGDP in Bioengineering. The committee must also include an "Outside Field Member" who is not a member of the IGDP in Bioengineering. Finally, at least one member of the doctoral committee must have his/her primary appointment outside the administrative unit in which the adviser's primary appointment is held. The Graduate School will appoint the committee and notify all persons.

To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

BIOENGINEERING (BIOE) course list

Last Revised by the Department: Spring Semester 2017

Blue Sheet Item #: 45-06

Review Date: 4/4/2017

Faculty linked: 5/27/14

Bioethics (BIOET)

Program Home Page

JONATHAN H. MARKS, Director of the Bioethics Program
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Degree Conferred

Students electing to pursue this program through participating departments will earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in [major program name] and Bioethics.

The following graduate programs offer dual degrees in bioethics: Ph.D. in Anthropology; Ph.D. in Biobehavioral Health; and Ph.D. in Communication Arts and Sciences.

Graduate Faculty

The Bioethics dual-title program is housed in the College of the Liberal Arts with administrative support (e.g., staff support) provided by the Rock Ethics Institute, similar to, for example, the Huck Institutes of the Life Sciences' support of the IBIOS Intercollege Graduate Degree Program. The Bioethics Program Committee, which contains representatives from participating colleges and departments, maintains the program's definition and goals, identifies faculty and courses relevant to the program, and recommends policies and procedures for the program's operation.

Program Objectives of Dual-Title Degree in Bioethics

The dual-title graduate degree in bioethics will acknowledge and foster scholarly work across disciplines, increasing the intellectual rigor and breadth of graduate work through immersion in both bioethics and the primary discipline. The dual-title degree will also provide opportunities for students to learn how to synthesize knowledge and develop expertise within and across disciplinary boundaries.

In addition to the intellectual and academic advantages of interdisciplinarity, the dual-title degree program will strengthen the reputation of individual programs/departments through an innovative degree program, increase recruitment of top quality graduate students, and increase job opportunities for students after graduation.

Dual-title degree programs do not duplicate other degree programs at Penn State University.

Admission Requirements

Dual-title bioethics graduate students will first be admitted to their major programs in accordance with the requirements stipulated by the Graduate Council and the major program. They will then be admitted to graduate study in the Bioethics program by an admissions committee consisting of faculty affiliated with the Bioethics program. Applicants should have a junior/senior cumulative average of at least 3.0 (on a 4.0 scale) and an appropriate background in undergraduate coursework. Prospective dual-title students will write a statement of purpose that addresses the ways in which their research and professional goals reflect an interest in interdisciplinary bioethics research.

Degree Requirements

General requirements for the dual-title Ph.D. in [major program name] and Bioethics are listed below.

- 7 required credits (BIOET 501, BIOET 502, and BIOET 590). At least three additional BIOET credits at the 500 level.
- Eight additional credits from a list of approved electives at the 400 and 500 level, with at least two credits at the 500 level.
- Comprehensive examination in bioethics and the related field, with the format and content to be determined by agreement with the major department.
- Dissertation on a bioethics-related topic or that includes a substantial bioethics component.

Language Competency Requirements

The student will fulfill the language requirement specified by the major department through which the student is admitted to the dual-title degree program.

Candidacy Requirement

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by the major program. During the candidacy process, the student will also be assessed for candidacy to the dual-title program, and at least one member of the candidacy committee must come from the dual-title program. Faculty members who hold appointments in both programs may serve in a combined role.

Committee Composition

In accordance with the Graduate Council's requirements, the doctoral committee shall contain at least four members. At least one of the committee members must be a faculty-member affiliated with the Bioethics Program. Where major programs are supportive of this, graduate students will be encouraged to have a second committee member so qualified. Faculty members who hold appointments in both programs may serve in a combined role. If the committee chair does not serve in this combined role, the faculty member representing the bioethics program must be designated as co-chair of the committee. The dual-title representative(s) will be expected to participate in constructing and grading comprehensive examination questions that cover the secondary area of study. The Outside Member will be appointed in accordance with the Graduate School's Graduate Student Committee Procedures. The Graduate Council's current policy is that the Outside Member cannot have more than a 25% budgetary connection with either the graduate major program or the dual-title degree program.

Comprehensive Exams

The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their major field.

Dissertation

A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student's committee.

Student Aid

When available, graduate assistantships available to students in this program and other forms of student aid will be described in the STUDENT AID section of the Graduate Program.

Course Listing

Required Courses

All students in the dual-title bioethics program are required to take the following three courses, which will provide a rigorous grounding in general theory, methods and the scholarly literature of bioethics:

BIOETHICS (BIOET)

501. PERSPECTIVES AND METHODS IN BIOETHICS (3)
502. PERSPECTIVES IN MACRO-BIOETHICS (3)
590. BIOETHICS COLLOQUIUM (1)

In addition, students will be required to take at least three additional BIOET credits at the 500-level. These course offerings will be enhanced over time, and will initially include:

BIOETHICS (BIOET)

503. ETHICS AND THE RESPONSIBLE CONDUCT OF BIOMEDICAL RESEARCH (3)
597. SPECIAL TOPICS IN BIOETHICS (1-3)

In addition, this rubric will be used to cross-list courses with a substantial bioethics-related component including courses in bioethics and health law offered by the Dickinson School of Law and courses in bioethics and medical humanities offered by the Department of Humanities in the College of Medicine at Hershey. (Approval for cross-listing will be obtained on a case-by-case basis.) It may also be used to create courses that run concurrently with a bioethics-related seminar series and/or lecture series run by the Rock Ethics Institute.

With the approval of the Director of the Bioethics Graduate Program, students may also fulfill the requirement for the three additional 500-level BIOET credits through one of four alternatives:

BIOET 594. RESEARCH TOPICS
BIOET 596. INDIVIDUAL STUDIES
BIOET 590. COLLOQUIUM (since the topics will vary from semester, students may take this course in subsequent semesters for additional credit OR
An additional elective course determined to satisfy this requirement on the grounds that the syllabus indicates a sufficiently strong bioethics content.

Elective Courses

Students in the program will take the remaining credits by choosing from a wide variety of existing elective courses at the 400 and 500 levels from a list maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. Students also have the right to petition the Director of the Bioethics Graduate Program to request that additional courses be added to the list of electives. The elective courses chosen by the student must be approved by either the Director of the Bioethics Graduate Program or, with the agreement of the Director, by another member of the Bioethics Program Committee. These courses are currently offered by a variety of departments (including BB H, BMMB, CAS, FRNSC, H ADM, HLHED, H P A, IBIOS, NURS, NUTR, PHIL, PHS, S T S, and WMNST) and they encompass a variety of subject areas including clinical ethics, research ethics, public health and health policy, health law, environmental ethics and policy, global and comparative health, biotechnology, and medical humanities. A list of courses available as elective credits for graduate students in the bioethics program is included below.

In addition, students may pursue an internship or practicum, provided that this is approved in advance by the Director of the Bioethics Graduate Program:

BIOET 595. INTERNSHIP (1-3)

List of Elective Courses

The list of elective courses will be maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. The list currently includes the following courses:

ANTH/BIOL 460 HUMAN GENETICS (3)
ANTH/BIOL 460H HUMAN GENETICS (4)
ANTH 471H BIOLOGY, EVOLUTION AND SOCIETY (3)
BB H 501 BIOBEHAVIORAL SYSTEMS IN HEALTH AND DEVELOPMENT: THEORY AND PROCESSES (3)
BB H 504 BEHAVIORAL HEALTH INTERVENTION STRATEGIES (3)
BB H 551 WORLD HEALTH PROMOTION (3)
BMH 490 BIOETHICS AND MEDICAL HUMANITIES CAPSTONE (3)
BMMB 509 ETHICS IN BIOMEDICAL SCIENCE (1)
CAS 453 HEALTH COMMUNICATION THEORY AND RESEARCH (3)
CAS 557 HEALTH COMMUNICATION (3)
CAS 562 QUALITATIVE METHODS (3)
FRNSC 561 ETHICS IN FORENSIC SCIENCE (1)
H ADM 539 HEALTH SYSTEMS ORGANIZATION (3)
H ADM 540 HEALTH ADMINISTRATIVE POLICY FORMULATION (3)
H ADM 541 HEALTH ECONOMICS AND POLICY (3)
H ADM 542 HEALTH CARE POLITICS AND POLICY (3)
H ADM 543 LONG-TERM CARE ADMINISTRATION AND POLICY (3)
H ADM 551 HEALTH CARE LAW (3)
H P A 401 (IL) COMPARATIVE HEALTH SYSTEMS (3)
H P A 510 HEALTH SERVICES FINANCING AND POLICY (3)
H P A 511 RESEARCH SEMINAR ON HEALTH SERVICES FINANCING AND POLICY (3)
H P A 520 INTRODUCTION TO HEALTH SERVICES ORGANIZATION AND DELIVERY (3)
H PA 521 RESEARCH SEMINAR ON HEALTH SERVICES ORGANIZATION AND DELIVERY (3)
H P A 540 EPIDEMIOLOGICAL APPLICATIONS IN HEALTH SERVICES RESEARCH (3)
H P A 541 POVERTY, RACE, ETHNICITY AND CHILD HEALTH (3)
H P A 545 INTRODUCTION TO HEALTH ECONOMICS (3)
H P A 822 CLINICAL ISSUES FOR HEALTH SERVICES MANAGEMENT (3)
H P A 836 HEALTH LAW (3)
HLHED 516 EVALUATION OF HEALTH EDUCATION AND PROMOTION PROGRAMS (3)
HLHED 552 CURRENT HEALTH EDUCATION ISSUES (3)
HLHED 553 MULTICULTURAL HEALTH ISSUES (3)
IBIOS 591 ETHICS IN THE LIFE SCIENCES (1)
NURS 464 (US;IL) DYING AND DEATH (3)
NURS 501 ISSUES IN NURSING AND HEALTH CARE (3)
NURS 580 EPISTEMOLOGY OF NURSING SCIENCE (3)
NURS 581 DEVELOPING THEORETICAL CONSTRUCTS RELEVANT TO NURSING (3)
NURS 587 ETHICS IN NURSING RESEARCH (1)
NUTR/S T S 430 (IL) GLOBAL FOOD STRATEGIES: PROBLEMS AND PROSPECTS FOR REDUCING WORLD HUNGER (3)
PHIL 403 ENVIRONMENTAL ETHICS (3)
PHIL 418 ETHICS (3)
PHIL/S T S 432: MEDICAL AND HEALTH CARE ETHICS (3)
PHS 570 HEALTH ECONOMICS AND ECONOMIC EVALUATION (3)
S T S 555 HUMAN DIMENSIONS OF NATURAL RESOURCES (3)
S T S 589 ETHICS AND VALUES IN SCIENCE AND TECHNOLOGY (3)
WMNST/BB H 458: CRITICAL ISSUES IN REPRODUCTION (3)

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-008

Review Date: 06/21/2011

Faculty linked: 5/27/14

Biology (BIOL)

Program Home Page

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Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Programs

The department directs graduate programs in a broad spectrum of research areas, including bioinformatics, cell biology, developmental biology, ecology, evolution, genetics, neuroscience, phylogenetics, and physiology. The department houses the Institute of Molecular Evolutionary Genetics. The Ph.D. in Biology may be taken with an option in Molecular Evolutionary Biology, Plant Biology, or one of the Integrative Biosciences options adopted by the department (Molecular Medicine, Cell and Developmental Biology, Chemical Biology, Ecological and Molecular Plant Physiology, or Neuroscience). The courses of study are planned individually by the student and an adviser.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Admission is restricted to students who have the baccalaureate degree in a biological science and who present a cumulative undergraduate average of at least 3.00 on a scale of 4.00. Each applicant must provide a personal statement of interests and objectives and letters from three persons verifying the applicant's academic competence.

Master's Degree Requirements

Students obtaining an M.S. degree in Biology must complete course work as described in the General Information section of this bulletin, with guidance from their academic adviser. A thesis is usually required and must be defended before a faculty committee. The research must represent an original contribution, and the time allotted to it is about one year.

Doctoral Degree Requirements

The only courses required across the department are Biology 592, Critical Evaluation of Biological Literature, and Biology 590, a colloquium covering the Biology Seminar Series. Course work specific to individual plans of study are decided upon by the student in consultation with their graduate adviser and Ph.D. committee. All doctoral degree students must pass a written and oral candidacy examination that is usually administered during their third semester of study. After a student has completed all of their course work and made substantial progress on the design and execution of their thesis research, a comprehensive examination is administered by their Ph.D. committee. The Ph.D. thesis must represent a significant original contribution suitable for publication, and will usually require between two and four years of laboratory or field research. When complete the thesis must be defended before the student's graduate committee. The thesis defense is normally immediately preceded by a public presentation of the thesis research by the student.

The department awards Ph.D. degrees in Biology covering the full spectrum of subjects represented by our diverse faculty. If desired, a student may elect to pursue one of the following options as part of his/her program of study.

Molecular Evolutionary Biology option: (1) The student must meet the criteria for the M.S. or Ph.D. in Biology. (2) The student's research adviser must be a member of the Biology program and/or a full member of the Institute of Molecular Evolutionary Genetics. Other committee members may be chosen as needed providing that a majority of the committee is associated with the IMEG. (3) In addition to the normal Biology program requirements, the student must take (for both an M.S. or Ph.D. in Biology) 3 credits of course work in BIOL 591; 9 credits from among the following courses (to be selected in consultation with the student's committee): BIOL 405, BIOL 410, BIOL 422, BIOL 427, BIOL 428, BIOL 501, BIOL 504, BIOL 514, BIOL 524, BIOL 533, BIOL 542, BIOL 590. (4) Any other course work or training deemed appropriate by the student's committee.

Plant Biology option: (1) The student must meet the criteria for the M.S. or Ph.D. in Biology. (2) The student's research adviser must be a member of the Biology program. Other committee members may be chosen as needed to assure that a well-rounded graduate advisory committee is established. (3) In addition to the normal Biology program requirements, the student must take the required colloquia in the field of specialization and (for both an M.S. or Ph.D. in Biology) a minimum of 6 credits from among the following courses (to be selected in consultation with the student's committee): BIOL 410, BIOL 414, BIOL 422, BIOL 427, BIOL 441, BIOL 448, BIOL 513, BIOL 514, BIOL 515, BIOL 516, BIOL 544, BIOL 591, BIOL 597, B M B 514, HORT 444. (4) Any other course work or training deemed appropriate by the student's committee.

Integrative Biosciences options are available in Molecular Medicine, Cell and Developmental Biology, Ecological and Molecular Plant Physiology, Chemical Biology, and Neuroscience. Requirements for these options that are in addition to the basic criteria for a Ph.D. in Biology are described under Integrative Graduate Program in Biosciences in this bulletin.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

BIOLOGY (BIOL) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/25/04

Faculty linked: 6/5/14

Biostatistics (BIOST)

Program Home Page

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Degree Conferred:

Ph.D.

The Graduate Faculty

The Program

Biostatistics is the science that applies statistical theory and mathematical principals to research in medicine, biology, environmental science, public health, and related fields. Biostatisticians working in the area of public health develop and use mathematical and scientific methods to (1) determine risk factors for disease and injuries, and (2) identify health trends within communities. Biostatisticians working in the area of medicine develop and use mathematical and scientific methods to design and analyze (1) clinical trials to investigate new therapies for treating acute and chronic illness, (2) observational studies to understand disease onset and progression, (3) basic science studies to determine the mechanisms of disease, and (4) human genetics studies to investigate the inherited susceptibility to disease. Career opportunities are available in universities, academic medical centers, government, and private industry. The demand for individuals with graduate-level degrees in biostatistics is extremely high.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Applicants must complete prior to admission:

1. A two-semester graduate-level course in applied statistics from a recognized graduate program. The comparable courses offered by the Department of Statistics are Stat 511: Regression Analysis and Modeling (3) and Stat 512: Design and Analysis of Experiments (3).

2. A two-semester graduate-level course in mathematical statistics from a recognized graduate program. The comparable courses offered by the Department of Statistics are Stat 513: Theory of Statistics and Stat 514 (3): Theory of Statistics II (3).

Prospective applicants must demonstrate:

3. For admission to the Graduate School, all applicants must have received from a regionally accredited institution a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. International applicants must hold the equivalent of an American four-year baccalaureate degree.

4. Results from one of the following standardized tests taken within the past five (5) years:

- Graduate Record Examination (GRE)
- Graduate Management Admission Test (GMAT)
- Medical College Admission Test (MCAT)
- Law School Admission Test (LSAT)
- (This requirement is waived for applicants who have an advanced degree in a related field beyond the baccalaureate.)

5. Results from the Test of English as a Foreign Language (TOEFL) or the International English Language Testing System (IELTS) for applicants whose first language is not English.

- The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test.
- The minimum composite score for the IELTS is 6.5.
- International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

6. Completion of the Graduate School application, which includes three (3) letters of recommendation and a Curriculum Vitae or resume.

7. Payment of the application fee.

Doctoral Degree Requirements

Each student in the Biostatistics Ph.D. program is expected to acquire knowledge in the disciplines of Biostatistics.

Each student must complete a total of 31 credits of graduate level course work, the majority of which are 500 level courses, specifically:

- 22 credits in required courses
- 6 additional credits in Epidemiology or Health Services Research
- 3 credits in elective courses, plus
- Dissertation

After the completion of the first year of coursework, each candidate is required to take a candidacy examination, based on the coursework in PHS 523, PHS 524, PHS 525, PHS 526 and PHS 527. The decision to admit or not to admit a student to candidacy will be made by a committee of graduate faculty in the Biostatistics program. In addition, a comprehensive examination is administered at the completion of all coursework, followed by the final oral examination in defense of the PhD dissertation.

Courses

Prescribed Courses: 22 credits
PHS 500(1), PHS 523(3), PHS 524(3), PHS 526(3), PHS 527(3), PHS 528(3), PHS 580(3), STAT 553(3)

Additional Courses: 6 credits
PHS 535(3), PHS 536(3), PHS 550(3), PHS 551(3), PHS 552(3), PHS 570(3)

Elective Courses: 3 credits
Select from PHS 516(3), STAT 561(3), STAT 562(3)

Common Courses: Varies
PHS 594(1-9), PHS 596(1-9), PHS 597(1-9), PHS 600(3-6)

PUBLIC HEALTH (PHS) course list

Last Revised by the Department: Fall Semester 2011
Blue Sheet Item #: 40-04-102
Review Date: 01/10/2012
Faculty linked: 8/14/14

Comparative Literature (CMLIT)

Program Home Page

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Degrees Conferred:

- Ph.D., M.A.
- Integrated B.A./M.A. Program in Comparative Literature
- Dual-Title Ph.D. in Comparative Literature and African Studies
- Dual-Title Ph.D. in Comparative Literature and Asian Studies
- Dual-Title Ph.D. in Comparative Literature and Visual Studies
- Dual-Title Ph.D. in Comparative Literature and Women's Studies

The Graduate Faculty

The Program

Graduate programs in Comparative Literature combine a core of comparative literature requirements with courses in selected literatures and further comparative courses, according to each student's interests. For example, programs of study can concentrate on such topics as genres, themes, periods, movements, folktale and oral literature, criticism, and the links between literature and related fields such as theatre or women's studies.

The M.A. is a general humanistic degree that helps prepare students for a variety of situations, including teaching in private high schools or community colleges, or further graduate work. The Ph.D. is a more specialized degree. The Ph.D. in Comparative Literature can be combined with a minor in a professional field such as teaching English as a second language. Other potential combinations include our dual-title Ph.D. programs in Comparative Literature and Asian Studies, Comparative Literature and African Studies, Comparative Literature and Visual Studies, or Comparative Literature and Women's Studies.

Only the faculty members and courses officially associated with the Department of Comparative Literature are listed here. Faculty members and courses in other departments are also available to comparative literature students according to their preparation.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Students with appropriate course backgrounds and at least a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The admission process is highly competitive and the best qualified students will be admitted subject to space availability. Students with a degree from a U.S. institution must submit GRE scores, all others must supply TOEFL/IELTS. The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information. Those international students who provide TOEFL/IELTS scores do not need to provide the GRE, but are encouraged to submit their scores, if feasible, as GRE scores are required to be eligible for many graduate fellowship opportunities. Most students who do graduate work in comparative literature hold a B.A. or M.A. degree in comparative literature or in a particular language and literature. Students completing degrees in such fields are welcome to apply --as are students in other humanistic fields, such as philosophy or history, if they have studied literature.

For admission to the M.A. program, students should be prepared to study at least one foreign literature in its own language. For admission to the Ph.D. program, students should be prepared to study at least two foreign literatures in their own language. Doctorate-seeking students usually complete the M.A. before being formally admitted to the Ph.D. program, but exceptional students may be admitted from the B.A. level directly to the Ph.D. Students are encouraged to plan a unified M.A./Ph.D. program if they take both degrees here; however, Ph.D. applications are welcomed from students holding or completing an M.A. elsewhere.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits at the 400, 500, or 800 level is required, with at least 18 credits at the 500 level. There are 9 credits required in the following core courses: CMLIT 501 (3 cr.), CMLIT 502 (3 cr.), and CMLIT 503 (3 cr.). In addition, 18 credits in comparative literature courses and other literature courses are required, with at least 6 credits in non-Anglophone literature. The culminating experience for the degree is a satisfactory master's paper completed while the student is enrolled in CMLIT 596 (3 cr.). Students must demonstrate advanced proficiency in at least two languages (one may be English).

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Requirements for the Ph.D. in comparative literature include (1) 9 credits total in 3 required courses: CMLIT 501 (3 credits), CMLIT 502 (3 credits), and CMLIT 503 (3 credits)--with substitute courses if these have been used in the M.A. program; (2) at least an additional 24 credits in literature courses, including course work in the three languages that the student selects, with emphasis on the student's primary literature--students should organize their course work, as much as possible, around a unifying principle, such as genre, period, or theme; (3) passing a candidacy examination; (4) proficiency in two foreign languages; (5) passing a comprehensive examination; and (6) a written dissertation and passing a final oral examination (the dissertation defense). The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

On item (4), the foreign languages are to be prepared at a level that permits thorough literary analysis of texts and related material in those languages.

Other Relevant Information

Students pursuing a graduate degree in comparative literature have individualized programs of study within the requirements specified above. For example, one student may emphasize film and new media; another, the novel. One student may concentrate on earlier literatures; another, on international modernism. One student may be interested primarily in the European tradition; another, in literatures. In such a program, the relationship between student and adviser is important. Each graduate student works with faculty advisers familiar with comparative studies as a whole and with the student's particular area of interest.

Integrated B.A./M.A. Program in Comparative Literature (CMLIT)

The Department of Comparative Literature offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students to obtain both the B.A. and the M.A. degrees in Comparative Literature within five years of study. The first two years of undergraduate course work include the University General Education and Liberal Arts requirements in addition to language and literature study in the major. In the third year, students are expected

to define areas of interest in two primary literatures in different languages. In addition, students in the B.A./M.A. program should begin to undertake work in a second foreign language. The fourth year includes graduate-level work in methodology and the student's selection of primary literatures, which replaces comparable 400-level senior year courses. The fifth and final year of the program typically consists of graduate work in Comparative Literature courses as well as the chosen literatures. The program culminates with an M.A. paper.

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program helps students more clearly define their area of interest and expertise in the otherwise vast field of international literatures. As a result, long-range academic planning for exceptional students pursuing doctoral degrees after leaving Penn State, or other professional goals, will be greatly enhanced. The student may also be more competitive in applying for admission to Ph.D. programs as well as for institutional and national grant monies and scholarships.

Admission Requirements

The number of openings in the integrated B.A./M.A. program is limited. Admission is selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the Comparative Literature B.A. program[1].
2. Must have completed 60 credits of the undergraduate degree program. (It is strongly suggested that students apply to the program prior to completing 100 credits.) Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
3. Must be accepted without reservation into the M.A. program in Comparative Literature. Students must apply to the program via the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the Comparative Literature graduate program for the Master of Arts degree, listed above.
4. Should have a recommended overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present a departmentally approved plan of study in the application process. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
6. Must be recommended by the chairs of the Department's undergraduate and graduate committees.

A typical sequence of coursework for the integrated program would appear as follows:

- Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in Comparative Literature are listed in theUndergraduate Bulletin. Degree requirements for the M.A. degree are listed in the Master's Degree Requirements section above. Up to 9 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. Because the B.A./M.A. is an *integrated* (rather than a sequential) degree program students are encouraged to gradually increase the number of graduate courses taken for credit. (See chart of suggested progress below.) Still, students should satisfy all of the B.A. requirements (including double-counted classes), before taking courses that count *only* toward the M.A. If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.
- CMLIT 501 will double-count for both degrees, and will replace CMLIT 400Y (a core requirement of the B.A.-only program). Students enrolled in the Integrated B.A./M.A. program can also double-count two further 500-level courses (502 and 503) toward both the B.A. and the M.A. degrees.

Year One:	6 credits:	CMLIT 10 CMLIT 100
Year Two:	6 credits:	Foreign Language (beyond the 12-credit level)
	6 credits:	Courses in Literature
Year Three:	9 credits:	400-level courses in Literature (6 credits) and CMLIT 501 (3 credits)
	(variable credits)	Work in foreign language (credits do not count towards the major, but reading proficiency is required for the M.A. degree)
Year Four:	3 credits:	CMLIT 502 or 503
	6 credits:	Comparative Literature courses
	6-9 credits:	500-level courses in Literatures (at least 3 credits in non-Anglophone literature)
Year Five:	3 credits:	CMLIT 502 or 503
	9-12 credits:	500-level courses in Literatures (at least 3 credits in non-Anglophone literature)
	6 credits:	500-level Comparative Literature Courses M.A. paper

Dual-Title Ph.D. in Comparative Literature and African Studies

Comparative Literature doctoral students who have research and educational interests in African Studies may apply to the Dual-Title Doctoral Degree Program in African Studies. The goal of the program is to enable doctoral students from Comparative Literature to complement their knowledge and skills in their primary discipline with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The Dual-Title Doctoral Degree Program will provide interested Comparative Literature doctoral students with a multidisciplinary approach that will enhance their analytical capabilities for addressing key issues in African Studies. It will, thereby, add value to their Comparative Literature degree and should increase their competitiveness in the job market. The well-rounded specialist who graduates from the program may be employed in an international setting and have enhanced opportunities for U.S. academic and non-academic positions as well.

Admission Requirements

Students must apply and be admitted to the graduate program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Comparative Literature and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in African Studies-related research.

To be enrolled in the Dual Title Doctoral Degree Program in African Studies, a student must have the approval of the Comparative Literature department and

then submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. Refer to the Admission Requirements section of the African Studies Bulletin page. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in Comparative Literature.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirements of the Comparative Literature doctoral program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Within this framework, course selection is determined by the student with the approval of the Comparative Literature and African Studies academic advisers.

Upon acceptance by the African Studies admissions committee, the African Studies director will assign the student an African Studies academic adviser in consultation with the African Studies admissions committee.

As a student develops specific scholarly interests, s/he may request a different African Studies adviser from the one assigned by the African Studies admissions committee. The student and the Comparative Literature and African Studies academic advisers will establish a program of study that is appropriate for the student's professional objectives and that is in accordance with the policies of the Graduate Council, the Comparative Literature graduate program, and the African Studies Program.

Requirements for the Comparative Literature and African Studies Ph.D.

The Ph.D. in Comparative Literature and African Studies is awarded to students who are admitted to the Comparative Literature doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Comparative Literature and African Studies are as follows:

- A minimum of 60 postbaccalaureate credits. Course work accepted for the M.A. in Comparative Literature will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Comparative Literature.
- AFR 501 (3)
- 15 credits of African-related coursework at the 400 or 500-level; a minimum of 6 of these credits must be taken from a list of courses maintained by the African Studies program chair.
- Up to 6 of the 15 credits may come from Comparative Literature, as approved by the student's Comparative Literature and African Studies Program academic advisors.
- The remaining credits can be taken in AFR or in any department other than Comparative Literature.
- Of the 15 credits, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.

The choice of courses in African Studies is to be proposed by the student subject to approval by the Comparative Literature and African Studies academic advisers. The suite of selected courses should have an integrated, intellectual thrust that probes thematic, national, or regional issues and that is complementary to the student's specialty in Comparative Literature.

Language Requirement

Fulfillment of communication and foreign language requirements will be determined by the student with approval of the Comparative Literature and African Studies program advisers and will meet the existing Comparative Literature requirements. The Ph.D. in Comparative Literature requires proficiency in two foreign languages. The foreign languages are to be prepared at a level that permits thorough literary analysis of texts and related material in those languages.

Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the Comparative Literature graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable. There will be a single candidacy examination, containing elements of both the major discipline and African Studies.

The candidacy examination committee for the dual-title degree will be composed of Graduate Faculty from Comparative Literature and must include a graduate faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Comparative Literature if that person holds a formal affiliation with the African Studies program.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Comparative Literature and African Studies dual-title Ph.D. student must include at least one member of the African Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in African Studies, the member of the committee representing African Studies must be appointed as co-chair.

Comprehensive Exam

After completing most course work, doctoral candidates for the dual-title doctoral degree in Comparative Literature and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate's examination fields according to the current Comparative Literature exam structure, and on African Studies. The African Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based on the student's thematic, national or regional area(s) of interest and specialization in African Studies.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Comparative Literature and African Studies. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Comparative Literature and Asian Studies

Graduate students with research and educational interests in international education may apply to the Comparative Literature/Asian Studies Degree Program. The goal of the dual-title degree Comparative Literature and Asian Studies is to enable graduate students from Comparative Literature to acquire the knowledge and skills of their major area of specialization in Comparative Literature while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent scholars of literature who are experts in Asian Studies as well. The dual-title degree Comparative Literature and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Additional details of the dual degree program are available in separate documentation and from the Asian Studies Program (see http://asian.la.psu.edu/graduate.shtml) and the Department of Comparative Literature (http://complit.la.psu.edu/graduate.shtml).

Admission Requirements

Students must apply and be admitted to the graduate program in Comparative Literature and The Gradaute School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admission requirements of the Asian Studies dual-title program. Refer to the Admission Requirements section of the Asian Studies Bulletin page. The Asian Studies admissions committee reviews applications forwarded by Comparative Literature, and recommends students for admission to the Asian Studies program to the Graduate School. Students already in their first and second years of the Comparative Literature graduate program may also apply to the dual-title program if their applications are forwarded by Comparative Literature. Doctoral students must be admitted into the dual-title degree program in Asian Studies prior to obtaining

candidacy in their primary graduate program.

Students with appropriate course backgrounds and a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The admission process is highly competitive and the best qualified students will be admitted subject to space availability. Scores from the Graduate Record Examination (GRE) are required for admission.

There are no specific requirements for admissions into the dual-title program beyond the requirements of the Graduate School and Comparative Literature, though applicants interested in the program should also make their interest in the dual-title program known clearly on their application for admission to the Comparative Literature program and include remarks in their essays that explain their training, interests, and career goals in an area of Asian Studies.

Degree Requirements

To qualify for an Asian Studies degree, students must satisfy the requirements of the Comparative Literature program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies Program. Within this framework, final course selection is determined by the students, their Asian Studies adviser, and their Comparative Literature program adviser.

Upon a student's acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic adviser in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the Comparative Literature department and the Asian Studies program.

Requirements for the Comparative Literature and Asian Studies Ph.D.

The doctoral degree in Comparative Literature and Asian Studies is awarded only to students who are admitted to the Comparative Literature doctoral program and admitted to the dual-title degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Comparative Literature and Asian Studies are as follows:

- Comparative Literature 501, 502, and 503
- 15 credits of Asia-related coursework at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502. As many as 6 may come from Comparative Literature, as approved by the student's doctoral adviser and the ASP director of graduate studies. The remaining credits can be taken in ASIA or in any department other than Comparative Literature.
- An additional 21 credits in literature or theory-related courses, including graduate course work in the three languages that the student selects, with emphasis on the student's primary literature

Particular courses may satisfy both the Comparative Literature requirements and those of the Asian Studies program. Within this framework, final course selection is determined by the students, their Asian Studies adviser, and their Comparative Literature program adviser.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Comparative Literature and must include at least one Graduate Faculty member from the Asian Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Comparative Literature and Asian Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Comparative Literature and Asian Studies dual-title Ph.D. student must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair. The Asian Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Comparative Literature and Asian Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Comparative Literature and Visual Studies

Comparative Literature graduate students who have research and educational interests in global visual culture may apply to the Dual-Title Doctoral Program in Visual Studies. The program aims to (a) provide students with the conceptual and methodological tools they will use to interpret literature and its history in global contexts; (b) help them develop a comprehensive understanding of literary systems, processes, and networks across languages, cultures, and media; and (c) guide them in using their specialized knowledge and skills to produce research of publishable quality. The program prepares graduates for college and university teaching, and careers in other related fields.

The dual-title Ph.D. in Visual Studies comprises two core components: 1) historical and theoretical analysis of various forms of visual culture, their diverse sources, and their current manifestations; 2) historical and theoretical analysis of visual media in the information age, including the visual aspects of the digital humanities and the presentation of scholarship and teaching in visual media. A program-specific required course in each of these areas will ensure breadth of training for participating students. Together these components will offer students a sophisticated understanding of and ability to intervene in debates about visual culture and visuality in the world today.

Admission Requirements

Students must apply and be admitted to the doctoral program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly in their applications to Comparative Literature and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in Visual Studies-related research. After admission to the doctoral program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program, as described in the Admission Requirements section of the Visual Studies Bulletin. Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to obtaining candidacy in the Comparative Literature program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Comparative Literature, listed above. In addition, students must complete the degree requirements for the dual-title in Visual Studies, listed on the Visual Studies Bulletin page.

Coursework

The program will consist of a total of fifteen credits, including two required courses – "Visual Culture Theory and History" and "Visual Studies in Digitality" -- and three elective courses dealing with questions of visuality, chosen in consultation with the Director of Graduate Studies for Comparative Literature. Up to six credits may be double-counted by both the primary graduate program (CMLIT) and the dual-title.

Language Requirements

There are no additional language requirements for the dual-title degree (the usual doctoral requirements of the Department of Comparative Literature are to be followed).

Candidacy

The dual-title field will be fully integrated into the candidacy exam for the doctoral program. The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Comparative Literature and must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both
programs' Graduate Faculty may serve in a combined role. In addition, candidates for the dual- title Ph.D. in Visual Studies will be required to present to their committee a portfolio of work in Visual Studies, consisting of a statement of the student's interdisciplinary research interests, a program plan, and

samples of writing that indicate the student's interest in questions related to Visual Studies.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Comparative Literature and Visual Studies dual-title Ph.D. student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the committee chair does not represent Visual Studies, a committee member representing Visual Studies must be appointed as co-chair.

Comprehensive Exam

After completing most course work, doctoral candidates for the dual-title doctoral degree in Comparative Literature and Visual Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate's examination fields according to the current Comparative Literature exam structure. The faculty member representing Visual Studies on the student's committee will participate in developing, administering, and evaluating the student's comprehensive exams.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Comparative Literature and Visual Studies. The dissertation must be accepted by the doctoral committee, the head of the Comparative Literature program, and the Graduate School.

Dual-Title Degree Program in Comparative Literature and Women's Studies

Comparative Literature graduate students who have research and educational interests in women's, gender, and sexuality studies may apply to the Dual-Title Doctoral Program in Women's Studies. The program creates a formal structure for training graduate students to describe, analyze, and evaluate the practices, phenomena, and policies that both issue from and structure the experiences and possibilities of women, as well as training for students to analyze how gender and sexuality intersect with literary production in multiple societies. This training cultivates breadth by pushing students to think across disciplines, geographic regions, geopolitical boundaries, domains of practice, aesthetic fields, literary genres, and historical eras. It also balances this breadth with rigor: it combines systematic training in comparative literary research, including working with primary sources in languages other than English, with a thorough grounding in the techniques and intellectual resources of state of the art scholarship on women, gender, and sexuality.

The Dual-Title Doctoral Degree Program in Comparative Literature and Women's Studies has three broad learning objectives at its core (in addition to the objectives that animate the regular doctoral program in Comparative Literature). Students will leave the program with expert awareness of responsibly produced knowledge and ethical research techniques for producing new knowledge, about (a) the forces that constitute, shape, distinguish, and link the lives of women in a variety of historical and geographic locations; (b) ways to understand the history of women, of gender, and of sexuality in global perspectives and specific local and linguistic contexts, with emphases on the relation of these fields to the history of the aesthetic, as well as to a variety of other economic, social, or philosophical structures that help determine the natures of gender and the lives of women; and (c) the history, content, conceptual options, and ethical stakes of the theoretical debates about the best ways to engage in the field of Women's Studies.

Admission Requirements

Students must apply and be admitted to the graduate program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women's Studies dual-title program. Refer to the Admission Requirements section of the Women's Studies Bulletin page. Students must have the approval of the Comparative Literature graduate director to apply for the dual-title. The application must include a statement of purpose that addresses how the student's research and professional goals intersect with the objectives of the dual-title graduate degree program in Comparative Literature and Women's Studies. The Women's Studies Admissions Committee reviews applications and recommends students for admission to the dual-title PhD program. Doctoral students must be admitted into the dual-title degree program in Women's Studies prior to obtaining candidacy in their primary graduate program.

Students may apply to the dual-title program when they request admission to the Comparative Literature Department, or at any time prior to taking the candidacy exam in Comparative Literature, provided that they a) secure the approval of the graduate director in Comparative Literature, and b) have sufficient funding and time to complete the dual-title requirements. Practically speaking, this will likely mean applying to the dual-title program before completing the second year of study in Comparative Literature.

Degree Requirements

The doctoral degree in Comparative Literature and Women's Studies is awarded only to students who are admitted to the Comparative Literature doctoral program and admitted to the dual-title degree in Women's Studies. To qualify for a degree in Comparative Literature and Women's Studies, students must satisfy the requirements of the Comparative Literature program, in which they are primarily enrolled, and of the Women's Studies dual-title program. Except where noted otherwise, students must complete the requirements listed below *in addition to* completing the general requirements for doctoral study in the Department of Comparative Literature.

Coursework

The minimum course requirements for this dual-title Ph.D. degree are 18 credits of coursework related to Women's Studies. Of these 18 credits, 9 consist of the required core course sequence in Women's Studies:

- WMNST 501: Feminist Perspectives on Research and Teaching Across the Disciplines (3 credits);
- WMNST 507: Feminist Theory (3 credits);
- WMNST 502: Global Perspectives on Feminism (3 credits).

Students also must complete 9 additional credits of Women's Studies course work chosen in consultation with the Graduate Director in Women's Studies. Most of these courses (at least 5 credits) should be at the 500 level, but a student may count some 400-level credits, with the approval of the Graduate Director in Women's Studies. Particular courses may simultaneously satisfy degree requirements in Comparative Literature and in the Women's Studies dual-title. Students who already hold a master's degree or other graduate credits from another institution may petition the Graduate Director in Women's Studies to have equivalent course credits accepted.

Language Requirements

There are no additional language requirements for the dual-title degree (the usual doctoral requirements of the Department of Comparative Literature are to be followed).

Candidacy

The dual-title field must be fully integrated into the candidacy exam for the doctoral program. In addition, candidates for the dual-title Ph.D. in Comparative Literature and Women's Studies will be required to present to their committee a portfolio of work in Women's Studies which includes a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's interest in questions taken up by scholars of Women's Studies. The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Comparative Literature and must include at least one Graduate Faculty member from the Women's Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Comparative Literature and Women's Studies dual-title Ph.D. student must include at least two member of the Comparative Literature Graduate Faculty and two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair.

Comprehensive Exams

The faculty member representing Women's Studies on the student's committee will participate in developing, administering, and evaluating the student's comprehensive exams. The exam will incorporate written and oral components based on the student's thematic or regional areas of interest and specialization and may include questions on queer theory, feminist methodology, global women's studies and sexuality studies in Comparative Literature.

Dissertation and Final Oral Examination (Dissertation Defense)

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Comparative Literature and Women's Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Teaching assistantships in the Department of Comparative Literature, as well as in related language and literature departments, typically have been available to students taking comparative literature degrees. In recent years, Comparative Literature students have held assistantships in Arabic, Chinese, English, French, German, Hebrew, Italian, Japanese, Russian, Spanish, Swahili, and Women's Studies, as well as in Comparative Literature courses. There also is a graduate assistantship position for an editorial assistant to the journal Comparative Literature Studies, which is edited in the department. Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*. In addition, the following awards typically have been available to graduate students in this program.

SAMUEL P. BAYARD AWARD
Available annually to a graduate student in comparative literature, selected by the graduate committee of the Department of Comparative Literature. Amount varies.
EDWIN ERLE SPARKS FELLOWSHIPS IN THE HUMANITIES (8)
Available to beginning and continuing graduate students in the following graduate programs: Comparative Literature, English, French, German, History, Philosophy, Spanish, and Communication Arts and Sciences.
FOLGER INSTITUTE FELLOWSHIPS
Penn State is a member of the Folger Institute of Renaissance and Eighteenth-Century Studies. Graduate students in Comparative Literature are eligible for Folger Institute Fellowships to study in seminars and workshops at the Folger Library, Washington, D.C.
TITLE VI CENTER FOR GLOBAL STUDIES ASSISTANTSHIP
Available to beginning and continuing graduate students in Comparative Literature and other programs.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMPARATIVE LITERATURE (CMLIT) course list

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Spring Semester 2018

Blue Sheet Item #: 46-05-000

Review Date: 2/20/2018

Faculty linked: 6/5/14; changed to dept head: 4/13/16

Biomedical Engineering (BME)

Program Home Page

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Degree Conferred:
M.S.

The Graduate Faculty

The Program

The Biomedical Engineering program at Penn State has graduated many undergraduates who have gone on to very successful careers in the biomedical industry. There is a critical niche to fill at the master's level for biomedical companies wishing to obtain highly trained students capable of carrying out cutting-edge work in translational medicine, device development, and related areas. To fill this niche, the Dept. of Biomedical Engineering offers a one-year master's program. The degree will consist of advanced instruction in biomedical engineering fundamentals, courses in advanced biotechnology and applications, and a culminating research proposal that incorporates experiments and computational work. This degree will result in the students developing foundational knowledge and skills in biomedical engineering that will make them competitive for industry leadership positions or doctoral-level graduate programs in BME and related disciplines.

The one-year master's program focuses on fundamentals of integrating life sciences and engineering, in addition to providing instruction in cutting-edge biotechnology methods in bio-imaging, drug delivery, regenerative medicine, bio-manufacturing, and biomaterials. Students can only start the M.S. program in the Fall semester.

Admission

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Applicants must apply for admission to the program via the Graduate School application for admission. Students with a degree in engineering, physics, or the life sciences are eligible for admission. All students must have a strong background in physics and mathematics. This background should include chemistry, calculus-based physics, and mathematics through calculus and differential equations. Students who lack this background may still be considered for provisional admission but will have to make up any deficiency early in their graduate program. These remedial courses will be required in addition to the stated graduate program course requirements. Students with a 3.0 junior/senior grade-point average and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to the minimum average may be made for students with special backgrounds, abilities, and interests.

Scores from the Graduate Record Examinations (GRE) are required for admission. However, at the discretion of the program a student may be admitted for graduate study in the Bioengineering program without these scores.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Mentored Projects: By the end of September, a student will identify an adviser. A mentored project assigned by the adviser will be completed and a culminating project using the data as a basis for the scholarly paper will be submitted and evaluated. These projects are completed while enrolled in BME 594.

A minimum of 32 credits at the 400-level or higher is required for a *M.S. in Biomedical Engineering (BME M.S.)*, with at least 24 credits at the BIOE 500 or 800 level. Students must take the following: 9 credits of foundation courses at the BIOE 500-level, an additional 12 credits of fundamentals and/or applications courses (with a minimum of 3 credits from each category), 1-credit BIOE 591 research ethics course, two 1-credit BIOE 590 graduate seminars, 2 credits of BME 429, and 6 credits of BME 594 mentored research.

Penn State allows a maximum of 10 transfer credits of high-quality graduate work to be applied toward the requirements for a graduate degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin*.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall 2016

Blue Sheet Item #: 45-01-000

Review Date: 8/23/2016

Biochemistry, Microbiology, and Molecular Biology (BMMB)

Program Home Page

Program Email: bmmb@psu.edu

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Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

The major goal of the program in Biochemistry, Microbiology, and Molecular Biology is to train students for independent research and teaching in the principal areas of those scientific disciplines. Students may enter the program from a variety of backgrounds such as biochemistry, biology, biophysics, cell biology, chemistry, genetics, microbiology, molecular biology, physics, and other related disciplines. The student's research may begin during the first year.

Research areas of faculty include cell and developmental biology, neurobiology, microbiology, virology, parasitology, pathogenesis, antibiotic discovery, iron, lipid, cellulose and xenobiotic metabolism, photosynthesis, plant biology, signal transduction, regulation of gene expression, cell cycle control, chromatin structure, DNA binding proteins, RNA binding proteins, RNA structure, enzymology, metallobiochemistry, genomics, transcriptomics, proteomics, metabolomics, electron paramagnetic resonance spectroscopy, nuclear magnetic resonance spectroscopy, cryo-electron microscopy, and X-ray crystallography.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores on the Graduate Record Examination (GRE) Test (verbal, quantitative, and analytical) are required for admission. Entering students should have taken courses in biology, biochemistry, chemistry, physics, genetics, and/ormicrobiology. Admission to the program is based on prior research experience, personal statement of interests and objectives, course records and grades, GRE scores, letters of recommendation, and interviews. All students are admitted with the intent of obtaining a Ph.D. degree, although a master's degree is obtained in some cases. The program does not admit for the terminal master's degree.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with at least 18 credits at the 500 and 600level, combined. Master's students must complete the core courses in BMMB: BMMB 501, BMMB 502, BMMB 507, and BMMB 509. Students are required to write a thesis, and at least 6 credits in thesis research (600 or 610) must be taken in conjunction with completing the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Each student must take a total of 19 credits in 400-,500- and 800-level courses, required and elective, from a list approved by the program faculty. Doctoral students must complete the core courses in BMMB: BMMB 501, BMMB 502, BMMB 507, and BMMB 509. Additional course work and research are individually planned by the student and the research adviser in consultation with the doctoral committee. The doctoral committee is established in compliance with Graduate Council policy once the student has passed the candidacy examination.

Doctoral students must pass a candidacy examination, a comprehensive oral examination, and a final oral examination (the dissertation defense). Admission to Ph.D. candidacy is decided on the basis of the student's performance in courses, research and teaching. In addition, an oral candidacy examination is taken during the fall semester of the second year. This examination tests the student's ability to utilize what they have learned in solving problems based on the scientific method. A comprehensive oral examination is taken before the student's Ph.D. doctoral committee within approximately three semesters after the student has been admitted to candidacy. The student is expected to present a written dissertation proposal including data that has been gathered, future research directions, and experimental approaches. Questioning may involve, but is not limited to, that dissertation proposal.

The faculty requires that each student demonstrate the ability to collect, organize, and present the results of their research in a professional manner before graduation. This is accomplished by preparing a manuscript based on the Ph.D. dissertation research. The manuscript must be written by the student and submitted for publication in a refereed journal prior to the final oral examination (the dissertation defense). The dissertation defense is taken before the student's doctoral committee at the end of the program. The student must also present a public seminar on the dissertation research within the two-week period preceding the dissertation defense. To earn the Ph.D. degree, the student's dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. Program in BMMB and Astrobiology

Graduate students with research and educational interests in astrobiology may apply to the Astrobiology Dual-Title Ph.D. Program. Students must apply and be admitted to the graduate program in BMMB and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Astrobiology dual-title program. Refer to the Admission Requirements section of theAstrobiology Bulletin page. Doctoral students must be admitted into the dual-title degree program in Astrobiology prior to taking the candidacy examination in their primary graduate program.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in BMMB, listed above. In addition, students must complete the degree requirements for the dual-title in Astrobiology, listed on theAstrobiology Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from BMMB and must include at least one

Graduate Faculty member from the Astrobiology program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both BMMB and Astrobiology. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees , the doctoral committee of a BMMB and Astrobiology dual-title Ph.D. student must include at least one member of the Astrobiology Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Astrobiology, the member of the committee representing Astrobiology must be appointed as co-chair. The Astrobiology representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in BMMB and Astrobiology. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. Programin BMMB and Biogeochemistry

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Ph.D. Program. Students must apply and be admitted to the graduate program in BMMB and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of theBiogeochemistry Bulletin page. Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the candidacy examination in their primary graduate program.

Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in BMMB, listed above. In addition, students must complete the degree requirements for the dual-title in Biogeochemistry, listed on the Biogeochemistry Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from BMMB and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both BMMB and Biogeochemistry. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees , the doctoral committee of a BMMB and Biogeochemistry dual-title Ph.D. student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in BMMB and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Other Relevant Information

The director of graduate studies is in charge of advising students about academic and related matters until they have chosen a dissertation adviser. Beginning students carry out a series of rotation projects in at least three different faculty laboratories before deciding on a research area. Students generally decide on their dissertation research adviser at the end of their first fall semester.

All students are required to participate as teaching assistants in undergraduate laboratory courses as part of their training. Students are required to register for BMMB 602 (Supervised Experience in College Teaching) for two semesters ; however, these credits cannot be counted towards the minimum credits required for the degree.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

BIOCHEMISTRY, MICROBIOLOGY, and MOLECULAR BIOLOGY (BMMB) course list

MICROBIOLOGY (MICRB) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 7/19/2018

Last Revised by the Department: Fall Semester 2018

Blue Sheet Item #: 47-01-000

Review Date: 8/28/2018

Faculty linked: 6/5/14

Biomedical Sciences (BMS)

Program Home Page

PROFESSOR RALPH KEIL, *Chair, Biomedical Sciences Graduate Program*
The Pennsylvania State University College of Medicine, Mail Code H133
500 University Dr. P.O. Box 850
Hershey, PA 17033
1-717-531-1045
1-717-531-0388 (FAX)
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Degrees conferred:

Ph.D., M.D./Ph.D., M.S.
Dual-Title Ph.D. (Biomedical Sciences and Clinical and Translational Sciences)

The Graduate Faculty

The Program

The Biomedical Sciences (BMS) Graduate Program with its Options in Biochemistry and Molecular Genetics, Cellular and Integrative Physiology, Translational Therapeutics, and Virology and Immunology provides students curricular training with a unique focus on human health and disease and the opportunity to concentrate in one or more disciplinary approaches including biochemistry, biophysics, cell biology, genetics, immunology, pharmacology, physiology, structural biology, and virology. Students receive rigorous training that provides the skills necessary to be leaders in biomedical research and other endeavors that benefit from a rigorous scientific background, including industry, education, intellectual property development, technology licensing, journalism, entrepreneurship, and public policy.

The BMS Graduate Program is an interdepartmental program that engages faculty from numerous basic science and clinical science departments. This broad-reaching Program provides students a wide-ranging understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is the hallmark of biomedical sciences in the 21st century.

Ph.D. Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

1. Submission of online Penn State Graduate School application and payment of nonrefundable application fee

1. Graduate Record Examinations (GRE) general test scores
2. Three letters of recommendation
3. Statement of goals including a) reasons for applying to the BMS Graduate Program, b) previous research experiences, c) particular areas of research interests if known, and d) long-term career goals
4. Official transcripts from all post-secondary institutions attended; Note that post-secondary course work should include biochemistry and molecular biology or genetics.

M.D./Ph.D. Admission Requirements

Prospective students interested in simultaneously pursuing a M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint-degree program. Applicants must also meet the admission requirements of the Graduate School and the Ph.D. admission requirements listed above, however, GRE scores are not required. The M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the M.D. and Ph.D. programs. After the review committee has accepted an applicant to the joint degree program, s/he must apply to the Graduate School for admission to the graduate program. Students must be admitted to the joint degree program prior to taking the first course they intend to count towards the graduate degree. Applicants not accepted into the joint-degree program may be referred to either the M.D. or Ph.D. program, depending on their qualifications.

Applicants to this program generally have very strong grades and MCAT scores, as well as a strong and sustained background in research. Applicants must be able to clearly articulate reasons for pursuing the joint degree. Letters of recommendation from faculty who have advised the applicant in research and who can comment on the applicant's passion and potential for research are strongly encouraged.

Dual-Title Ph.D. Degree in Biomedical Sciences and Clinical and Translational Sciences Admission Requirements

Potential dual-title students can express an interest in the dual-title program as early as during the recruitment process for the BMS Graduate Program. Students must apply and be admitted to the graduate program in BMS and the Graduate School before they can apply for admission to the dual-title Ph.D. in Clinical and Translational Sciences (CTS). Refer to the Admission Requirements section of theClinical and Translational Sciences Bulletin page. Students must apply and be admitted to the dual-title program in CTS prior to taking the candidacy exam.

Degree Requirements

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Hershey, PA 17033
lms17@psu.edu

Master's Degree Requirements
Although the BMS Graduate Program awards M.S. degrees, it does not actively recruit students to earn M.S. degrees.

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

To receive the M.S. degree in BMS, at least 32 credits from courses at the 400, 500, 600, and 800 level are required.

1. **Required BMS Core Courses (13 cr.)**: BMS 502 Cell and Systems Biology and BMS 503 Flow of Cellular Information (6 cr.), BMS 504 and BMS 505 Art of Scientific Communication I and II (2 cr.), BMS 590 Colloquium (2 cr.), BMS 591 Biomedical Research Ethics (1 cr.), and BMS 596 Individual Studies: Research Rotation (2 cr.).
2. **Required Program Courses (13 cr.):** Colloquium or Journal Club fulfilled by taking 2 credits of any of the following: BCHEM 590 Colloquium, PSIO 501 Scientific Analysis and Presentation, PHARM 590 Colloquium, MICRO 590 Colloquium, MICRO 572 Virology Literature Reports, NEURO 590 Colloquium, or VIRIM 580 Critical Reading in Immunobiology, and at least 11 credits of elective courses at the 500 or 800 level, selected in consultation with the student's thesis adviser and thesis committee.
3. **Thesis Research (6 cr.**): BMS 600 Thesis Research (6 cr.). No more than 6 credits of BMS 600 Thesis Research may be counted toward the 32 credit minimum. Students must complete original laboratory research that culminates in a thesis. The thesis must be accepted by the master's committee, the chair of the graduate program, and the Graduate School.

Each candidate for the M.S. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

Doctoral Degree Requirements
Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

To receive the Ph.D. degree in Biomedical Sciences, at least 29 credits from courses at the 400, 500, 600, and 800 level are required.

1. **Required BMS Core Courses (17 cr.)**: BMS 502 Cell and Systems Biology and BMS 503 Flow of Cellular Information (6 cr.); BMS 504 and 505 Art of Scientific Communication I and II (2 cr.), BMS 590 Colloquium (5 cr.), BMS 591 Biomedical Research Ethics (1 cr.), BMS 596 Individual Study: Research (2 cr.), BMS 801 Writing Grant Proposals for Biomedical Research (1 cr.).

1. **Required Program Courses (12 cr.):** 2 credits of Colloquium or Journal Club fulfilled by taking any of the following: BCHEM 590 Colloquium, PSIO 501 Scientific Analysis and Presentation, PHARM 590 Colloquium, MICRO 590 Colloquium, MICRO 572 Virology Literature Reports, NEURO 590 Colloquium, or VIRIM 580 Critical Reading in Immunobiology, and at least 10 credits of elective courses at the 500 or 800 level, selected in consultation with the student's dissertation adviser and doctoral committee.

Each candidate for the Ph.D. degree must fulfill written and spoken English communication requirements that are satisfied by preparing written and oral reports describing the laboratory rotations during the first year.

The first-year Fall curriculum provides the student an understanding of basic cellular processes through a core curriculum that includes two integrated three-credit courses: Flow of Cellular Information and Cell and Systems Biology. These courses develop concepts related to genome structure and function, regulation of gene expression, regulation of energy supply and demand, cellular and subcellular structures, cell-to-cell signaling, and the organization and function of cells in multicellular systems. The Fall curriculum also includes the one-credit Art of Scientific Communication I course that reinforces concepts developed in the integrated courses and aids students in the transition from textbooks to primary literature as a source of information.

The first-year Spring curriculum offers an opportunity to explore one or more curricular paths that lead to entry into one of the Options or to design an individualized curricular path within the BMS Graduate Program. The Spring curriculum also includes the one-credit Art of Scientific Communication II course that further develops the student's knowledge acquisition from the primary literature and assists improvement of presentation and writing skills necessary for subsequent journal clubs, literature-based courses, and scientific learning and discourse throughout their career.

In addition, students complete at least three research rotations during the first year that expose them to the wide range of research interests of the Penn State graduate faculty from both basic and clinical science departments at the College of Medicine in Hershey. These rotations serve to inform the students with regard to choosing a dissertation adviser and doctoral committee.

Curriculum in the second year is determined by the choice to participate in one of the Options, or an individualized curricular path designed by the student in consultation with the dissertation adviser and doctoral committee.

All doctoral students must pass a candidacy examination, a comprehensive examination, and a final oral examination (the dissertation defense). At the end of the first year, admission to Ph.D. candidacy is determined by performance in course work, laboratory rotations, and the BMS Graduate Program Candidacy Examination. Students join their research laboratory by the end of the summer of the first year.

Ph.D. candidates prepare a written comprehensive examination in the format of a grant application prior to the end of the fifth semester of enrollment. As part of this examination, the candidate also gives an oral presentation of this proposal to their doctoral committee.

To earn the Ph.D. degree, doctoral students must write a dissertation that is accepted by the doctoral committee, the chair of the graduate program, and the Graduate School. Students are required to have at least one first-author publication accepted or published based on their dissertation research prior to the final oral examination. A student may petition the Chair of the BMS Graduate Program to waive this requirement due to extenuating circumstances (e.g., adviser relocation, abnormal issues with publication process). All waivers must be approved by the Vice Dean for Research and Graduate Studies of the College of Medicine.

Dual-Title Doctoral Degree Requirements

To qualify for the dual-title degree in Biomedical Sciences and Clinical and Translational Sciences, students must satisfy the BMS Ph.D. degree requirements listed in the “Doctoral Degree Requirements” section above. In addition, students pursuing the dual-title Ph.D. in BMS and CTS must complete the degree requirements for the dual-title CTS Ph.D., listed on theCTS Bulletin page. Up to 7 credits for the Ph.D. degree in BMS that overlap with the CTS elective requirements can be counted toward the CTS dual-title.
The choice of CTS electives is subject to approval by the student’s academic adviser(s) from the BMS and CTS programs. The electives should complement the student’s work in BMS. A list of approved electives is maintained by the CTS program office.

The candidacy examination contains elements of both BMS and CTS. In accordance with Graduate Council policy, the candidacy committee must include at least one member of the CTS Graduate Faculty. Faculty with graduate appointments in both programs may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The doctoral committee must include at least one member of the CTS Graduate Faculty. Faculty members who hold appointments in the Graduate Faculty of both programs may serve in a combined role. If the chair of the doctoral committee is not a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair. The fields of BMS and CTS will be integrated in the student’s comprehensive exam, and the doctoral committee member representing CTS is responsible for insuring coverage of information relevant to the CTS field of study.

The candidate must complete a dissertation on a topic that reflects their original research and education in both BMS and CTS. To earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the chair of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

OPTIONS

The Options offered within the BMS Graduate Program provide the student a curricular specialization focused on different approaches to biomedical research.

BIOCHEMISTRY AND MOLECULAR GENETICS (BMG) OPTION
Thomas Spratt, Ph.D., Option Director
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The objective of the BMG Option is to provide course work and laboratory training that focus on the principles and application of biochemical and molecular genetic analysis. These approaches play key roles in identifying and characterizing cellular processes and elucidating the structure and function of key macromolecules including DNA, RNA, proteins, lipids, and carbohydrates. The Option also stresses the biological intersections of these classes of macromolecules. The combination of didactic courses, colloquia, seminars, and laboratory research provides students with an integrated approach for applying biochemical and molecular genetic analyses to interrogate and manipulate basic cellular processes and macromolecules of biomedical significance. The training afforded by this Option exposes graduates to the fundamentals needed to experimentally address scientific questions in areas such as epigenetic control of gene expression, structure/function, biomolecular engineering, and systems analysis using genetic and biochemical approaches.

Admission Requirements for the BMG Option
To be admitted to the BMG Option, students must successfully complete 1) the first year of the BMS Graduate Program, and 2) three research rotations, at least two with faculty in the BMG Option.

Curricular Requirements for the M.S. degree in the BMG Option
In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the BMG Option must take BCHEM 521 Structure, Function, and Regulation of Biological Molecules (3 cr.), BCHEM 522 Molecular Genetics: Genes to Genomes (3 cr.), BCHEM 590 Colloquium (2 cr.), BMS 512 Data Analysis for the Biomedical Lab Scientist (2 cr.), and at least 3 credits of 500-level elective courses selected in consultation with the student's thesis adviser and thesis committee.

Curricular Requirements for the Ph.D. degree in the BMG Option

In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the BMG Option must take BCHEM 521 Structure, Function, and Regulation of Biological Molecules (3 cr.), BCHEM 522 Molecular Genetics: Genes to Genomes (3 cr.), BCHEM 590 Colloquium (2 cr.), BMS 512 Data Analysis for the Biomedical Lab Scientist (2 cr.), and at least 2 credits of 500-level elective courses selected in consultation with the student's dissertation adviser and doctoral committee.

CELLULAR AND INTEGRATIVE PHYSIOLOGY (CIP) OPTION

David Waning, Ph.D., Option Director
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The objective of the CIP Option is to provide students training that focuses on cellular and integrative physiology, which includes the functions and interactions between different tissues and cell types and different organ systems. The training afforded by this Option exposes graduates to the fundamentals needed to experimentally address scientific questions in areas such as intracellular organization, and the regulation of key biological processes including cell signaling, ion channel and transport function, gene expression, protein translation and turnover, molecular motors, and intercellular communication. In addition, the Option stresses the importance of systems biology and inter-organ signaling to understand the biological basis of health and disease. The combination of didactic courses, colloquia, seminars, and laboratory research provides students with an integrated approach for applying advanced imaging, biochemical, and molecular analyses to interrogate and manipulate basic cellular processes and macromolecules of biomedical significance

Admission Requirements for the CIP Option
To be admitted to the CIP Option, students must successfully complete 1) the first year of the BMS Graduate Program, and 2) three research rotations, at least two with faculty in the CIP Option.

Curricular Requirements for the M.S. degree in the CIP Option
In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the CIP Option must take PSIO 504 and 505 Cellular and Integrative Physiology I and II (6 cr.), BMS 581 Molecular and Translational Approaches to Human Disease (3 cr.), PSIO 501 Scientific Analysis and Presentation (2 cr.), and at least 2 credits of 500-level elective courses selected in consultation with the student's thesis adviser and thesis committee.

Curricular Requirements for the Ph.D. degree in the CIP Option
In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the CIP Option must take PSIO 504 and 505 Cellular and Integrative Physiology I and II (6 cr.), BMS 581 Molecular and Translational Approaches to Human Disease (3 cr.), PSIO 501 Scientific Analysis and Presentation (2 cr.), and at least 1 credit of a 500-level elective course selected in consultation with the student's dissertation adviser and doctoral committee.

TRANSLATIONAL THERAPEUTICS (TT) OPTION

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The TT Option is designed to give students a combination of didactic instruction, informal interaction, and laboratory experience that enables them to obtain a firm foundation in the principles, methods, and contributions of pharmacology, defined broadly as the science of the interaction of chemical agents with biological systems. Of primary importance, this Option focuses on identification of disease targets, development of therapeutic strategies, and refinement of drug delivery approaches. With this preparation, graduates of the TT Option will be capable of designing and executing high-quality independent research, and of assuming positions of responsibility within the therapeutic community.

This Option offers studies in the general areas of drug discovery and development, molecular pathophysiology, drug metabolism, molecular pharmacology, endocrine pharmacology, neuropharmacology, cardiovascular-renal pharmacology, pharmacogenetics, and clinical pharmacology. Primary emphasis is placed on the molecular mechanism by which drugs act in the body and by which the body transforms drugs.

Admission Requirements for the TT Option
To be admitted to the TT Option, students must successfully complete 1) the first year of the BMS Graduate Program, and 2) three research rotations, at least two with faculty in the TT Option.

Curricular Requirements for the M.S. degree in the TT Option
In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the TT Option must take PHARM 520 Principles of Drug Action (2 cr.), PHARM 551 Anti-infective Therapeutics (1 cr.), PHARM 552 Integrated Systems Pharmacology (1 cr.), PHARM 553 Gastrointestinal and Immunomodulatory Therapeutics (1 cr.), PHARM 554 Anticancer Therapeutics (1 cr.), PHARM 561 Neuropharmacology (2 cr.), PHARM 562 Endocrine Pharmacology (2 cr.), PHARM 590 Colloquium (1 cr.), and at least 2 credits of 500-level elective courses selected in consultation with the student's thesis adviser and thesis committee.

Curricular Requirements for the Ph.D. degree in the TT Option
In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the TT Option must take PHARM 520 Principles of Drug Action (2 cr.), PHARM 551 Anti-infective Therapeutics (1 cr.), PHARM 552 Integrated Systems Pharmacology (1 cr.), PHARM 553 Gastrointestinal and Immunomodulatory Therapeutics (1 cr.), PHARM 554 Anticancer Therapeutics (1 cr.), PHARM 561 Neuropharmacology (2 cr.), PHARM 562 Endocrine Pharmacology (2 cr.), PHARM 590 Colloquium (1 cr.), and at least 1 credit of a 500-level elective course selected in consultation with the candidate's dissertation adviser and doctoral committee.

VIROLOGY AND IMMUNOLOGY (VIRIM) OPTION

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The objective of the VIRIM Option is to provide graduate students the opportunity to focus their graduate-level coursework and laboratory research in areas related to virology and immunology. The areas of research within virology include viral oncology, virus-cell interactions, the structure and assembly of viruses, functional role of viral gene products, the molecular biology of virus replication, and viral induced latency. The areas of research within immunology include adaptive and innate immunity, cellular and humoral immunity, antigen presentation, tumor immunology, vaccine development, and neuroimmunology. The VIRIM Option allows students to develop an integrative research approach using aspects of biochemistry, molecular and cellular biology, and genetics to approach scientific questions associated with areas of virology and immunology.

Admission Requirements for the VIRIM Option
To be admitted to the VIRIM Option, students must successfully complete 1) the first year of the BMS Graduate Program, and 2) three research rotations, at least two with faculty members in the VIRIM Option.

Curricular Requirements for the M.S. degree in the VIRIM Option
In addition to the 13 credits of required BMS Core Courses for the M.S. degree and 6 credits of thesis research, students pursuing the M.S. degree in the VIRIM Option must take MICRO 550 Medical Microbiology (2 cr.), MICRO 581 Immunology A: Basic Concepts in Innate and Adaptive Immunity (1 cr.), MICRO 582 Immunology B: Adaptive Immunity (1 cr.), BMS 562 Principles of Immunology C: Dysfunction and Manipulation of the Immune System (1 cr.) or BMS 566 Viral Oncogenesis (1 cr.), BMS 564 Concepts of Virology (2 cr.) or MICRO 560 Concepts in Immunology (2 cr.), BMS 567 Viral Pathogenesis (1 cr.), GENET 581 Genetics of Model Organisms A: Bacterial and Viral Pathogenesis (1 cr.), MICRO 572 Virology Literature Reports (1 cr.) or VIRIM 580 Critical Reading in Immunobiology (1 cr.), MICRO 590 Colloquium (1 cr.), and at least 2 credits of 500-level elective courses selected in consultation with the student's thesis adviser and thesis committee.

Curricular Requirements for the Ph.D. degree in the VIRIM Option
In addition to the 17 credits of required BMS Core Courses for the Ph.D. degree, students pursuing the Ph.D. degree in the VIRIM Option must take MICRO 550 Medical Microbiology: Topics in Molecular Pathogenesis (2 cr.), MICRO 581 Immunology A: Basic Concepts in Innate and Adaptive Immunity (1 cr.), MICRO 582 Immunology B: Adaptive Immunity (1 cr.), BMS 562 Principles of Immunology C: Dysfunction and Manipulation of the Immune System (1 cr.) or BMS 566 Viral Oncogenesis (1 cr.), BMS 564 Concepts of Virology (2 cr.) or MICRO 560 Concepts in Immunology (2 cr.), BMS 567 Viral Pathogenesis (1 cr.), GENET 581 Genetics of Model Organisms A: Bacterial and Viral Pathogenesis (1 cr.), MICRO 572 Virology Literature Reports (1 cr.) or VIRIM 580 Critical Reading in Immunobiology (1 cr.), MICRO 590 Colloquium (1 cr.), and at least 1 credit of a 500-level elective course selected in consultation with the candidate's

dissertation adviser and doctoral committee.

REQUIREMENTS FOR THE M.D./Ph.D. DEGREE

Students must fulfill all requirements for each degree in order to be awarded that degree. Degree requirements for the M.D. program are listed on the Penn State College of Medicine website. If students accepted into the joint degree program are unable to complete the M.D. degree, they are still eligible to receive the Ph.D. degree if all the Ph.D. degree requirements have been satisfied.

During the first two years of medical school, the student conducts at least three research rotations. After successful completion of the first two years of medical school the student enters the BMS Graduate Program and may be admitted to one of its options.

During the summer after the second year of medical school M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves as the candidacy examination for the BMS Graduate Program.

In addition to the requirements for the doctoral committee for a Ph.D. student in the BMS Graduate Program, at least one member of the dissertation committee must be on the M.D./Ph.D. Steering Committee. This member may serve other roles on the doctoral committee.

M.D./Ph.D. students must complete 28 credits; 8 credits from the first two years of medical school will be double-counted towards the Ph.D., replacing the following required core courses: BMS 502 (3 cr.), BMS 503 (3 cr.), and BMS 596 (2 cr.). In addition to the curriculum of the first two years of medical school at the Penn State College of Medicine, all M.D./Ph.D. students in the BMS Graduate Program take the following core courses: BMS 506A and 506B Biological Basis of Human Health and Disease A and B (4 cr.), BMS 512 Data Analysis for the Biomedical Lab Scientist (2 cr.), BMS 590 Colloquium (4 cr.), BMS 591 Biomedical Research Ethics (1 cr.), and BMS 801 Writing Grant Proposals for Biomedical Research (1 cr.).

In addition, students must take 2 credits of Colloquium or Journal Club, which is fulfilled by taking any of the following: BCHEM 590 Colloquium, PSIO 501 Scientific Analysis and Presentation, PHARM 590 Colloquium, MICRO 590 Colloquium, MICRO 572 Virology Literature Reports, NEURO 590 Colloquium, or VIRIM 580 Critical Reading in Immunobiology, and at least 6 elective credits of 500-level elective courses selected in consultation with the student's dissertation adviser and doctoral committee.

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their doctoral committee.

A dissertation must be prepared and defended by each M.D./Ph.D. candidate. The dissertation must be accepted by the doctoral committee, the chair of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense). Students are required to have at least one first-author publication accepted or published based on their dissertation research prior to the final oral examination.

OTHER RELEVANT INFORMATION

The BMS Graduate Program Advisory Committee, which includes representation from the Program and each Option of the Program, advises students about academic and related matters until the student has a dissertation adviser. If desired, students formally make a decision to join an Option by the end of the Spring semester of their first year and must satisfy all admission requirements of the Option.

Students must have a dissertation adviser by the end of the summer of the first year. The student and dissertation adviser then plan additional course work and develop a research plan in consultation with the doctoral committee.

STUDENT AID

Graduate assistantships available to students in this Program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

COURSES

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses to make up deficiencies or to fill gaps in previous education, but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer 2017

Review Date: 8/22/2017

Faculty linked: 8/14/14

BioRenewable Systems (BRS)

Program Home Page

PAUL H. HEINEMANN, *Head of the Department of Agricultural and Biological Engineering*
250 Agricultural Engineering Building
814-865-7792

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

Biorenewable Systems are the structures and processes that create and support biologically-based products capable of being continuously replaced through sound technology and management. The BioRenewable Systems (BRS) degree is offered as a resident instruction, research-based M.S. and Ph.D. program. The degree requires a thesis at both levels. BRS is positioned to be a world-renowned graduate program in renewable biologically-based materials, products, and processes that fully integrates scientific research with the principles of systems technology, business, management, marketing, leadership development, and entrepreneurship for biorenewable systems. Toward that end, the academic requirements for BRS are closely related to the disciplinary focus of agricultural and biological sciences, technological innovation and application, and business, management, and leadership within the continually evolving biobased sectors. This makes BRS unique from other fields of science and management. To promote and fulfill this uniqueness, continuation of courses in science, business, management, and technology at the graduate level is encouraged and expected. Excellent facilities, including equipment and instrumentation, are available for research in the designated areas. Collaborative arrangements allow access to a large variety of other resources: Materials Research Institute; Penn State Institutes of the Energy and Environment; Housing Research Center; USDA Pasture Systems and Watershed Management Research Lab; a mushroom research and demonstration facility and a 1,500-acre agricultural research center for cooperative work with agronomic and horticultural production systems as well as animal production systems.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

In general, for admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

Graduate Record Examination (GRE). All students must submit GRE general aptitude test scores (i.e., verbal, quantitative, and analytical) to be considered for admission.

To qualify for admission, all international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5.

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

All applicants must provide the official transcripts of all their previous course work, a statement of purpose written by the applicant, and at least three letters of recommendation. Admission into the BRS Graduate. Program is based upon a thorough review of all applicant qualifications, and the best-qualified applicants will be accepted up to the number of students for which program resources are available.

Entrance to Master of Science Program

Completion of a relevant undergraduate Bachelor degree program is required for admission to the M.S. degree program; relevant programs span a diverse set of academic disciplines, including but not limited to: Agricultural Sciences, Biology, Chemistry, Business, Engineering, and Environmental Sciences. Students with junior-senior GPA of at least 3.00 (4.00 base) will be competitive in the admission process.

Entrance to Doctor of Philosophy Program

The program requirement for acceptance to graduate study toward a Ph.D. degree in BRS is typically an M.S. degree with research thesis in BRS or related discipline such as Agricultural Sciences, Biology, Chemistry, Business, Engineering, and Environmental Sciences, or with a B.S. degree in Agricultural Systems Management (ASM) or BRS or equivalent. Outstanding students interested in direct admission from a B.S., B.A., or M.B.A. program to the Ph.D. Program should contact the Graduate Program Coordinator for further clarification and details. Direct admission will be based on critical evaluation of the student's: potential to conduct publishable research, academic record, an additional language (other than the student's mother tongue), performance on standardized tests, statement of purpose, and reference letters.

Students who apply directly to the Ph.D. program with a B.S. degree and are deemed by the admissions committee not to meet the standards for admission to the Ph.D. program may be considered either for admission into the M.S. program or for admission to the Ph.D. program on a provisional basis. The student will remain in provisional status in the Ph.D. program until completing the following specific courses: BRS 500 (3 credits), BRS 501 (3 credits), BRS 502 (1 credit), BRS 550 (3 credits), BRS 511 (3 credits), BRS 551 (2 credits), and ABE 559 (3 credits), with a minimum grade-point average of 3.00. For provisional status to change, the specific courses must be completed within the first two semesters of study.

Master's Degree Requirements

All candidates for the M.S. degree must prepare and complete a thesis, complete a minimum of 30 credits at the 400-level or higher (including a minimum of 18 credits at 500-level or higher and a minimum of 6 credits of research), and obtain a minimum grade-point average of 3.00. Only courses in which grades of C or better are earned may be counted toward the requirements of the master's degree. Each program must include BRS 500 Research Methods, BRS 501 Biobased Polymers, and BRS 502 Human Behavior in Management and Technology, two courses from the list of electives in graduate syllabus and at least one statistics course. A total of at least 18 credits must be from 500-level or above courses. All requirements for a master of science degree, whether satisfied at Penn State or elsewhere, must be met within eight years from the first semester of graduate study.

Additional program details are contained in a graduate syllabus, available from the department.

Doctoral Degree Requirements

Official entrance into a Ph.D. program occurs upon successful completion of the Ph.D. Candidacy Examination. Ph.D. degree requirements include successful completion of the following: approved graduate course work, Ph.D. language and communication requirements, a comprehensive examination, and defense, approval, and submission of a dissertation.

No University-level (Graduate Council) minimum number of courses completed or credits earned are specified for the Ph.D.; the student's doctoral advisory committee will recommend the minimum requirements as appropriate for each individual student's program of study and dissertation research. Unless previously taken for the M.S., each Ph.D. student must complete BRS 500 Research Methods, BRS 501 Biobased Polymers, BRS 502 Human Behavior in Management and Technology, and at least 1 credit of BRS 602 Supervised College Teaching. In addition, the candidate must complete 6 credits of BRS 5XX (excluding BRS 500 and 590-596) or select from the list in graduate syllabus. The candidate is expected to develop a program of study and submit it to the appointed doctoral committee for consideration and approval. All requirements for a Ph.D. degree, whether satisfied on this campus or elsewhere, must be completed within eight years after passing the candidacy examination.

CANDIDACY EXAMINATION -- The Ph.D. Candidacy Examination Committee will administer the Candidacy Examination. This committee will consist of four BRS graduate faculty members, including the Adviser, the ABE Department Head (or annually appointed designee), the BRS Graduate Program Coordinator, and one faculty member selected by the student. In cases where a member serves two roles on the committee, an additional member will be appointed by the Graduate Program Coordinator. The Candidacy Examination will consist of developing a Ph.D. research proposal following the completion of BRS 500 Research Methods, presenting the proposal, and defending/discussing the proposed research with the Committee. The Candidacy Examination will be completed by the student soon after s/he has completed at least 18 credits but before the end of the third semester. Successful completion of the Candidacy Examination does not mean that the student's Ph.D. research proposal is approved. Rather, final approval of the candidate's research proposal will be the responsibility of the Doctoral Committee.

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

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

Consistent with the two preceding paragraphs, a Doctoral Committee must consist of four or more members of the Graduate Faculty and (1) the chairperson and at least one other member must be BRS Graduate Faculty members, (2) at least one member must be from a department other than ABE and s/he should be a graduate faculty member of a program other than BRS, (3) at least one member must represent any minor department(s) if the student selects a minor(s), and (4) the Advisory Committee can be appointed only after the Candidacy Examination has been passed.

PH.D. LANGUAGE AND COMMUNICATION REQUIREMENT--The purpose of the communication requirement is to strengthen the student's professional communication skills. The candidate must take a minimum of one three-credit course and receive a grade of B or better. Course selections must be approved by the academic adviser prior to registration. Courses used to satisfy this requirement must include the substantial practice of writing and/or speaking.

COMPREHENSIVE EXAMINATION -- When a Ph.D. candidate has substantially completed the coursework, including the communication requirements, s/he is required to take a Comprehensive Examination covering the major, minor, and related areas of study. The Comprehensive Examination will be both written and oral. The nature and details of the Comprehensive Examination will be determined by the student's Advisory Committee. In general, the student will be required to demonstrate ability to synthesize information acquired through formal coursework and to use technical literature to find information required for solving biorenewable systems problems. A favorable vote of at least two-thirds of the committee is required for passing. If a candidate fails, the committee will determine whether another examination may be taken.

FINAL ORAL EXAMINATION -- Upon recommendation of the Adviser, a Ph.D. candidate who has satisfied all other requirements for the degree will be scheduled by the Dean of the Graduate School to take a Final Oral Examination. The student must be a registered full-time or part-time degree student for the semester in which the Final Oral Examination is taken. This examination is open to the public and the student should notify all departmental faculty and graduate students. The examination is related largely to the dissertation, but may cover the candidate's entire field of study without regard to courses that have been taken either at Penn State University or elsewhere. The defense of the dissertation should be well-prepared including any appropriate visual aids. One of the aims of the preparation should be to synthesize the important conclusions in a time-efficient presentation, leaving ample time for questions and discussion. A favorable vote of at least two-thirds of the committee is required for passing. If a candidate fails, the committee will determine whether another examination may be taken.

Other Relevant Information

Continuous fall and spring registration is required for all graduate students until the thesis is approved.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2013

Review Date: 1/14/14

Faculty linked: 6/5/14

Business Administration (BUSAD)

PROGRAM HOME PAGE

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Degree Conferred:

M.B.A.

The Graduate Faculty

The Program

The Penn State Great Valley M.B.A. is a general business degree program emphasizing development of the planning and problem-solving skills crucial in middle and upper management in the public, private, and nonprofit sectors. Nearly all students are working professionals who bring a wealth of experience and knowledge to the classroom. Required research may be conducted in Penn State Great Valley's Library and Computer Center, which provide local research support as well as access to the library and computer resources of the entire Penn State system.

The M.B.A. program is geared toward the needs of part-time students who are employed full-time. Courses in the program, which are offered at Penn State Great Valley campus, Penn State Berks campus, and at the Navy Yard in Philadelphia, are scheduled for the convenience of adult learners, in the evening or on Saturday. Online and blended formats are also available.

Admission Requirements

Requirements listed here are in addition to the Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Management Admission Test (GMAT) are required for admission. Applicants should have had at least one year of quantitative analysis or statistics.

Admission decisions are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments, GMAT scores, two recommendations, and a personal statement that provides indications of future academic and professional potential.

Application filing dates: Penn State Great Valley's M.B.A. program has a rolling admission policy. New students may start classes in fall, spring, or summer sessions.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Prior to enrolling in M.B.A. program requirements, students entering the program are expected to meet preprogram requirements that build a foundation for quantitative analysis as described below.

Quantitative Skills Requirement: Prior to enrolling in their M.B.A. course work, students must demonstrate competence in quantitative skills. This requirement must be satisfied in one of two ways:

1. Completion of two sequential undergraduate courses in applied statistics or one graduate introductory course in applied statistics at a regionally accredited institution of higher education with a minimum grade of B, within the seven years prior to being enrolled at Penn State Great Valley. Syllabi for the courses must be provided.

OR

1. Satisfactory completion of BUSAD 501 Statistical Analysis for Managerial Decision Making (3) at Penn State Great Valley. This requirement must be satisfied by the first semester or summer session of the student's matriculation prior to enrolling in M.B.A. degree courses, and completed with a grade of B or higher. Successful completion of this course will result in 3 graduate credits, but these credits will not count toward the degree requirements for the M.B.A. degree.

Students who need to take BUSAD 501 to fulfill the Quantitative Skills Requirements will be admitted on a one-year provisional basis.

A minimum of 45 credits of course work at the 400, 500, and 800 level is required, including 18 credits of Foundation Courses, 15 Credits of Essential Courses, 9 credits of Elective Courses, and a 3-credit Capstone Course. Students may petition to have up to 15 credits of the required Foundation Courses waived in accordance with the course exemption guidelines for the M.B.A. program, in which case the total credits required for the degree may be reduced in an equivalent manner, down to the base minimum of 30 credits. To be eligible for exemption from a single foundation course, students must have completed at least two equivalent undergraduate courses with a grade of B or higher, no more than seven years prior to admission to the M.B.A. program. At the Management Division Head's discretion, a competency exam may be required to receive certain course exemptions. Time limits may be waived by the M.B.A. program on the basis of post-graduate training or current and relevant work experience. If a waiver is not granted, students must complete all Foundation Courses prior to starting advanced course work.

All entering students are required to take MGMT 501; exemptions will not be granted.

Foundation Courses (18 credits) provide an overview of key business processes and functional areas of organizations. These are: MGMT 501 Behavioral Science in Business (3 cr.), ACCTG 511 Financial and Managerial Accounting (3 cr.), FIN 531 Financial Management (3 cr.), BUSAD 523 Prices and Markets (3 cr.), MKTG 500 Marketing Management (3 cr.), and OPMGT 510 Operations Management (3 cr.).

Essential Courses (15 credits) build necessary competencies for effective managerial practice, knowledge of key elements of contemporary business, and ethical decision making. They include one course in each of the following categories: Ethics, Global, Interpersonal Dynamics, Organizational and Industry Contexts, and Managing Technology. A list of courses that will satisfy these requirements is maintained by the program office.

Elective Courses (9 credits) provide an opportunity for students to pursue their interests and develop distinctive competencies by pursuing advanced courses offered or approved by the Management Division. A list of approved elective courses is maintained by the graduate program office.

Capstone Course (3 credits): All students must complete a Capstone course that provides students with an opportunity to strategically integrate and apply what they have learned in their course work. MGMT 571 Strategic Management (3 cr.) is the capstone course for the M.B.A.

Student Aid

There are a limited number of scholarships, fellowships, and graduate assistantships available. For more information on these, contact the Office of Student Aid at Penn State Great Valley. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Most students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To find other options that may be available to you, contact the Office of Student Aid at Penn State Great Valley, 610-648-3311.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ACCOUNTING (ACCTG) course list

BUSINESS ADMINISTRATION (B A) course list

BUSINESS ADMINISTRATION (BUSAD) course list

BUSINESS LAW (B LAW) course list

FINANCE (FIN) course list

HEALTH POLICY AND ADMINISTRATION (H P A) course list

INTERNATIONAL BUSINESS (I B) course list

LEADERSHIP (LEAD) course list

MANAGEMENT (MGMT) course list

MARKETING (MKTG) course list

SYSTEMS ENGINEERING (SYSEN) course list

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-04

Review Date: 01/10/2017

Faculty linked: 8/14/14

Civil Engineering (CE)

Program Home Page

PATRICK J. FOX, *Head, Department of Civil and Environmental Engineering, and Shaw Professor*
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Degrees Conferred:

Ph.D., M.S., M.Eng.

The Graduate Faculty

Students may specialize in environmental engineering, geotechnical and materials engineering, structural engineering, transportation engineering, and water resources engineering.

Admission Requirements

The requirements listed here are in addition to the general requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Candidates should possess a baccalaureate degree from a regionally accredited institution. Students in engineering, physical sciences, or mathematics with a 3.00 grade-point average (on a 4.00 scale) may be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students without a baccalaureate degree in engineering would be admitted on a provisional basis pending successful completion of entrance requirements (completed concurrently with degree requirements).

U.S. applicants will upload unofficial copies of their transcripts, a statement of objectives, and three references for letters of recommendation when applying to the program. If admitted, applicants will be required to provide the Graduate School with OFFICIAL COPIES of transcripts of all their previous course work (in duplicate). In addition, all applicants must submit scores from the General Graduate Record Examinations Aptitude Test (verbal, quantitative, and analytical). For the M.Eng. degree, the GRE requirement will be waived for students who have graduated with a degree from the College of Engineering at The Pennsylvania State University with a cumulative grade-point average of greater than 3.30.

International applicants will upload unofficial copies of their transcripts, a statement of objectives, and three references for letters of recommendation when applying to the program. If admitted, applicants will be required to provide the Graduate School with OFFICIAL TRANSCRIPTS or ATTESTED COPIES of transcripts, degree, and diploma certificates in both English and native language. Photocopies will NOT be accepted. All international applicants whose native language is not English must submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System). The minimum acceptable score for the TOEFL is a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum composite score for the IELTS is 6.5 on all subjects. International applicants who have received a baccalaureate or master's degree from a college, university, or institution in any of the following countries are exempt from the TOEFL requirement: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, or Wales.

Application Deadlines

M.Eng.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by March 15th of the calendar year for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

M.S. and Ph.D.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by September 15th for admission in Spring semester and by December 15th for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

Degree Requirements

Three degrees are offered: Master of Engineering (M.Eng.), Master of Science (M.S.), and the Doctor of Philosophy (Ph.D.).

The M.Eng. degree is a non-thesis professional master's degree. The program provides training for advanced professional practice. A minimum of 31 graduate credits (400 level and above) of course work are required. At least 18 credits must be earned in graduate courses (500 level). At least 12 credits must be earned in courses with the CE prefix. At least 20 credits must be earned at an established graduate campus of the University. All students are required to take CE 535 Integrated Project Management for Civil Engineering to fulfill the requirement for a culminating experience. All students are required to take the 1-credit CE 590 Colloquium and complete all requirements for Scholarship and Research Integrity (SARI) training. The M.Eng. degree is designed as a one-year master's degree program and students are required to start their degree in the Fall semester. The preferred plan of study is as follows:

- Fall semester: Fifteen credits of course work plus one credit of C E 590
- Spring semester: Fifteen credits of course work, including C E 535

Students entering the M.Eng. degree must select and declare an area of specialization, where each area has specific core course requirements. The three areas of specialization are Infrastructure, Transportation Systems, and Water and Environment.

The M.S. degree program is strongly oriented toward research. A thesis is required, and at least 6 credits of thesis research (C E 600 or 610) must be included in the candidate's academic course plan. A minimum of 31 graduate credits (400-level and above) are required, of which 20 must be earned at an established graduate campus of the University. A minimum of 24 credits of course work are required. A minimum of 12 credits of course work (400 and 500 level) must be completed in the major (courses prefixed C E). At least 18 credits in the 500 and 600 levels, combined, must be included in the program. Specific core courses are required depending on the specialization within the department. Students are not permitted to count audited credits toward the minimum credits required for the degree. All students are required to take the 1-credit CE 590 Colloquium and complete all requirements for Scholarship and Research Integrity (SARI) training. A candidate for the Ph.D. degree must pass the English proficiency and candidacy examinations, prepare and defend the thesis proposal as part of the oral comprehensive examination, and pass the final oral examination (thesis defense). Prior to completion of the Ph.D. program, the candidate must spend at least two consecutive semesters as a registered full-time student.

Continuous registration is required for all graduate students until the thesis (M.S.) or dissertation (Ph.D.) has been approved or course requirements have been satisfied (M.Eng.). See also Environmental Engineering.

Other Relevant Information

Students in this program may elect to participate in the dual-title degree program option in Operations Research for the Ph.D. and M.S. degrees. See also Environmental Engineering.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. International applicants who wish to be considered for a teaching assistantship must present an acceptable score (250-300 or 55-60) on the Test of Spoken English (TSE). The TSE can be taken in many countries, or at Penn State after arrival. The Department offers a number of graduate fellowships.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

CIVIL ENGINEERING (C E) course list

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06-000

Review Date: 04/14/2015

Faculty linked: 6/5/14; Department head updated: 9/24/15

Curriculum and Instruction (C I)

Program Home Page

ROSE MARY ZBIEK, *Director of Graduate Studies for Curriculum and Instruction*
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Degrees Conferred:

Ph.D., M.S., M.Ed.
Integrated B.S. in Special Education/M.Ed. in Curriculum and Instruction
Integrated B.S. in Biology/M.Ed. in Curriculum and Instruction
Integrated B.S. in Chemistry/M.Ed. in Curriculum and Instruction
Integrated B.S. in Mathematics/M.Ed. in Curriculum and Instruction

The Graduate Faculty

This program provides advanced professional preparation in the special areas of bilingual education, curriculum and supervision, early childhood education, elementary education, instructional leadership, language and literacy education, science education, social studies education, and mathematics education.

Admission Requirements

Scores from the Miller Analogies Test (MAT) or the Graduate Record Examinations (GRE) are required for admission. However, applicants for the doctoral degree are strongly encouraged to take the GRE. Moreover, students with excellent academic records who wish to be considered for fellowships, scholarships, and assistantships should take the GRE as a matter of course. At the discretion of an emphasis area, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATIONsection of the *Graduate Bulletin*. Each IUG might have additional requirements. Applications must be submitted via the Graduate School.

Students with appropriate course and professional backgrounds will be considered for admission, subject to the limitation of program facilities. For admission to the professional degree programs leading to the M.Ed., teaching or equivalent experience and at least 18 credits in education are recommended.

Master's Degree Requirements

M.Ed. and M.S. candidates are expected to complete C I 590(1) as well as a core of one course in each of three areas: learning/foundation (EDPSY 421, EDPSY 526, SCIED 552, C I 560), research (C I 400, C I 501, SCIED 558, STAT 500, EDSPY 400), and curriculum (C I 550, C&S 551, SCIED 550), or the equivalent. Through C I 590, students complete Scholarship and Academic Research Integrity (SARI) training. M.S. candidates are required to enroll in six credits of thesis research (C I 600 or 610) as they plan, conduct, and report a master's research thesis. M.Ed. candidates submit a professional master's culminating paper.

Doctoral Degree Requirements

The completion of a core of competencies in curriculum, instruction, and supervision with at least one course in each area is expected of Ph.D. candidates. Additional course are requirements include courses in an emphasis area, in quantitative or qualitative research methods, and in supporting courses that extend or complement the emphasis area. Emphasis areas include curriculum and supervision; early childhood education; language, literacy and culture; mathematics education; and science education. All students complete Scholarship and Academic Research Integrity (SARI) training through C I 590(1). In addition, each student completes all Degree Requirements of the Ph.D. and produces and defends a doctoral dissertation.

To meet residency requirements, the Ph.D. candidate must spend at least two consecutive semesters enrolled as a full-time student at the University Park campus. For additional requirements, please see the Graduate School's degree requirements for doctoral degrees: http://bulletins.psu.edu/graduate/degreerequirements/.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Integrated B.S. in Special Education/M.Ed. in Curriculum and Instruction

The Special Education and Curriculum and Instruction with emphasis in Language and Literacy Education Integrated Undergraduate-Graduate (SE/CI-LLED IUG) leading to certification as a Reading Specialist.

The Special Education and Curriculum Instruction with Emphasis in Language and Literacy Education Integrated Undergraduate-Graduate (SE/CI-LLED IUG) Degree Program consists of integration of required courses for a B.S. in Special Education with courses required for certification as a Reading Specialist and a M.Ed. in Curriculum and Instruction with emphasis in Language and Literacy Education (LLED). The five-year, SE/CI-LLED IUG is an option for highly qualified students seeking certification to teach Special Education in Pennsylvania in grades K-12. Students in this IUG will be taught how to design and deliver appropriate instruction based on individual needs and incorporate a variety of materials and strategies. Students are expected to complete courses required for the graduate level K-12 reading specialist integrated with their undergraduate experiences and coursework in Special Education and will complete a summer practicum in an on-campus reading clinic as well as a capstone Special Education teaching experience in their final semester. Completion of the IUG (along with earning a passing score on PDE required content tests) leads to a B.S. in Special Education, certification in special education and as a reading specialist in the state of Pennsylvania, and a M.Ed. in Curriculum and Instruction.

In addition to the admission requirements for the Curriculum and Instruction M.Ed., admission to the SE/CI-LLED IUG Reading Specialist program will be based upon having attained a minimum GPA of 3.5 in Special Education courses, with a grade of B or better in SPLED 412. Admission will be based on a recommendation by the Reading Specialist Program Coordinator in consultation with the Coordinator of Teacher Education in Special Education.

For the B.S./M.Ed. Degree in integrated Special Education B.S. and Curriculum and Instruction M.Ed., a minimum of 150 credits is required. Up to 12 credits can apply to both undergraduate and graduate degrees; half of these must be at the 500-level. Students who have been accepted into the IUG program but are unable to complete the M.Ed. in Curriculum and Instruction may be awarded the B.S. in Special Education after having completed all degree requirements for the B.S.

Master of Education (IUG in Special Education/Curriculum and Instruction)

CURRICULUM AND INSTRUCTION M.Ed. (30 credits)
(IUG in Special Education/Curriculum and Instruction)

Core Areas (9 credits - choose one course from each area):
Curriculum: CI 550
Research: CI 501 or EDPSY 400
Learning: EDPSY 421, EDPSY 545, or HDFS 429

Emphasis in Language and Literacy Education with Reading Specialist (* denotes required courses)
EDLDR 563, EDPSY 526, *LLED 500, *LLED 501, *LLED 550, *LLED 595A

Note: A Master's paper is required for completion of the M.Ed.

A passing score on the state-required Reading Specialist Exam (qualifying score of 570) is required for Reading Specialist certification.

Integrated B.S. in Biology/M.Ed. in Curriculum and Instruction

This Integrated Undergraduate/Graduate (IUG) degree program combines the Bachelor of Science in Biology with the Master of Education in Curriculum and Instruction, Science Education emphasis. The program is designed to be completed in five years. The program enables highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching. Most students in this option intend to seek Pennsylvania teacher certification, and a semester of student teaching comprises part of their final year of studies. The IUG may also be suitable for a student who does not need to become certified, because they intend to teach in a private secondary school or a non-formal educational setting; in such cases, the second graduate semester will be a program of studies determined through consultation with the graduate advisor and customized for the student's specific needs.

Students shall be admitted to the program no earlier than the beginning of the third semester of undergraduate study and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Application materials to be submitted include a current undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master's study to the graduate program in Curriculum and Instruction, Science Education emphasis area. In addition, a minimum GPA of 3.5 in Science and Education courses is required. Admission will be based on a recommendation by the Science Education Program Coordinator in consultation with the Associate Chair for Undergraduate Education in the Biology Department. Additional details about the graduate application procedure can be found above in the section, "Admissions Requirements." Applications must be submitted via the Graduate School.

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is usually devoted to full time student teaching. Additional graduate coursework is completed in a second semester. Courses required for the M.Ed. degree include a course in learning theory (e.g., SCIED 552(3)), a course in research methods (e.g., SCIED 558(3)), a course in curriculum (e.g., SCIED 550), and a course in research ethics (C I 590(1)).

Students pursuing teacher certification (the usual option) additionally complete a 500-level EDTHP course (3), C I 595(6), and C I 496(6). SCIED 558(3), C I 496(6), and C I 595(6) comprise the student-teaching semester course load. Students who are not pursuing teacher certification substitute 15 credits of other 400- or 500-level coursework for the student teaching semester; those courses are selected in consultation with their advisors, in order to address the students' specific career aspirations.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCIED 411(3), SCIED 412(3), and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level. In addition to the double-counted courses taken during the first four years, the timeline for the M.Ed. is one year that includes these specified courses. The program is designed to be finished in five years.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include C I 280(3), SPLED 400(3), and C I 495C(3). Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees, as described in the undergraduate and graduate *Bulletins*. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Biology content exam may be awarded both of his or her earned degrees.

Integrated B.S. in Chemistry/M.Ed. in Curriculum and Instruction

These Integrated Undergraduate/Graduate (IUG) degree programs combine the Bachelor of Science in Chemistry with the Master of Education in Curriculum and Instruction, Science Education emphasis. The programs are designed to be completed in five years. The programs enable highly qualified and motivated students to delve deeply into a scientific content area and to pursue graduate level preparation in the theory and practice of teaching.

Students shall be admitted to the program no earlier than the beginning of the third semester of undergraduate study and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Application materials to be submitted include an undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master's study to the graduate program in Curriculum and Instruction, Science Education emphasis area. In addition, a minimum GPA of 3.5 in Science and Education courses is required. Admission will be based on a recommendation by the Science Education Program Coordinator in consultation with the Associate Chair for Undergraduate Education in the Chemistry Department. Additional details about the graduate application procedure can be found above in the section, "Admissions Requirements." Applications must be submitted via the Graduate School.

IUG students fulfill all degree requirements for a B.S. in the Eberly College of Science. If a student chooses to leave the program without completing M.Ed. requirements, he or she may still receive the relevant B.S. degree, after all B.S. requirements are completed.

For the M.Ed. degree, students must earn at least 30 credits at the 400/500 level, at least 18 of them at the 500 level. One graduate semester is devoted to full time student teaching. Additional graduate coursework is completed in a second graduate semester. Courses required for the M.Ed. degree include SCIED 552(3), SCIED 558(3), a 500-level EDTHP course (3), C I 590(1), C I 595(12), and a 500-level course in curriculum (e.g., SCIED 550(3)). Of these, SCIED 558(3) and C I 595(12) comprise the student teaching semester course load.

124 credits are required for the B.S. degree and 30 credits for the M.Ed. degree. The following courses may be double-counted toward both the B.S. and the M.Ed. degrees, up to a limit of 12 credits: EDTHP 500-level courses (3), SCIED 411(3) & SCIED 412(3), and SCIED 500-level courses. Note that at least 50% of credits proposed for double-counting must be at the 500 level. In addition to the double-counted courses taken during the first four years, the timeline for the M.Ed. is one year that includes these specified courses. The program is designed to be finished in five years.

There are a number of other requirements for Pennsylvania teacher certification, including state-required tests and clearances, as well as coursework that can be completed at either the undergraduate or graduate level. Some courses, not enumerated above, that are usually required to satisfy teacher certification requirements include C I 280(3), SPLED 400(3), and C I 495C(3). Please note that changes in Pennsylvania certification requirements are common; students should check the Certification FAQ page at the Penn State Science Education website for updates and clarification about the specific requirements that affect them, based on their admission date to the IUG program option. Note also that students in the IUG program option are not required to complete all Penn State teacher certification requirements in order to receive their B.S. and M.Ed. degrees, as long as they have completed the requirements for those degrees. For example, a student who has completed all degree requirements but has not yet received a score for the Pennsylvania-required Chemistry content exam may be awarded both of his or her earned degrees.

Integrated B.S. in Mathematics/M.Ed. in Curriculum and Instruction

The Mathematics and Curriculum Instruction with Emphasis in Mathematics Education Integrated Undergraduate-Graduate (MATH/CI-MTHED IUG) Degree Program consists of the integration of required courses for a B.S. in Mathematics Systems Analysis Option, a M.Ed. in Curriculum and Instruction with emphasis in Mathematics Education (MTHED), and Pennsylvania certification for Mathematics Grades 7-12.

The MATH/CI-MTHED IUG is a five-year program for highly qualified students seeking to teach mathematics at the secondary level. A hallmark of the program is its strong statistics strand in combination with its mathematics core. In addition to developing advanced understanding of mathematics and statistics, students will learn how to develop and implement lessons and to incorporate technology and research in instruction designed to reach all students.

Students are expected to complete courses required for the certification program integrated with their undergraduate and graduate experiences and will likely complete one summer in residence. Completion of the IUG (along with earning a passing score on Pennsylvania Department of Education required test[s]) leads to a B.S. in Mathematics, certification in Mathematics Grades 7-12, and a M.Ed. in Curriculum and Instruction.

Students shall be admitted to the program no earlier than the beginning of the third semester of undergraduate study and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Admission to the MATH/CI-MTHED IUG Mathematics Grades 7-12 program will be based upon having attained a minimum GPA of 3.5 after completing at least 60 credits of the program, with a grade of C or better in all courses. Application materials to be submitted include a current undergraduate transcript, statement of purpose, draft plan of study, two letters of recommendation, and concurrent submission of an application for master's study to the graduate program in Curriculum and Instruction, Mathematics Education emphasis area. Admission will be based on a recommendation by the Mathematics Department in consultation with the Mathematics Education faculty in the Department of Curriculum and Instruction.

For the B.S./M.Ed. Degree in integrated Mathematics B.S. and Curriculum and Instruction M.Ed., 129 credits are required for the B.S. degree, 30 credits are required for the M.Ed., and 41 credits are required for field experiences and additional courses required for secondary mathematics certification in Pennsylvania. A maximum of 12 credits, at least half of which are at the 500-level, may be dual-counted toward the B.S. and M.Ed. The following courses can be used in both the B.S. and the M.Ed. degrees: two MATH 400-level electives, STAT 501, STAT 502. Students can complete the B.S. in Mathematics and not advance to the M.Ed. Curriculum and Instruction degree if they desire. Students who have been accepted into the IUG program but are unable to complete the M.Ed. in Curriculum and Instruction may be awarded the B.S. in Mathematics after having completed all degree requirements for the B.S. The M.Ed. requires one full year beyond the B.S., including student teaching in the graduate year.

Master of Education

CURRICULUM AND INSTRUCTION M.Ed. (30 credits)
(IUG in Mathematics/Curriculum and Instruction)

Core Areas (9 credits - choose one course from each area): ?Curriculum: CI 550 or equivalent;
Research: STAT 500 or equivalent; Learning: EDPSY 421 or equivalent

Emphasis in Mathematics Education (* denotes required courses) includes *CI 590; *STAT 501; MATH 485, MATH 486, or MATH/CMPSC 451; *MTHED 511 or equivalent; *MTHED 524; at least one additional 400-level MATH course other than 401, 405, 406, 441, 470, or 471; at least one additional 400- or 500-level MTHED course.

Note: A Master's paper is required for completion of the M.Ed.

A passing score on the state-required Mathematics Content Exam is required for Mathematics Grades 7-12 certification.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

CURRICULUM AND INSTRUCTION (C I) course list

CURRICULUM AND SUPERVISION (C & S) course list

EARLY CHILDHOOD EDUCATION (E C E) course list

LANGUAGE AND LITERACY EDUCATION (LL ED) course list

MATHEMATICS EDUCATION (MTHED) course list

SCIENCE EDUCATION (SCIED) course list

SOCIAL STUDIES EDUCATION (SS ED) course list

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-01-141

Review Date: 08/23/2016

Faculty linked: 6/5/14; Head updated: 9/24/15

Criminology (CRIM)

Program Home Page

JOHN ICELAND, *Head of the Department of Sociology*
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Degrees Conferred:

Ph.D., M.A.

The Graduate Faculty

The Program

The graduate program in Criminology is for students seeking the Ph.D. degree. Students may either enter the program with an M.A. degree or earn that degree en route to the PhD program. The program offers an advanced education on various aspects of criminology to persons interested in research careers in academia and public service.

The graduate program emphasizes theory and research on crime and justice, research and statistical methodology, and substantive knowledge about crime and its control.

Admission Requirements

Applications from students with either the B.A. or M.A. degree will be accepted through early January for admission in the fall of the following academic year. Selection is based on transcripts, three letters of recommendation from persons familiar with the applicant's academic performance, a statement of goals, a sample of written work such as a term paper, and Graduate Record Examinations (GRE) verbal, quantitative, and writing scores.

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

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

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

M.A. Degree Requirements

Students entering the program with the B.A. degree will first earn the M.A. degree. Thirty-seven credits of course work at the 400 level or higher, with a minimum of 18 credits at the 500 or 800 level, and a master's thesis, including 6 credits of thesis research, are required for the M.A. The course work includes a proseminar, an introduction to graduate studies seminar, a sequence of methods and statistics courses; a criminological theory course; a course in the organization and criminal justice system; and additional 500-level substantive criminology courses selected in consultation with a student's faculty committee.

Ph.D. Degree Requirements

For the Ph.D. 30 credits beyond the M.A. are required, no more than three of which may be for Individual Studies. All Ph.D. candidates also must have completed all courses required for the M.A. degree or their equivalent. The 30 credits beyond the M.A. must include 6 hours of Criminology seminars and 12 hours of elective seminars, all of which should be selected in consultation with the Ph.D. committee. Seminar requirements are not fulfilled by Individual Studies credits.

Candidacy Examination

A candidacy exam is required of all students seeking the Ph.D., after a master's degree has been earned. Students admitted with a master's degree will stand for this exam in the second semester of full-time study.

Language Requirement

The program in Criminology has no formal foreign language or communication requirement

Doctoral Committee Composition

The candidate's Ph.D. studies are conducted under the supervision of a doctoral committee, composed of at least four members of the Graduate Faculty, at least two of whom must be Criminology tenure-line faculty and one of whom must be from outside the Criminology Program and Sociology Department and must represent a field outside the candidate's major field of study. One Criminology tenure-line faculty member is designated chair of the Ph.D. committee; ordinarily this person also serves as general adviser and director of the dissertation.

Comprehensive Examination

After completing all course work, doctoral candidates must pass a comprehensive examination that will be administered by the student's doctoral committee. At the discretion of the committee, examination content will include material on: (1) general criminological theory, (2) criminal justice/law, (3) research methods/statistics, and (4) the student's area of specialization.

Dissertation and Dissertation Defense

In order to earn the Ph.D., students are required to write and orally defend a dissertation on a topic that reflects their original research and education.

Student Aid

All students admitted to the program are supported with stipends and tuition waivers for either four years (students entering with a master's degree) or five years (students entering with a bachelor's degree). Support may be in the form of research assistantships or teaching assistantships, with most students receiving a combination of types of support across their graduate careers.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

CRIME, LAW, AND JUSTICE (C L J) course list

Last Revised by the Department: Summe rSession 2014

Blue Sheet Item #: 42-07-000

Review Date: 0610/2014

Faculty linked: 6/5/14

Classics and Ancient Mediterranean Studies (CAMS)

Program Home Page

MARK MUNN, *Department Head*
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Degrees Conferred

Students electing this program through participating departments will earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (graduate program name) and Classics and Ancient Mediterranean Studies.

The following graduate program offers a dual degree in Classics and Mediterranean Studies: Philosophy

The Graduate Faculty

Classics and Ancient Mediterranean Studies faculty include individuals with budgeted appointments in Classics and Ancient Mediterranean Studies and individuals with courtesy joint appointments.

The Program

Dual-title degrees grounded both in CAMS and a given discipline will acknowledge and foster interdisciplinary scholarship. This dual-title degree program will increase the intellectual rigor, breadth, and depth of graduate work in a participating program through immersion in the disciplinary fields covered by the Department of Classics and Ancient Mediterranean Studies: the literatures and languages of ancient Mediterranean societies; their history, social and material cultures, and their reception by other cultures.

This dual-title program will thus provide a context in which students will learn how to synthesize knowledge within and across traditional disciplinary boundaries. In addition, this dual-title degree program will provide qualified students opportunities for instructional training encouraging an interdisciplinary approach to teaching.

The primary advantages of this dual-title program include the intellectual and academic advantages and benefits of interdisciplinary study, as well as the enhancement of the reputation of the departments concerned through an innovative program, leading to recruitment of highly qualified graduate students, and an improved placement of doctoral graduates in highly-competitive humanities fields.

Admission Requirements

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the CAMS dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CAMS dual-title program. Doctoral students must apply for enrollment into the dual-title degree program in CAMS prior to obtaining candidacy in their home department.

Applicants to this dual-title degree program should have a junior/senior cumulative average of at least 3.30 (on a 4.00 scale) and appropriate academic preparation. Preference will be given to those candidates who have an academic record that demonstrates expertise in a field relevant to ancient Mediterranean studies and proficiency at an intermediate level (e.g., 3 semesters of study) in one or more ancient languages. Where applicable, a minimum GPA of 3.5 (on a 4.00 scale) is requisite for graduate work previously undertaken. Prospective students seeking admission to this dual-title degree program are required to write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary research in the participating program and the disciplines and fields included in CAMS.

Ph.D. Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in CAMS, listed below.

This dual-title degree will require CAMS-related course work, normally including additional course work in ancient languages, additional components to the comprehensive examinations, and the completion of a CAMS-related doctoral dissertation. A CAMS graduate supervisory committee, chaired by a CAMS faculty member closely related to the student's field of interest, will supervise the graduate study of each student accepted into this dual-title program until all CAMS-related coursework is completed. Students will be expected to attend and participate actively in the CAMS regularly scheduled colloquia.

Coursework

15 credits of CAMS-related coursework at the 400 or 500 level or above.
3 of these credits will come from CAMS 592 (Proseminar).
At least 3 credits will come from CAMS 593 (Research Seminar). The remainder may come from CAMS courses or courses relevant to the student's research interests, as approved by the student's doctoral adviser and the CAMS program director of graduate studies. Unless exempted by the student's doctoral committee, at least 6 of these credits should be in an ancient language. No more than 6 credits can come from 400-level courses.

Candidacy

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by the cooperating department. In addition, the student will be required to present a portfolio of work in CAMS to their committee. Such a portfolio would include a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's work in CAMS.

The candidacy examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the CAMS program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a CAMS dual-title Ph.D. student must include at least one member of the CAMS Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in CAMS, the member of the committee representing CAMS must be appointed as co-chair. The CAMS representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

English Competency Requirements

The student will fulfill the English Competency requirements specified by the participating program.

Modern Language Reading Proficiency Requirements

Students will be expected to acquire and demonstrate reading proficiency in those modern foreign languages (e.g., but not exclusively, French, German, Italian) appropriate to their research interests, as identified in consultation with the student's doctoral committee.

Dissertation

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in both their primary graduate program and CAMS. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships are available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500-699 and 800-899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate language requirements when taken by graduate students. Courses below the 400 level do not qualify. A graduate student may register for or audit these lower-level courses in order to make up deficiencies, but not to meet requirements for an advanced (graduate) degree.

CLASSICS AND ANCIENT MEDITERRANEAN (CAMS) course list

Last Revised by the Department: Fall Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/17

Faculty linked: 6/5/14

Community and Economic Development (CEDEV)

Program Home Page

C. DANIEL AZZARA , *Interim Head of the Department of Agricultural Economics, Sociology, and Education*
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814-865-5461; cedevinfo@psu.edu

Degree Conferred:

M.P.S.

The Graduate Faculty

The Program

The Master of Professional Studies in Community and Economic Development (MPS CEDEV) is a 30-credit terminal master's degree program that emphasizes an interdisciplinary approach to community and economic development. The program balances theory and practice. Courses are taught in MPS CEDEV use a blend of web technology, print, and other media to provide an effective balance of flexibility and interaction. Individuals who currently work with, or are interested in working with communities, community organizations and stakeholders, or on a range of community and economic development issues at the state or national levels would benefit from this program. The MPS CEDEV program requires the completion of seven core courses (21 credits) in which students learn and apply sociological and economic concepts to issues in community and economic development. the courses offer examples and opportunities to apply theses concepts to real issues facing communities and rural regions. Two of the core courses (6 credits) emphasize statistical methods and tools and techniques useful to practitioners in community and economic development, or to work toward additional certifications. All students are required to complete a Master's paper (at least 3 credits) that integrates theory and practice.

Instruction in the MPS CEDEV program emphasizes key themes that include economic planning and development; municipal finance, land use ad population change; community structure, organization and process; leadership; tools and techniques in community development; community decision-making and capacity building.

Students in Community and Economic Development gain a broad understanding of the dynamics of communities and their social, economic, and political systems. The program emphasizes teaching the theory, skills, and tools that allow practitioners to address the important issues in development practice.

Graduates of the Community and Economic Development program have a wide range of career opportunities, including: local and state government, planning commissions, major corporations, non-governmental organizations, and consulting firms.

Admission Requirements

Students with a 3.00 average (on a 4.00 scale) for the most recent two years of college/university education, or with an advanced degree, and with appropriate course and experiential backgrounds will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, experience, abilities, and interests. The best-qualified applicants will be accepted to the graduate program.

Admission requirements include the following:

- Either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.
- Statement of purpose describing professional experiences and education, career goals, and how the MPS program will enable the applicant to meet their objectives
- Current resume
- Three letters of recommendation
- Two sets of official transcripts from educational institutions attended for undergraduate or graduate degree work
- Test of English as a Foreign Language (TOEFL) score, if applicable. The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions listed below The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Purposes) and attainment of a grade of B or higher. The minimum composite score for the IELTS is 6.5.

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

- Non-refundable application fee

To begin your application, please visit http://www.gradschool.psu.edu/. On the "Campus, Major, Degree & Semester" page select "WORLD CAMPUS" as the campus and "COMMUNITY AND ECONOMIC DEVELOPMENT" as the major.

Scores from the Graduate Record Examinations (GRE) are not required for admission to the MPS CEDEV program. Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Prerequisites for the master's program include 12 credits in rural sociology, sociology, agricultural economics, or other social and behavioral sciences at the discretion of the graduate program. If the entering student does not have these prerequisites, they must be made up at the University during the early part of the master's program.

Degree Requirements

The professional Master's degree requires 30 credits including a final integrative assessment/experience, referred to by the program as a Master's paper. All students complete the required MPS CEDEV core program of community and economic development courses, statistics, and methods. The MPS CEDEV courses consist of CEDEV 430, CEDEV 452, CEDEV 500, CEDEV 505, and CEDEV 509. The statistics, methods, and techniques requirement includes STAT 500 (or equivalent), CEDEV 575, and CEDEV 580. A Master's paper, such as an integrative paper, project, or internship is required where the student demonstrates the capability to integrate and apply concepts, principles, analytical techniques and interpretation skills learned in the program to a real problem faced by a community or community organization. Choice of electives will be based on a plan of study worked out between the student and faculty adviser. There is no foreign language requirement for the degree; however, students planning to work in multi-cultural or international settings are encouraged to gain competency in an appropriate language(s). A total of 18 credits must be 500 level or higher, with at least 6 credits of 500-level course work. This Graduate Council requirement is met through the required courses and the Master's paper credits.

Student Aid

Student aid is described in the STUDENT AID section of the *Graduate Bulletin*. Graduate assistantships, fellowships, and traineeships are not available for the CEDEV program.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMMUNITY AND ECONOMIC DEVELOPMENT (CEDEV) course list

Last Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-05

Review Date: 02/25/2014

Faculty linked: 8/14/14

Civil Engineering

School of Science, Engineering, and Technology
Penn State Harrisburg - W-236 Olmsted Building
777 West Harrisburg Pike, Middletown, PA 17057
(717) 948-6127

Degree Conferred: M.S.

The Program

Penn State Harrisburg (PSH) is located within a short commute from York, Lancaster, Carlisle, Reading, and Harrisburg, where many large civil engineering firms are located. These firms focus on structural design, construction management, transportation design, treatment plant design, and water-resources engineering. The Master of Science in Civil Engineering degree program is designed to provide support for these firms and their employees who want to enhance their design skills and update their knowledge above the level taught at the undergraduate level. This program also will support changes in the professional licensure for civil engineers, if they occur.

The program is accessible to engineering professionals who wish to pursue advanced studies without giving up current employment. The program may be completed on a full-time or part-time basis. Classes are scheduled weekly in three-hour evening sessions, offering a convenient format for career professionals seeking to enroll on part-time basis. Whenever possible, the program will take advantage of the specialized equipment and facilities available in the local firms to enhance the training of M.S. CE program students.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Admission into the Master of Science (M.S.) Civil Engineering program will be granted only to candidates who demonstrate high potential for success in graduate studies. Applicants should have undergraduate degrees in engineering or technology-related fields from an accredited university and must meet the admission requirements as set by Penn State's Graduate School. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the GRE are required for admission.

Applicants should submit the following:

- a completed Graduate School online application with the application fee;
- official transcripts from all post-secondary institutions attended;
- three (3) letters of professional recommendations from individuals who can evaluate the applicant's potential;
- a personal statement of professional interest, goals, and experience;
- test scores from the Graduate Record Examination (GRE); and
- a statement of interest in a graduate assistantship, if desired (full-time study required).

English Proficiency

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

All graduate students in Civil Engineering are required to adhere to the requirements of the Graduate School, as found in the Graduate Degree Programs Bulletin. The requirements of the Graduate School, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduate students pursuing the M.S. in Civil Engineering degree. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student's personal responsibility to see that all requirements are satisfied.

The M.S. CE program at PSH is structured to take full advantage of the specialty areas of expertise of the CE Graduate Faculty. The program requires 31 credits at the 400, 500, 600, or 800 level, including 24 course credits with at least 12 credits at the 500 level, one colloquium credit (CE 590), and six thesis credits (CE 600 or 610). M.S. CE students are required to take an advanced math or statistics course (EMCH 524A or STAT 500). Then students will take 12 credits of civil engineering courses, selected from offerings in structural, transportation, and water resources, with nine (9) credit hours required at the 500-level. Students will take nine (9) additional elective credits at either the 400- or 500-level. These electives may be taken from civil engineering courses or courses offered by other departments that meet the objective of the M.S. CE degree. Students can work with their adviser to select courses that either focus on a specific area of civil engineering or that provide a robust in-depth background of multiple areas of civil engineering. A maximum of four 400-level courses (12 credits) may be taken for the M.S. CE degree.

Original research, usually requiring at least two semesters of work (up to 6 credits), is expected for a thesis. The work should be an in-depth investigation intended to extend the state of knowledge in a specialty area. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. A maximum of three credits of independent study (CE 596) may be applied towards the M.S. CE degree program, but the undergraduate individual study course (CE 496) will not count towards program credit requirements.

During the first year of enrollment, graduate students will be required to complete an online Responsible Conduct of Research (RCR) training program. This is part of the SARI (Scholarship and Research Integrity) program at Penn State which is designed to offer graduate students comprehensive, multilevel training in the responsible conduct of research. The Office for Research Protections (ORP) will provide the conduit to this training via the SARI Resource Portal on the ORP website (www.research.psu.edu/orp/sari/).

Graduate students will also be required to engage in an additional 5 hours of discussion-based RCR education prior to degree completion. This may be set up as an integral part of the graduate colloquium.

All students are expected to complete one credit of colloquium (CE 590) during the first two semesters of study. Degree requirements must be completed during a six-year period.

Penn State Harrisburg's M.S. CE program is distinct and independent of the M.S. CE program offered at the University Park campus.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Chemical Engineering (CH E)

Program Home Page

PHILLIP E. SAVAGE, *Head of the Department of Chemical Engineering*
119 Greenberg Complex
814-865-2574

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

Course offerings and research facilities are available in: bioprocessing, protein engineering, energy and alternative energy, catalysis and kinetics, fluid mechanics, nanotechnology, polymer science and engineering, process control, molecular simulation, systems biology and optimization.

Admission Requirements

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Students should be a graduate of an accredited program in chemical engineering. Graduates with other accredited engineering, mathematics, or physical science majors may be admitted, though alternative program schedules may be required as students will be required to demonstrate graduate level competency in the core chemical engineering disciplines of thermodynamics, reaction and reactor kinetics, and transport. This may include making up of undergraduate deficiencies without graduate credit. Students with a 3.00 grade-point average or above (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission.

Master's Degree Requirements

Two tracks are available in the Chemical Engineering MS program, a thesis and a non-thesis track. A minimum of 18 course credits (30 credits total) is required of the thesis track, which must also include completion of a research thesis and oral defense of the thesis. A minimum of 21 course credits (30 credits total) is required of the non-thesis track. This track also includes a 7 credits research project during the spring and summer that includes a culminating written paper and presentation. All MS students complete a set of core-courses in the fundamental chemical engineering disciplines of thermodynamics, reaction and reactor kinetics, and transport. There is no communication or language requirement. Continuous registration is required for all graduate students until the thesis or final paper is approved.

Doctoral Degree Requirements

A minimum of 30 graduate course credits is required and must include a minimum of 15 credits of 500-series Chemical Engineering courses taken at the University. There is no communication or language requirement. The comprehensive examination consists of a written research proposal or project defended orally after it has been accepted.

Continuous registration is required for all graduate students until the thesis is approved.

Other Relevant Information

Programs leading to a minor in Chemical Engineering are available to both M.S. and Ph.D. candidates who wish to complement studies in their major fields with a broader knowledge of chemical thermodynamics, transport phenomena, and reactor design.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

CHEMICAL ENGINEERING (CH E) course list

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06

Review Date: 04/14/2015

Faculty linked: 6/5/14

Chemistry (CHEM)

Program Home Page

Tom Mallouk, *Head of the Department*
101 Chemistry Research Building
814-865-6553

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

The Ph.D. program in Chemistry provides students with a broad background in chemistry and intensive research experience culminating in the preparation of a formal thesis. The goal of the program is to prepare students for a variety of careers in academia, government, or industry. The exceptionally high quality of our laboratory and computer facilities enables us to provide students with outstanding research opportunities. Distinguished visiting scholars conduct informal discussions each week at a departmental colloquium.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examination (GRE) are required for admission. In extenuating circumstances, a student may be admitted at the discretion of the program for graduate study without these scores.

For admission, at least integral calculus plus one year's work in general physics, organic chemistry, physical chemistry, and either analytical or inorganic chemistry are normally required. Students who have appropriate course backgrounds and who present a 2.50 average (on a 4.00 scale) in all undergraduate courses in chemistry, physics, and mathematics will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 2.50 grade-point average may be made for students with special backgrounds, abilities, and interests.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits at the 400, 500, or 800 level is required, with at least 18 credits at the 500 and 600 level, combined. CHEM 431W, CHEM 450, CHEM 452, CHEM 457, CHEM 494, and CHEM 500 cannot be applied towards the M.S. degree requirements. Students who choose to complete a scholarly paper as the culminating experience must complete 18 credits at the 500 level.

M.S. students must complete either a thesis or a scholarly paper as the culminating experience for the degree. Students who choose to write a thesis must defend the thesis at an oral examination. The thesis will be accomplished under the sponsorship of a faculty member, and the candidate must take 12 credits of CHEM 600 in conjunction with the thesis. A maximum of 6 credits of CHEM 600 may be awarded a quality grade. The thesis must be approved by a committee of at least three faculty members, one of whom will be the candidate's sponsor. The thesis must also be accepted by the head of the graduate program and the Graduate School, and the student must pass the thesis defense. Students who choose to complete a scholarly paper enroll in CHEM 589 (12 credits).

Examinations in analytical, biological, inorganic, organic, and physical chemistry will be given to all new students upon entrance in the fall semester. These exams cover subject matter at the level of the basic courses offered for the B.S. degree in Chemistry at Penn State. For certification as an M.S. candidate, proficiency in two areas is required. Such proficiency may be demonstrated either by (1) passing the area examination upon entrance, or (2) obtaining a grade-point equivalent of 3.0 in at least 3 credits of 500-level course work in the area. The courses used to fulfill this latter option will be designated by the graduate counseling committee. This course work must be completed successfully during the student's first two semesters of residence.

A final oral examination will be administered by a committee consisting of the student's research preceptor and two other faculty members. This examination is scheduled after the M.S. thesis has been completed.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Candidates for the Ph.D. degree in Chemistry must meet the following requirements established by the department faculty.

A Ph.D. candidate must take a minimum of five 3-credit courses in chemistry at the 400 or 500 level. The candidate's doctoral committee may require additional specific courses.

Examinations in analytical, biological, inorganic, organic, and physical chemistry will be given to all new students upon entrance in the fall semester. These exams cover subject matter at the level of the basic courses offered for the B.S. degree in Chemistry at Penn State. As a part of the requirements for certification as a Ph.D. candidate, each student will be expected to demonstrate proficiency in three areas of chemistry. Such proficiency may be demonstrated either by (a) passing the area examination upon entrance, or (b) obtaining a grade-point equivalent of 3.0 in at least 3 credits of 500-level course work in the area. The courses used to fulfill this latter option will be designated by the graduate counseling committee. This course work must be completed successfully during the student's first two semesters of residence.

In order to qualify for the oral comprehensive examination, a Ph.D. candidate must first obtain a grade of 3.0 or better on 4 credits of CHEM 500 (by writing the requisite number of seminar reports, proposals, and presenting in an area seminar).

A Ph.D. candidate must pass the oral comprehensive examination during his or her first two and one-half years of residency.

Every Ph.D. candidate shall present at least one area or department seminar during the course of residency.

A final oral examination based on a defense of the doctoral thesis is required of all candidates. This exam is given as a formal public seminar with a subsequent closed meeting with the doctoral committee. To earn the Ph.D. degree, doctoral students must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass the final oral examination (the dissertation defense).

Biogeochemistry Dual-Title Degree Program

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major

degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Students must apply and be admitted to the graduate program in Chemistry and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page. Doctoral students must be admitted into the dual-title degree program in Biogeochemistry prior to taking the candidacy examination in their primary graduate program." The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Chemistry and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Chemistry and Biogeochemistry. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees , the doctoral committee of a Chemistry and Biogeochemistry dual-title Ph.D. student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Chemistry and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Other Relevant Information

All candidates for advanced degrees must schedule CHEM 602, Supervised Experience in College Teaching, for at least 1 credit for at least one semester; however, this 1 credit cannot be counted towards the minimum credits required for the degree.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. It is important to note that department policy limits financial support from department funds to the first two years of graduate study of an M.S. candidate and to the first five years of graduate study of a Ph.D. candidate. Financial support beyond these periods is permitted from other than department funds, e.g., a research assistantship funded from an individual faculty member's research grant(s). Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

CHEMISTRY (CHEM) course list

Last Revised by the Department: Fall 2018

Blue Sheet Item #: 47-01-000

Review Date: 6/28/2018

UCA Revision#1: 11/8/06

Faculty linked: 6/5/14

Comparative and International Education (CI ED)

Program Home Page

DANA MITRA, Director of Graduate Studies
302A Rackley Building
814-863-7020

Degrees Conferred:

Students earn a dual-title degree in this option through participating programs at either the Ph.D. (or D.Ed.) or the M.A., M.S., M.Ed. level. Students receive a degree which lists their major program and Comparative and International Education.

The following graduate programs offer dual degrees in Comparative and International Education: Adult Education; Agricultural and Extension Education;Curriculum and Instruction; Counselor Education; Educational Leadership; Educational Psychology; Educational Theory and Policy; Entomology; Higher Education; Learning, Design, and Technology; School Psychology; Special Education; and Workforce Education and Development.

The Graduate Faculty

The Program

The Comparative and International Education dual-title degree program option is administered by the Committee on Comparative and International Education. The committee maintains program definition, identifies courses appropriate to the option, develops and administers the program's comprehensive examination, and recommends policy and procedures for the program's operation to the dean of the College of Education and to the dean of the Graduate School. Members of the committee also chair or co-chair the dissertation committees for students electing the dual-title doctoral degree.

The dual-title degree program is offered through participating programs in the College of Education and, where appropriate, other graduate programs in the University. The option enables students from several graduate programs to gain the perspectives, techniques, and methodologies of comparative and international education, while maintaining a close association with program areas of application. Comparative and international education is a field devoted to the systematic analysis of the operation and effects of the world's education systems. For admission to pursue a dual-title degree under this program, a student must apply to (1) the Graduate School; (2) one of the participating graduate major programs; and (3) the Committee on Comparative and International Education.

Admission Requirements

In addition to materials submitted for admission to the major program, candidates to the dual-title degree program will be required to provide a writing sample, and to submit a written personal statement indicating the career goals they hope to serve by attaining a Comparative and International Education degree.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the graduate major programs in which they are enrolled, in addition to the minimum requirements of the Comparative and International Education program.

For the M.A., M.S., or M.Ed. dual-title degree in Comparative and International Education, the minimum course requirements are: 3 credits in the required Proseminar in Comparative and International Education; 6 credits in advanced Comparative and International Education courses; and 3 credits in Comparative and International Education content courses.

A master's thesis or master's paper if so required by the student's graduate major program, must include one reader who is a member of the Committee on Comparative and International Education.

The minimum course requirements for the Ph.D. (or D.Ed.) dual-title degree in Comparative and International Education are: 3 credits in the Proseminar in Comparative and International Education; 6 credits in advanced-Comparative and International Education courses; 12 credits in Comparative and International Education content courses or courses with comparative or international content; and 6 credits in research methods. Students are expected to be fluent in reading, writing, and speaking English, and must demonstrate competency in reading a language other than English, preferably a language relevant to a country or geographic area they propose to study. (This foreign language requirement can be satisfied by passing the appropriate ETS Language Achievement Test, or by passing the appropriate Penn State foreign language course.) A minimum of 18 credits must be 500-level course, and particular courses may satisfy both the graduate major program requirements and those in the Comparative and International Education program. Candidates for the dual-title Ph.D. or D. Ed. in Comparative and International Education will also be required to pass a comprehensive examination from the student's participating program, and at least one CI ED faculty member participating in the examination who will integrate relevant comparative and/or international education knowledge into the student's comprehensive examination.

A Ph.D. (or D.Ed.) minor program in Comparative and International Education is available to doctoral students who find it desirable to include the perspectives and methodologies of Comparative and International Education in their programs and have been approved to do so by their doctoral committees. To qualify for a minor in Comparative and International Education, students must satisfy the requirements of their graduate major programs, and meet the following minimum requirements: 3 credits in the Proseminar in Comparative and International Education; 3 credits in a Comparative and International Education course; and 9 credits in Comparative and International Education content courses (or advanced courses) or in courses with comparative or international content offered outside the College of Education.

The doctoral dissertation committee of a Ph.D. (or D.Ed.) dual-title degree student is recommended, in conjunction with the Comparative and International Education committee, by the graduate major program granting the degree. The chair and at least two members of a doctoral committee must be members of the graduate faculty. The chair or co-chair of the dissertation committee must be a member of the Comparative and International Education committee.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMPARATIVE AND INTERNATIONAL EDUCATION (CI ED) course list

Lasted Revised by the Department: Summer Session 2014

Blue Sheet Item #: 43-01-000

Review Date: 08/19/2014

Faculty linked: 6/5/14

Criminal Justice Policy and Administration

Jeff Ulmer, Professor of Sociology and Criminology
211 Oswald Tower
University Park, PA 16802
814-865-6429

Degree Conferred

Master of Professional Studies (M.P.S.)

The Graduate Faculty

Master of Professional Studies in Criminal Justice Policy and Administration

The M.P.S. in CJPA degree program capitalizes on Penn State's strengths as a premier research institution to provide an advanced professional degree in criminal justice policy and administration. Combining theory and applied research, this degree allows professionals and students entering the work force to gain graduate level expertise in this growing, applied field of study. The degree caters to professionals in criminal justice (broadly, policing, courts, corrections, probation/parole, and treatment), government, administration, and offender or victim services. The 30-credit program of study emphasizes social science perspectives to the study of criminal justice. The degree consists of core courses (18 credits) and allows students to choose from among several electives.

Admission Requirements

Educational Background

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Students who do not have an undergraduate GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Work experience will be considered for applicants who have more than two years of experience in a related field.

Core Application Packet

- Completed official online Graduate School application and payment of a nonrefundable application fee.
- Statement of purpose: a 2-3 page essay articulating career and educational goals that demonstrate the student's written communication skills and describes their background with basic statistics education and/or usage.
- A current curriculum vitae (vita) or résumé.
- Three letters of recommendation that attest to the student's readiness for graduate study. Letters must be submitted through the online application system. Within the online application you will be asked to enter the names and email addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via email asking them to complete a brief form that will serve as your recommendation. Please inform all recommenders they must submit the form in order for your application to be complete.
- Official transcripts from each institution attended.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Total required credits for the M.P.S.: 30 credits. At least 18 credits must be completed at the 500 level or 800 level, with at least 6 credits at the 500 level.

Core Courses of Master's Program (18 credits)
All students will take these courses:

- CJPA 501: Criminal Justice Institutions (3 credits)
- CJPA 502: Theories of Crime (3 credits)
- CJPA 803: Applied Research Methods for Criminal Justice (3 credits)
- CRIMJ 503 Advanced Statistics in Criminal Justice (3 credits)
- CJPA 820: Criminal Procedure (3 credits)
- CJPA 865: Criminal Justice Ethics in a Diverse Society (3 credits)

Electives (9 credits):
Students will have the opportunity to tailor their program of study to their interests by choosing from a list of elective courses. The elective courses will be chosen in consultation with the student's advisor. The list of approved elective courses is maintained by the graduate program office.

Capstone Course (3 credits):

- CJPA 808: Criminal Justice Policy and Administration Capstone

The capstone course provides students with an opportunity to apply their knowledge from their courses to a project. The choice of project topic and exact form will be mutually determined by faculty mentors and the student. For example, the capstone experience could be an academic research project, an evidence-based policy evaluation, or the development of a program. The student will work with a faculty mentor/adviser on a capstone project that will be written up as a capstone report. Students are expected to utilize theories, literature, and methods acquired during other courses in the M.P.S. in Criminal Justice Policy and Administration. The report will be formally presented to peers in the M.P.S. and faculty members at the end of the semester. The capstone report must be approved by the faculty mentor/adviser as meeting the course requirements.

Course Substitutions

Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis subject to restrictions outlined in Transfer of Nondegree and Certificate Graduate Credits. Course substitutions must be petitioned and approved in advance by the Chair/Co-Chair, with input from the student's adviser.

Student Aid

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section of the World Campus website for more information. Refer to the Student Aid section of the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Climate Science (CLSCI)

Distinguished Professor Michael Mann, Program Coordinator
514 Walker Bldg.
814-863-4075

Degree Conferred

Students electing this degree program through participating programs earn a degree with a dual title in the Ph.D., i.e., Ph.D. in (graduate program name) and Climate Science.
The following graduate programs offer dual degrees in Climate Science: Ph. D. in Meteorology and Atmospheric Science and Climate Science.

The Graduate Faculty

The Program

The Climate Science dual-title degree program is administered by the Department of Meteorology and Atmospheric Science for the participating graduate programs. A program committee with representatives from each participating department maintains program definition, defines the nature of the candidacy examination and assigns the examining committee, identifies courses appropriate to the program, and recommends policy and procedures for the program's operation to the dean of the Graduate School and to the deans of the participating colleges. The dual-title degree program is offered through participating programs in the College of Earth and Mineral Sciences and, where appropriate, other graduate programs in the University. The program enables students from several graduate programs to gain the perspectives, techniques, and methodologies of Climate Science, while maintaining a close association with major program areas of application. Climate Science is a field devoted to the study of Earth's climate in the past, present, and future. A particular focus is understanding the effects of human activities (anthropogenic impacts) and natural forcing on climate.

Admission Requirements

Students must be admitted to their primary graduate program and The Graduate School before they can apply for admission to the dual-title degree program. Students must be admitted into the dual-title degree program in Climate Science prior to obtaining candidacy in their primary graduate program.

Graduate students with research and educational interests in climate science may apply to the Climate Science Dual-Title Degree Program. Students must submit transcripts of their undergraduate and graduate course work, a written personal statement indicating the career goals they hope to serve by attaining a Climate Science dual title, and a statement of support from their dissertation adviser. A strong preparation in the basic sciences is expected, with evidence of an interest in multiple disciplines.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in Climate Science, listed below.

The minimum course requirements for the dual-title in Climate Science are as follows: students must take a total of at least 3 credits of approved 400-, 500-, or 800-level courses in each of two specific areas: 1) Climate dynamics seminar and 2) Climate dynamics and observations, as well as 3 credits of approved 400-, 500-, or 800-level courses in each of three of the four remaining areas: 3) Physical climate system, 4) Biogeochemistry of the climate system, and 5) Numerical methods and data analysis, and 6) Human dimensions of climate change, for a total of 15 credits. Students are not eligible to take a 400-level course in any one of the areas if the course is offered by their primary graduate program. All students must take at least one 500-level course, and at least one course must be from outside of their core disciplinary expertise. Finally, all of the courses offered in Climate Dynamics and Observations will include sufficient material in radiative transfer and the greenhouse effect to ensure that the students clearly understand the underlying physics of climate and climate change. A list of the approved courses that will satisfy each of the area requirements is maintained by the graduate program office. Students or faculty may request that the Climate Science Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses.

The candidacy examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Climate Science program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both the primary graduate degree program and Climate Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Climate Science dual-title doctoral degree student must include at least one member of the Climate Science Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Climate Science, the member of the committee representing Climate Science must be appointed as co-chair. The Climate Science representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in both their primary graduate program and Climate Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships and other forms of student aid may be available through the student's primary graduate program; these are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07-000

Review Date: 6/26/2018

Comparative Literature (CMLIT)

Program Home Page

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Degrees Conferred:

- Ph.D., M.A.
- Integrated B.A./M.A. Program in Comparative Literature
- Dual-Title Ph.D. in Comparative Literature and African Studies
- Dual-Title Ph.D. in Comparative Literature and Asian Studies
- Dual-Title Ph.D. in Comparative Literature and Visual Studies
- Dual-Title Ph.D. in Comparative Literature and Women's Studies

The Graduate Faculty

The Program

Graduate programs in Comparative Literature combine a core of comparative literature requirements with courses in selected literatures and further comparative courses, according to each student's interests. For example, programs of study can concentrate on such topics as genres, themes, periods, movements, folktale and oral literature, criticism, and the links between literature and related fields such as theatre or women's studies.

The M.A. is a general humanistic degree that helps prepare students for a variety of situations, including teaching in private high schools or community colleges, or further graduate work. The Ph.D. is a more specialized degree. The Ph.D. in Comparative Literature can be combined with a minor in a professional field such as teaching English as a second language. Other potential combinations include our dual-title Ph.D. programs in Comparative Literature and Asian Studies, Comparative Literature and African Studies, Comparative Literature and Visual Studies, or Comparative Literature and Women's Studies.

Only the faculty members and courses officially associated with the Department of Comparative Literature are listed here. Faculty members and courses in other departments are also available to comparative literature students according to their preparation.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Students with appropriate course backgrounds and at least a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The admission process is highly competitive and the best qualified students will be admitted subject to space availability. Students with a degree from a U.S. institution must submit GRE scores, all others must supply TOEFL/IELTS. The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information. Those international students who provide TOEFL/IELTS scores do not need to provide the GRE, but are encouraged to submit their scores, if feasible, as GRE scores are required to be eligible for many graduate fellowship opportunities. Most students who do graduate work in comparative literature hold a B.A. or M.A. degree in comparative literature or in a particular language and literature. Students completing degrees in such fields are welcome to apply --as are students in other humanistic fields, such as philosophy or history, if they have studied literature.

For admission to the M.A. program, students should be prepared to study at least one foreign literature in its own language. For admission to the Ph.D. program, students should be prepared to study at least two foreign literatures in their own language. Doctorate-seeking students usually complete the M.A. before being formally admitted to the Ph.D. program, but exceptional students may be admitted from the B.A. level directly to the Ph.D. Students are encouraged to plan a unified M.A./Ph.D. program if they take both degrees here; however, Ph.D. applications are welcomed from students holding or completing an M.A. elsewhere.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits at the 400, 500, or 800 level is required, with at least 18 credits at the 500 level. There are 9 credits required in the following core courses: CMLIT 501 (3 cr.), CMLIT 502 (3 cr.), and CMLIT 503 (3 cr.). In addition, 18 credits in comparative literature courses and other literature courses are required, with at least 6 credits in non-Anglophone literature. The culminating experience for the degree is a satisfactory master's paper completed while the student is enrolled in CMLIT 596 (3 cr.). Students must demonstrate advanced proficiency in at least two languages (one may be English).

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*. Requirements for the Ph.D. in comparative literature include (1) 9 credits total in 3 required courses: CMLIT 501 (3 credits), CMLIT 502 (3 credits), and CMLIT 503 (3 credits)--with substitute courses if these have been used in the M.A. program; (2) at least an additional 24 credits in literature courses, including course work in the three languages that the student selects, with emphasis on the student's primary literature--students should organize their course work, as much as possible, around a unifying principle, such as genre, period, or theme; (3) passing a candidacy examination; (4) proficiency in two foreign languages; (5) passing a comprehensive examination; and (6) a written dissertation and passing a final oral examination (the dissertation defense). The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

On item (4), the foreign languages are to be prepared at a level that permits thorough literary analysis of texts and related material in those languages.

Other Relevant Information

Students pursuing a graduate degree in comparative literature have individualized programs of study within the requirements specified above. For example, one student may emphasize film and new media; another, the novel. One student may concentrate on earlier literatures; another, on international modernism. One student may be interested primarily in the European tradition; another, in literatures. In such a program, the relationship between student and adviser is important. Each graduate student works with faculty advisers familiar with comparative studies as a whole and with the student's particular area of interest.

Integrated B.A./M.A. Program in Comparative Literature (CMLIT)

The Department of Comparative Literature offers an integrated B.A./M.A. program that is designed to allow academically superior baccalaureate students to obtain both the B.A. and the M.A. degrees in Comparative Literature within five years of study. The first two years of undergraduate course work include the University General Education and Liberal Arts requirements in addition to language and literature study in the major. In the third year, students are expected to define areas of interest in two primary literatures in different languages. In addition, students in the B.A./M.A. program should begin to undertake work in a second foreign language. The fourth year includes graduate-level work in methodology and the student's selection of primary literatures, which replaces comparable 400-level senior year courses. The fifth and final year of the program typically consists of graduate work in Comparative Literature courses as well as the chosen literatures. The program culminates with an M.A. paper.

By encouraging greater depth and focus in the course of study beginning in the third undergraduate year, this program helps students more clearly define their area of interest and expertise in the otherwise vast field of international literatures. As a result, long-range academic planning for exceptional students pursuing doctoral degrees after leaving Penn State, or other professional goals, will be greatly enhanced. The student may also be more competitive in applying for admission to Ph.D. programs as well as for institutional and national grant monies and scholarships.

Admission Requirements

The number of openings in the integrated B.A./M.A. program is limited. Admission is selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the Comparative Literature B.A. program[1].
2. Must have completed 60 credits of the undergraduate degree program. (It is strongly suggested that students apply to the program prior to completing 100 credits.) Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
3. Must be accepted without reservation into the M.A. program in Comparative Literature. Students must apply to the program via the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the Comparative Literature graduate program for the Master of Arts degree, listed above.
4. Should have a recommended overall GPA of 3.2 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
5. Must present a departmentally approved plan of study in the application process. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
6. Must be recommended by the chairs of the Department's undergraduate and graduate committees.

A typical sequence of coursework for the integrated program would appear as follows:

- Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in Comparative Literature are listed in the Undergraduate Bulletin. Degree requirements for the M.A. degree are listed in the Master's Degree Requirements section above. Up to 9 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. Because the B.A./M.A. is an integrated (rather than a sequential) degree program students are encouraged to gradually increase the number of graduate courses taken for credit. (See chart of suggested progress below.) Still, students should satisfy all the B.A. requirements (including double-counted classes), before taking courses that count only toward the M.A. If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.
- CMLIST 501 will double-count for both degrees, and will replace CMLIT 400Y (a core requirement of the B.A.-only program). Students enrolled in the Integrated B.A./M.A. program can also double-count two further 500-level courses (502 and 503) toward both the B.A. and M.A. degrees.

Year One:	6 credits:	CMLIT 10 CMLIT 100
Year Two:	6 credits:	Foreign Language (beyond the 12-credit level)
	6 credits:	Courses in Literature
Year Three:	9 credits:	400-level courses in Literature (6 credits) and CMLIT 501 (3 credits)
	(variable credits)	Work in foreign language (credits do not count towards the major, but reading proficiency is required for the M.A. degree)
Year Four:	3 credits:	CMLIT 502 or 503
	6 credits:	Comparative Literature courses
	6-9 credits:	500-level courses in Literatures (at least 3 credits in non-Anglophone literature)
Year Five:	3 credits:	CMLIT 502 or 503
	9-12 credits:	500-level courses in Literatures (at least 3 credits in non-Anglophone literature)
	6 credits:	500-level Comparative Literature Courses M.A. paper

Dual-Title Ph.D. in Comparative Literature and African Studies

Comparative Literature doctoral students who have research and educational interests in African Studies may apply to the Dual-Title Doctoral Degree Program in African Studies. The goal of the program is to enable doctoral students from Comparative Literature to complement their knowledge and skills in their primary discipline with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The Dual-Title Doctoral Degree Program will provide interested Comparative Literature doctoral students with a multidisciplinary approach that will enhance their analytical capabilities for addressing key issues in African Studies. It will, thereby, add value to their Comparative Literature degree and should increase their competitiveness in the job market. The well-rounded specialist who graduates from the program may be employed in an international setting and have enhanced opportunities for U.S. academic and non-academic positions as well.

Admission Requirements

Students must apply and be admitted to the graduate program in Comparative Literature and The Graduate School before they can apply for admission to the

dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Comparative Literature and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in African Studies-related research.

To be enrolled in the Dual Title Doctoral Degree Program in African Studies, a student must have the approval of the Comparative Literature department and then submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. Refer to the Admission Requirements section of the African Studies Bulletin page. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in Comparative Literature.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirements of the Comparative Literature doctoral program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Within this framework, course selection is determined by the student with the approval of the Comparative Literature and African Studies academic advisers.

Upon acceptance by the African Studies admissions committee, the African Studies director will assign the student an African Studies academic adviser in consultation with the African Studies admissions committee.

As a student develops specific scholarly interests, s/he may request a different African Studies adviser from the one assigned by the African Studies admissions committee. The student and the Comparative Literature and African Studies academic advisers will establish a program of study that is appropriate for the student's professional objectives and that is in accordance with the policies of the Graduate Council, the Comparative Literature graduate program, and the African Studies Program.

Requirements for the Comparative Literature and African Studies Ph.D.

The Ph.D. in Comparative Literature and African Studies is awarded to students who are admitted to the Comparative Literature doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Comparative Literature and African Studies are as follows:

- A minimum of 60 postbaccalaureate credits. Course work accepted for the M.A. in Comparative Literature will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Comparative Literature.
- AFR 501 (3)
- 15 credits of African-related coursework at the 400 or 500-level; a minimum of 6 of these credits must be taken from a list of courses maintained by the African Studies program chair.
- Up to 6 of the 15 credits may come from Comparative Literature, as approved by the student's Comparative Literature and African Studies Program academic advisors.
- The remaining credits can be taken in AFR or in any department other than Comparative Literature.
- Of the 15 credits, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.

The choice of courses in African Studies is to be proposed by the student subject to approval by the Comparative Literature and African Studies academic advisers. The suite of selected courses should have an integrated, intellectual thrust that probes thematic, national, or regional issues and that is complementary to the student's specialty in Comparative Literature.

Language Requirement

Fulfillment of communication and foreign language requirements will be determined by the student with approval of the Comparative Literature and African Studies program advisers and will meet the existing Comparative Literature requirements. The Ph.D. in Comparative Literature requires proficiency in two foreign languages. The foreign languages are to be prepared at a level that permits thorough literary analysis of texts and related material in those languages.

Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the Comparative Literature graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable. There will be a single candidacy examination, containing elements of both the major discipline and African Studies.

The candidacy examination committee for the dual-title degree will be composed of Graduate Faculty from Comparative Literature and must include a graduate faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Comparative Literature if that person holds a formal affiliation with the African Studies program.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Comparative Literature and African Studies dual-title Ph.D. student must include at least one member of the African Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in African Studies, the member of the committee representing African Studies must be appointed as co-chair.

Comprehensive Exam

After completing most course work, doctoral candidates for the dual-title doctoral degree in Comparative Literature and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate's examination fields according to the current Comparative Literature exam structure, and on African Studies. The African Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based on the student's thematic, national or regional area(s) of interest and specialization in African Studies.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Comparative Literature and African Studies. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Comparative Literature and Asian Studies

Graduate students with research and educational interests in international education may apply to the Comparative Literature/Asian Studies Degree Program. The goal of the dual-title degree Comparative Literature and Asian Studies is to enable graduate students from Comparative Literature to acquire the knowledge and skills of their major area of specialization in Comparative Literature while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Asian Studies will add value to their degree and their status as candidates. It will produce excellent scholars of literature who are experts in Asian Studies as well. The dual-title degree Comparative Literature and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Additional details of the dual degree program are available in separate documentation and from the Asian Studies Program (see http://asian.la.psu.edu/graduate.shtml) and the Department of Comparative Literature (http://complit.la.psu.edu/graduate.shtml).

Admission Requirements

Students must apply and be admitted to the graduate program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admission requirements of the

Asian Studies dual-title program. Refer to the Admission Requirements section of the Asian Studies Bulletin page. The Asian Studies admissions committee reviews applications forwarded by Comparative Literature, and recommends students for admission to the Asian Studies program to the Graduate School. Students already in their first and second years of the Comparative Literature graduate program may also apply to the dual-title program if their applications are forwarded by Comparative Literature. Doctoral students must be admitted into the dual-title degree program in Asian Studies prior to obtaining candidacy in their primary graduate program.

Students with appropriate course backgrounds and a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The admission process is highly competitive and the best qualified students will be admitted subject to space availability. Scores from the Graduate Record Examination (GRE) are required for admission.

There are no specific requirements for admissions into the dual-title program beyond the requirements of the Graduate School and Comparative Literature, though applicants interested in the program should also make their interest in the dual-title program known clearly on their application for admission to the Comparative Literature program and include remarks in their essays that explain their training, interests, and career goals in an area of Asian Studies.

Degree Requirements

To qualify for an Asian Studies degree, students must satisfy the requirements of the Comparative Literature program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies Program. Within this framework, final course selection is determined by the students, their Asian Studies adviser, and their Comparative Literature program adviser.

Upon a student's acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic adviser in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the Comparative Literature department and the Asian Studies program.

Requirements for the Comparative Literature and Asian Studies Ph.D.

The doctoral degree in Comparative Literature and Asian Studies is awarded only to students who are admitted to the Comparative Literature doctoral program and admitted to the dual-title degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Comparative Literature and Asian Studies are as follows:

- Comparative Literature 501, 502, and 503
- 15 credits of Asia-related coursework at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502. As many as 6 may come from Comparative Literature, as approved by the student's doctoral adviser and the ASP director of graduate studies. The remaining credits can be taken in ASIA or in any department other than Comparative Literature.
- An additional 21 credits in literature or theory-related courses, including graduate course work in the three languages that the student selects, with emphasis on the student's primary literature

Particular courses may satisfy both the Comparative Literature requirements and those of the Asian Studies program. Within this framework, final course selection is determined by the students, their Asian Studies adviser, and their Comparative Literature program adviser.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Comparative Literature and must include at least one Graduate Faculty member from the Asian Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Comparative Literature and Asian Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Comparative Literature and Asian Studies dual-title Ph.D. student must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair. The Asian Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Comparative Literature and Asian Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Comparative Literature and Visual Studies

Comparative Literature graduate students who have research and educational interests in global visual culture may apply to the Dual-Title Doctoral Program in Visual Studies. The program aims to (a) provide students with the conceptual and methodological tools they will use to interpret literature and its history in global contexts; (b) help them develop a comprehensive understanding of literary systems, processes, and networks across languages, cultures, and media; and (c) guide them in using their specialized knowledge and skills to produce research of publishable quality. The program prepares graduates for college and university teaching, and careers in other related fields.

The dual-title Ph.D. in Visual Studies comprises two core components: 1) historical and theoretical analysis of various forms of visual culture, their diverse sources, and their current manifestations; 2) historical and theoretical analysis of visual media in the information age, including the visual aspects of the digital humanities and the presentation of scholarship and teaching in visual media. A program-specific required course in each of these areas will ensure breadth of training for participating students. Together these components will offer students a sophisticated understanding of and ability to intervene in debates about visual culture and visuality in the world today.

Admission Requirements

Students must apply and be admitted to the doctoral program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly in their applications to Comparative Literature and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in Visual Studies-related research. After admission to the doctoral program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program, as described in the Admission Requirements section of the Visual Studies Bulletin. Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to obtaining candidacy in the Comparative Literature program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Comparative Literature, listed above. In addition, students must complete the degree requirements for the dual-title in Visual Studies, listed on the Visual Studies Bulletin page.

Coursework

The program will consist of a total of fifteen credits, including two required courses – "Visual Culture Theory and History" and "Visual Studies in Digitality" -- and three elective courses dealing with questions of visuality, chosen in consultation with the Director of Graduate Studies for Comparative Literature. Up to six credits may be double-counted by both the primary graduate program (CMLIT) and the dual-title.

Language Requirements

There are no additional language requirements for the dual-title degree (the usual doctoral requirements of the Department of Comparative Literature are to be followed).

Candidacy

The dual-title field will be fully integrated into the candidacy exam for the doctoral program. The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Comparative Literature and must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. In addition, candidates for the dual-title Ph.D. in Visual Studies will be required to present to their committee a portfolio of work in Visual Studies, consisting of a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's interest in questions related to Visual Studies.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Comparative Literature and Visual Studies dual-title Ph.D. student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the committee chair does not represent Visual Studies, a committee member representing Visual Studies must be appointed as co-chair.

Comprehensive Exam

After completing most course work, doctoral candidates for the dual-title doctoral degree in Comparative Literature and Visual Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate's examination fields according to the current Comparative Literature exam structure. The faculty member representing Visual Studies on the student's committee will participate in developing, administering, and evaluating the student's comprehensive exams.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Comparative Literature and Visual Studies. The dissertation must be accepted by the doctoral committee, the head of the Comparative Literature program, and the Graduate School.

Dual-Title Degree Program in Comparative Literature and Women's Studies

Comparative Literature graduate students who have research and educational interests in women's, gender, and sexuality studies may apply to the Dual-Title Doctoral Program in Women's Studies. The program creates a formal structure for training graduate students to describe, analyze, and evaluate the practices, phenomena, and policies that both issue from and structure the experiences and possibilities of women, as well as training for students to analyze how gender and sexuality intersect with literary production in multiple societies. This training cultivates breadth by pushing students to think across disciplines, geographic regions, geopolitical boundaries, domains of practice, aesthetic fields, literary genres, and historical eras. It also balances this breadth with rigor: it combines systematic training in comparative literary research, including working with primary sources in languages other than English, with a thorough grounding in the techniques and intellectual resources of state of the art scholarship on women, gender, and sexuality.

The Dual-Title Doctoral Degree Program in Comparative Literature and Women's Studies has three broad learning objectives at its core (in addition to the objectives that animate the regular doctoral program in Comparative Literature). Students will leave the program with expert awareness of responsibly produced knowledge and ethical research techniques for producing new knowledge, about (a) the forces that constitute, shape, distinguish, and link the lives of women in a variety of historical and geographic locations; (b) ways to understand the history of women, of gender, and of sexuality in global perspectives and specific local and linguistic contexts, with emphases on the relation of these fields to the history of the aesthetic, as well as to a variety of other economic, social, or philosophical structures that help determine the natures of gender and the lives of women; and (c) the history, content, conceptual options, and ethical stakes of the theoretical debates about the best ways to engage in the field of Women's Studies.

Admission Requirements

Students must apply and be admitted to the graduate program in Comparative Literature and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women's Studies dual-title program. Refer to the Admission Requirements section of the Women's Studies Bulletin page. Students must have the approval of the Comparative Literature graduate director to apply for the dual-title. The application must include a statement of purpose that addresses how the student's research and professional goals intersect with the objectives of the dual-title graduate degree program in Comparative Literature and Women's Studies. The Women's Studies Admissions Committee reviews applications and recommends students for admission to the dual-title PhD program. Doctoral students must be admitted into the dual-title degree program in Women's Studies prior to obtaining candidacy in their primary graduate program.

Students may apply to the dual-title program when they request admission to the Comparative Literature Department, or at any time prior to taking the candidacy exam in Comparative Literature, provided that they a) secure the approval of the graduate director in Comparative Literature, and b) have sufficient funding and time to complete the dual-title requirements. Practically speaking, this will likely mean applying to the dual-title program before completing the second year of study in Comparative Literature.

Degree Requirements

The doctoral degree in Comparative Literature and Women's Studies is awarded only to students who are admitted to the Comparative Literature doctoral program and admitted to the dual-title degree in Women's Studies. To qualify for a degree in Comparative Literature and Women's Studies, students must satisfy the requirements of the Comparative Literature program, in which they are primarily enrolled, and of the Women's Studies dual-title program. Except where noted otherwise, students must complete the requirements listed below *in addition to* completing the general requirements for doctoral study in the Department of Comparative Literature.

Coursework

The minimum course requirements for this dual-title Ph.D. degree are 18 credits of coursework related to Women's Studies. Of these 18 credits, 9 consist of the required core course sequence in Women's Studies:

- WMNST 501: Feminist Perspectives on Research and Teaching Across the Disciplines (3 credits);
- WMNST 507: Feminist Theory (3 credits);
- WMNST 502: Global Perspectives on Feminism (3 credits).

Students also must complete 9 additional credits of Women's Studies course work chosen in consultation with the Graduate Director in Women's Studies. Most of these courses (at least 5 credits) should be at the 500 level, but a student may count some 400-level credits, with the approval of the Graduate Director in Women's Studies. Particular courses may simultaneously satisfy degree requirements in Comparative Literature and in the Women's Studies dual-title. Students who already hold a master's degree or other graduate credits from another institution may petition the Graduate Director in Women's Studies to have equivalent course credits accepted.

Language Requirements

There are no additional language requirements for the dual-title degree (the usual doctoral requirements of the Department of Comparative Literature are to be followed).

Candidacy

The dual-title field must be fully integrated into the candidacy exam for the doctoral program. In addition, candidates for the dual-title Ph.D. in Comparative Literature and Women's Studies will be required to present to their committee a portfolio of work in Women's Studies which includes a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's interest in questions taken up by scholars of Women's Studies. The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Comparative Literature and must include at least one Graduate Faculty member from the Women's Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Comparative Literature and Women's Studies dual-title Ph.D. student must include at least two member of the Comparative Literature Graduate Faculty and two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair.

Comprehensive Exams

The faculty member representing Women's Studies on the student's committee will participate in developing, administering, and evaluating the student's comprehensive exams. The exam will incorporate written and oral components based on the student's thematic or regional areas of interest and specialization and may include questions on queer theory, feminist methodology, global women's studies and sexuality studies in Comparative Literature.

Dissertation and Final Oral Examination (Dissertation Defense)

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Comparative Literature and Women's Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Teaching assistantships in the Department of Comparative Literature, as well as in related language and literature departments, typically have been available to students taking comparative literature degrees. In recent years, Comparative Literature students have held assistantships in Arabic, Chinese, English, French, German, Hebrew, Italian, Japanese, Russian, Spanish, Swahili, and Women's Studies, as well as in Comparative Literature courses. There also is a graduate assistantship position for an editorial assistant to the journal Comparative Literature Studies, which is edited in the department. Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*. In addition, the following awards typically have been available to graduate students in this program.

SAMUEL P. BAYARD AWARD
Available annually to a graduate student in comparative literature, selected by the graduate committee of the Department of Comparative Literature. Amount varies.
EDWIN ERLE SPARKS FELLOWSHIPS IN THE HUMANITIES (8)
Available to beginning and continuing graduate students in the following graduate programs: Comparative Literature, English, French, German, History, Philosophy, Spanish, and Communication Arts and Sciences.
FOLGER INSTITUTE FELLOWSHIPS
Penn State is a member of the Folger Institute of Renaissance and Eighteenth-Century Studies. Graduate students in Comparative Literature are eligible for Folger Institute Fellowships to study in seminars and workshops at the Folger Library, Washington, D.C.
TITLE VI CENTER FOR GLOBAL STUDIES ASSISTANTSHIP
Available to beginning and continuing graduate students in Comparative Literature and other programs.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMPARATIVE LITERATURE (CMLIT) course list

[1] A student enrolled in this major must receive a grade of C or better, as specified in Senate Policy 82-44.

Last Revised by the Department: Fall Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Faculty linked: 6/5/14; changed to dept head: 4/13/16

Counselor Education (CN ED)

Program Home Page

RAYNE SPERLING, *Director of Graduate Studies*
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Degrees Conferred:

Ph.D., D.Ed., M.Ed.

The Graduate Faculty

The Program

Professional preparation is offered at the master's level (M.Ed.) with emphasis areas in career counseling, clinical mental health counseling, school counseling, and rehabilitation counseling. The M.Ed. consists of 39 required credit hours plus specialization courses ranging from an additional 12 to 21 credit hours depending on the area of emphasis. All courses must be taken at the 400 level and above.

The Ph.D. program prepares candidates for positions as counselor education faculty members and consists of a minimum of four academic years of graduate level preparation (including master's-level preparation), defined as eight semesters, with a minimum of 96 credits at the 400 level and above required of all students in the program. The D.Ed. program helps students prepare to become supervisors of counseling services and a minimum of 91 credits at the 400 level and above is required of all students in the program.

Admission Requirements

Scores from the Graduate Record Examination (GRE) are required for admission to the Ph.D. program. GRE scores are not required for the M.Ed. or D.Ed. programs. Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

M.Ed. applications with a 3.0 junior/senior average (on a scale of 4.00) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.0 grade-point average may be made for students with special backgrounds, abilities, and interests.

Doctoral applicants must have completed a master's degree in counselor education prior to admission into the Ph.D. or D.Ed. program. A master's degree is required for admission that must be comprised of a minimum of 48 credit hours that align with the standards of the Counsel for Accreditation of Counseling and Related Educational Programs (CACREP). All doctoral applicants should present at least a 3.33 average in all graduate study completed prior to admission. Post-master's counseling experience is required for admission to the D.Ed. program.

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

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

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

Degree Requirements

All candidates are expected to exhibit, in addition to academic competence, effectiveness in interpersonal relations and in both written and oral communication. They also must provide evidence in support of professional counseling activities and involvement in professional organizations. All degree options require students to participate in extensive practicum or fieldwork experience under supervision.

The M.Ed. program includes 51 to 60 credit hours depending on the area of emphasis. This includes 39 hours of core requirements plus 12 to 21 credit hours depending on the area of emphasis. All courses must be taken at the 400 or 500 levels.

CORE COURSES for Counselor Education M.Ed. Program:

Counselor Education (CN ED)

- 404. Group Procedures in Guidance and Counseling (3)
- 500. Introduction to Counseling and Development (3)
- 501. Counseling Theory and Method (3)
- 503. Guidance Services in Elementary Education (3)
- 505. Foundations of Career Development and Counseling Information (3)
- 506. Individual Counseling Procedures (3)
- 507. Multicultural Counseling: Foundations (3)
- 525. Applied Testing in Counseling (3)
- 526. Research in Counselor Education Research (3)
- 595A. Counseling Practicum (3)
- 595G. Counseling Internship (6)
- 596. Individual Studies (Master's Paper) (3)

The Ph.D. program consists of a minimum of 96 credit hours including master-level preparation in counselor education. Ph.D. students must satisfy advanced degree requirements in the CACREP counselor education core areas (36 credit hours including a counseling and teaching internship), a specialty area of study (15 credit hours), and empirical foundations (15 credit hours). Students in the Ph.D. program are expected to complete a dissertation involving independent and original research. Students are expected to use theoretical models of counseling to investigate problems of importance to the field. The additional credits in the Ph.D. program incorporate advanced coursework in research design, statistics, and counseling theory to prepare students for their subsequent roles as faculty members in counselor education programs.

CORE COURSES for Counselor Education Ph.D. Program:

COUNSELOR EDUCATION (CN ED)

- 502. Advanced Counseling Theory and Method (3)
- 554. Multi cultural Counseling (3)
- 555. Career Counseling (3)
- 580. Foundations: History and Trends in Counselor Education (3)
- 581. Professional Issues in Counselor Education (3)
- 582. Advanced Group Psychotherapy (3)
- 589. Seminar on Counseling Supervision (3)
- 595D. Supervision of Counselors (3)
- 595I. Counselor Education Doctoral Teaching Internship (3)
- 595K. Counselor Education Doctoral Counseling Internship (3)
- 595P. Counselor Education Doctoral Counseling Practicum (3 credits per semester; two semesters [6 credits] are required)

The D.Ed. Program consists of a minimum of 91 credit hours including the master-level preparation in counselor education. Students in the D.Ed. program in Counselor Education must satisfy degree requirements in core counselor education courses (21 credit hours), empirical foundations (12 credit hours), and a counseling specialty area (15 credit hours) such as: career guidance, administration, planning, and management in service delivery settings. D.Ed. students must complete a dissertation (15 dissertation credit hours) that is of practical significance to the delivery or administration of counseling services.

CORE COURSES for Counselor Education D.Ed. Program:

COUNSELOR EDUCATION (CN ED)

- 554. Multicultural Counseling (3)
- 580. Foundations: History and Trends in Counselor Education (3)
- 581. Professional Issues in Counselor Education (3)
- 589. Seminar on Counseling Supervision (3)
- 595D. Supervision of Counselors (3)
- 595K. Counselor Education Doctoral Counseling Internship (3)
- 595P. Counselor Education Doctoral Counseling Practicum (3)

Candidacy Examination

All Ph.D./D.Ed. students are required to have a master's degree in counselor education prior to admission. After completion of 12 credits of doctoral study, which may allow the student to take the candidacy examination as early as the second semester in their doctoral program, Ph.D. and D.Ed. students may take a candidacy examination. Given the requirement that doctoral students will have a master's degree in counselor education thereby demonstrating their ability to complete graduate work successfully, the nature of the candidacy examination will include a review of the following by the student's candidacy committee: (1) the student's professional resume, (2) a statement regarding the general direction of the student's research interests and possible areas of dissertation inquiry, (3) grades from completed graduate courses, (4) proposed course of study for subsequent semesters, (5) selected graduate papers written by the student, and (6) a statement regarding the student's professional goals. In the candidacy examination, the student's candidacy committee determines the student's ability to continue in the program and to conduct doctoral research.

Comprehensive Examination

Both Ph.D. and D.Ed. candidates are required to take a written and oral comprehensive examination once their course work is completed (or when they are in their final semester of required coursework) and prior to the dissertation. The examination, prepared by the student's doctoral committee, covers all areas of the student's doctoral work. The comprehensive examination for Ph.D. students must include an assessment of the student's competence related to conducting independent and original research.

Doctoral Committee Composition

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

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

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

Doctoral Dissertation and Final Oral Examination

Ph.D. and D.Ed. students should complete the writing of the dissertation and make revisions to the satisfaction of the committee chair, who is expected to ensure that the dissertation is in near final form before allowing the final oral examination (defense) to be scheduled. The student is responsible for arranging and scheduling a time (2 hours) so that all members of the committee can be present. The student must give each committee member a copy of the complete dissertation *two weeks before the final oral examination.* Students should not expect this to be the final version for submission to the Graduate School, as there are typically revisions after successful completion of the oral defense.

English Competence

Candidates for the Ph.D. and D.Ed. programs are required to demonstrate high-level competence in the use of English language, including reading, writing, and speaking, as part of the language. Counselor Education evaluates English language proficiency in several ways. Prior to admission all students are required to provide written goals statements and personal development statements that are evaluated by faculty as a portion of the application process. Additionally, international students must have either earned a master’s degree in the United States or supply official minimum scores for the TOEFL (total score 80 and 19 on speaking section) or IELTS (6.5 composite). Once admitted to the program and prior to gaining candidacy, students are evaluated for their reading, writing, and speaking in class assignments and as a part of their first-year portfolio evaluation. When problems are identified, individual remediation programs are developed that utilize faculty and all appropriate University resources.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 699 and 800-899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COUNSELOR EDUCATION (CN ED) course list

Lasted Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-06
Review Date: 04/08/2014
Faculty linked: 6/5/14

Communications (COMMS)

PETER KAREITHI, *Program Coordinator*
Penn State Harrisburg W-356 Olmsted Building
777 West Harrisburg Pike, Middletown, PA 17057

Degree Conferred:

M.A.

The Graduate Faculty

The Program

The Master of Arts in Communications prepares students for doctoral study and leadership positions in areas of public information such as journalism, education, public relations and advertising. The program places an emphasis on cultivating an interdisciplinary and intercultural perspective for media educators and practitioners who may serve publics in a variety of fields, including business, government agencies, non-profit organizations, and community and political action groups. Because our program is broad-based and research-oriented, students will work with their academic advisers to develop their thesis projects to address critical issues in the above areas, rather than acquiring a specific and narrowly defined skill set.

The program balances research and creative production by integrating national and international perspectives on history, culture, and society in all instruction in theory and production practice.

Because of the program's location in the Pennsylvania state capital region and its close proximity to prominent public and private institutions and other resources, students in the program will have opportunities for internships and field experiences that provide valuable context for the development of their thesis projects. This integrated approach between theory and practice positions the program to provide a strong foundation for the pursuit of doctoral studies in communications.

Students admitted to the Master of Arts in Communications Program at Penn State Harrisburg must complete 36 credits, 21 of which must be at the 500 level in order to be granted the degree. Each student must complete and submit either a master's project or thesis. The master's project option (COMMS 580 Master's Project in Communications, 3-6 credits) consists of a creative production with an accompanying scholarly essay. The thesis option (COMMS 600 Thesis Research or COMMS 610 Thesis Research Off Campus, 6 credits) consists of an original research paper that follows the guidelines established by the Graduate School Thesis Office (see http://www.gradsch.psu.edu/current/thesis.htm). The subject of the master's project or thesis must be defined in conjunction with a faculty member, and evaluated by a committee of at least two faculty members, supplemented by outside consultants where appropriate. To register for the master's thesis or project, a student must have completed COMMS 500 and COMMS 503 and must have earned at least 27 credits towards the Masters in Communications.

Grade-Point Average and Time Limit

A 3.00 grade-point average will be required for successful completion of the degree.
A full-time student can expect to complete the program in four semesters, a part-time student in six or more semesters. All requirements for a master's degree for the Master of Arts in Communications (including acceptance of the master's thesis or project) must be met within eight years of admission to degree status. Extensions may be granted by the Graduate School in appropriate circumstances.
The 36-credit program is distributed over two groups of courses:

Prescribed Courses - 21-24 Credits

Take a minimum of 9-12 credits from the following:
COMMS 500 Seminar in Communications and Cultural Theory (3 cr.)
COMMS 503 Research Methods in Communications (3 cr.)
COMMS 580 Master's Project in Communications (3-6 cr.)
COMMS 600 or 610 Thesis Research (6 cr.)
[COMMS 500 and COMMS 503 to be taken within the first 12 credits after enrollment in the program. Students elect EITHER COMMS 580 or COMMS 600. **A minimum of 12 credits in prescribed courses are required if selecting the thesis option, COMMS 600**]

Choose 6 credits from ONE of the following:
COMMS 525 Advanced Writers' Seminar (3-9 cr.)
COMMS 568 Media Production Workshop (3-9 cr.)

Choose 6 credits from the following:
COMMS 519 Communications Technology and Culture in History (3 cr.)
COMMS 555 **Media Discourse Analysis (3 cr.)**
COMMS 560 Seminar in **Global Culture and Communications** (3 cr.)

Additional Courses - 15 Credits

Take 15 credits in additional courses at the 400- and 500-levels, which can come from either Communications or other fields, including: American Studies, Business Administration, Community Psychology and Social Change, Criminal Justice, Education, Health Administration, Health Education, Humanities, Information Systems, Management, Marketing, Public Administration, Training and Development.

The following 400- and 500-level Communications courses are approved selections:
COMM 414 MEDIA MANAGEMENT (3)
COMM 415 ADVANCED PHOTOGRAPHY (3)
COMM 421W ADVERTISING CREATIVE STRATEGIES (3)
COMM 430 MASS MEDIA AND POLITICS (3)
COMM 441 ADVANCED GRAPHIC DESIGN (3)
COMM 456 MEDIA CRITICISM AND THEORY (3)
COMM 457 MEDIA AUDIENCES AND CONTEXTS (3)
COMM 458 MEDIA LAW AND ETHICS (3)
COMM 459 CULTURAL EFFECTS OF INTERACTIVE AND ONLINE MEDIA (3)
COMM 462 FEATURE WRITING (3)
COMM 471 PUBLIC RELATIONS MEDIA AND METHODS (3)
COMM 474 DEPTH REPORTING (3)
COMM 482 ADVANCED COMMUNICATIONS WORKSHOP (4)
COMM 488 WRITERS' SEMINAR (3 per semester, maximum of 9)
COMM 594 RESEARCH TOPICS (1 -15)
COMM 595 INTERNSHIP (1 -18)
COMM 596 INDIVIDUAL STUDIES (1 - 9)
COMM 597 SPECIAL TOPICS (1 - 9)

NOTE: The following 400-level Communications courses may **not** be taken to fulfill the requirements of this degree: COMM 495, COMM 495A, COMM 496

and COMM 497.

- **Admission Requirements**

Applicants must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution and have earned at least a 3.0 grade-point average in their junior and senior years.
Exceptions may be made for those with special backgrounds or abilities who are committed to advanced interdisciplinary study in communications. All application materials should be submitted before February 15 for the fall semester and November 1 for the spring semester.

Applicants must submit the following:

- an online Graduate School application with the application fee;
- two copies of official transcripts from each college or university previously attended (with the exception of Penn State University).
- a personal statement of 500 to 1000 words outlining educational goals and career objectives;
- two letters of reference attesting to the applicant's suitability for the program (preferably from previous professors or others who are familiar with the applicant's intellectual/creative work or interests);
- a writing sample or other creative production (e.g. short film, photo essay, advertisement or PR campaign sample, multimedia art, etc).

Application materials are available on the web at: http://gradsch.psu.edu/portal/

Transfer of Credits

Transfer credits are limited to 9 equivalent graduate Communications credits with a grade of B or better taken within the last 5 years from an accredited institution. It must be the opinion of the reviewing faculty that these courses are equivalent in quality to those offered at Penn State Harrisburg. Credit will not be given for any course used to complete a previous degree.
International Students

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

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, with remedial course work. The minimum composite score for the IELTS is 6.5. Specific graduate programs may have more stringent requirements.

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

Last Revised by the Department: Spring Semester 2011

Blue Sheet Item #: 39-04-587

Review Date: 01/11/2011

Faculty linked: 8/14/14

Computer Science (COMP)

Program Home Page

LINDA NULL, *Graduate Program Coordinator*
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717-948-6081
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Degree Conferred:

M.S.

The Graduate Faculty

The Program

The program is professionally oriented and designed to prepare students for employment in industry or government. Courses emphasize practical concerns as well as the relevant theoretical background. The program will provide appropriate background for diverse tasks such as developing scientific and engineering applications, developing system software, developing safety or security critical systems, solving computationally hard problems, and developing distributed applications. While not intended as preparation for subsequent entrance to a Ph.D. program, this goal is not precluded. Once the specific course requirements are met, appropriate selection of electives will enable individual interests to be met within the program. Anticipated areas of interest include software engineering, systems programming, and artificial intelligence.

Admission Requirements

In addition to the general Graduate School requirements, applicants must present a baccalaureate degree in Computer Science or a related field from a regionally accredited institution. A minimum GPA of 2.75 (on a 4.0 scale) is required. While a bachelor's degree in Computer Science is not required, admission without deficiency requires that an applicant has completed courses in analysis of algorithms, operating systems, database, and linear algebra. If these courses are not taken before admission to the program, they may be taken at Penn State Harrisburg, but the student will receive at most 3 credits toward the MS degree for these courses.

At the discretion of the program, applicants may be required to provide scores from the Graduate Record Examinations (GRE) and/or the GRE subject test in computer science. In addition, applicants must provide three letters of reference, at least one of which is from an academic source, and a letter outlining significant work experience and academic and career objectives.

Degree Requirements

A total of 30 graduate credits (400 level or above) is required for the degree of master of science in Computer Science. Students are required to take the following courses: COMP 505 and COMP 511, COMP 512, and COMP 519. Additionally, students are required to complete either a thesis or a paper according to one of the two options described below. Students who believe that they have completed a course substantially similar to one of the specific course requirements may apply to have their previous work evaluated for the purpose of exemption to that requirement. If the exemption is granted, another approved course shall be taken in place of that required course. The remaining 18 credits must be completed according to one of the following options:

1. *Thesis Option: Research into a specific computer science problem, development of a scholarly written paper, and an oral defense.*
   This option requires: 6 credits of COMP 600, 3 additional credits from approved 500-level electives in computer science, mathematics, engineering, and information systems courses and 9 credits from approved 400- and 500-level electives in computer science, mathematics, engineering, and information systems courses.
2. *Paper Option: In-depth study of specific computer science problems, development of a written paper or project, and an oral defense.*
   This option requires: 3 credits of COMP 594, 9 credits from approved 500-level electives in computer science, mathematics, engineering, and information systems courses and 6 credits from approved 400- and 500-level electives in computer science, mathematics, engineering, and information systems courses.

A maximum of 9 transfer credits will be allowed for course work completed as a graduate student at another institution.

Suggested Tracks

For students with interests in the areas of software engineering, systems programming, and artificial intelligence, the program suggests the following course work. These tracks are only advisory--there is no requirement that a student follow any track, and tracks will not be noted on diplomas or transcripts.

Track in Software Engineering: Students following the track in software engineering will be provided with the conceptual tools needed for designing and managing large software systems. In addition to the required core, the track in software engineering consists of the following courses: COMP 513, COMP 516, INFSY 570. In addition to these courses, CMPSC 470 is highly recommended, as compiler development is an ideal environment for gaining practical experience with software engineering techniques and tools.

Track in Systems Programming: Students following the track in systems programming will receive instruction in both the conceptual foundation of systems software and the implementation of such systems. In addition to the required core, the track in systems programming consists of the following courses: CMPSC 436, COMP 517, COMP 545.

Track in Artificial Intelligence: Students following the track in artificial intelligence are expected to gain an understanding in the theory and applications of AI methods as well as evolutionary methods for solving a variety of problems. In addition to the required core, the track in artificial intelligence consists of the following courses: COMP 520, COMP 524, COMP 556.

Additional Information

For further information, see: http://cs.hbg.psu.edu

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMPUTER SCIENCE (COMP) course list

Integrated B.S./M.S. Program in Computer Science

The Computer Science program offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science and the Master of Science in Computer Science. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. However, the total course load is reduced due to the maximum of 12 credits that can count towards both degrees. A minimum of 6 credits proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted. The first two years of the IUG program are identical to the first two years of the Bachelor of Science program. The third and fourth years of the IUG program differ from those of the Bachelor of Science program due to the courses that count toward the Master of Science degree requirements. Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the student has completed 100 to 105 credits, which is at the end of the first semester of the senior year for a typical student in the program. Students who have not maintained a 3.5 GPA in their Math and Computer Science courses will be put on probationary status with respect to the IUG program. Their ability to continue in the IUG program will be based on their academic performance in the last semester of their senior year. As part of the review in the senior year, students will be advised about the paper option and thesis option in the graduate program. Students intending to pursue the thesis option would be advised to do so only if they have been doing very well in the program and are in no danger of not being able to continue into the fifth year. A minimum grade point average of 3.5 must be earned in all math and computer science course work that is applied toward the graduate degree. This includes any courses that count toward both the undergraduate and graduate degrees, as well as all courses taken during the fifth year. Students have the choice of receiving the B.S. degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years. Note that students who are awarded a graduate assistantship must elect to receive the B.S. degree at the end of the fourth year. If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Science degree, the student will be permitted to receive the Bachelor of Science degree assuming all the undergraduate degree requirements have been satisfactorily completed. Students who successfully complete the courses listed in the recommended schedule will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

Admission Requirements

To initiate the application process, students must submit an Integrated Undergraduate-Graduate (IUG) Degree in Computer Science Application Form, a transcript, and a faculty recommendation, in addition to applying for admission to the Graduate School. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. In order to apply for the IUG program, students must have completed a minimum of 45 credits. A typical student would apply after completing between 45 to 60 credits, that is, after the fourth semester and before the end of the fifth semester. For consideration for acceptance into the program, students must have completed and earned a minimum grade point average of 3.0 in the following Computer Science and Mathematics courses: MATH 140, MATH 141, MATH 220, CMPSC 121, CMPSC 122, and CMPSC 360. Student applications will be evaluated based on their overall academic performance, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Computer Science.

Degree Requirements

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. The total course load is reduced due to the maximum of 12 credits that can count towards both degrees. The minimum of 6 credits double-counted must be at the 500 level. Thesis credits may not be double counted.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-05-074

Review Date: 02/21/2012

UCA Revision #2: 7/30/07

Faculty linked: 8/14/14

Community Psychology and Social Change (CP&SC)

Program Home Page

HOLLY ANGELIQUE, *Coordinator*
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777 W. Harrisburg Pike
Middletown, PA 17057-4898

Degrees Conferred:

Master of Arts in Community Psychology and Social Change

The Graduate Faculty

The Program

The graduate program in Community Psychology emphasizes planned social change, and is based on both sociology and psychology. The program equips students with skills useful in coping with the multifaceted problems facing communities. Students learn (a) to assess problems at the level of communities or organizations, (b) to plan and implement possible solutions to these problems, and (c) to evaluate the effectiveness of the solutions. Learning takes place both in courses and in a master's project that entails fieldwork and the writing of a master's paper.

To act as a change agent, the student must be aware of contemporary community needs, along with the impact of the community structure upon its individual members and the techniques best suited to initiate productive changes. After completing this interdisciplinary program, the graduate should be able to approach problems with a more integrated point of view and work cooperatively with community individuals and agencies toward practical solutions. Problems related to crime, education, child and family development, employment, the lack of effective social power, and other factors affecting psychological well being are approached from bases in community service agencies or informal community groups. The majority of students work full-time in agencies or governmental units. To accommodate these working students, 500-level graduate courses are scheduled in the evening.

Admission Requirements

Requirements listed below are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

For admission to the program, a student must have a baccalaureate degree from an accredited academic institution, earned under residence and credit conditions equivalent to those required by Penn State. The minimum grade-point average (GPA) in the junior and senior years must be 3.00 or higher (on a 4.00 scale). Students with experience in carrying out planned social change are particularly encouraged to apply. Most applicants hold degrees in psychology, sociology, or related disciplines. Ideally, applicants will have taken courses in developmental, personality, and social psychology, along with work in social change, social problems, and social conflict. Students from diverse other backgrounds are welcome to apply, particularly if they have had work or other experience effecting change in community settings. Applicants will be asked to take additional course work without graduate credit, chosen after consultation with an adviser, if they have had no psychology or sociology courses beyond the introductory level. Applicants must have received a C or better in an introductory statistics course covering parametric and non-parametric inferential statistics; they will be requested to make up any deficiency without graduate credit.

Off-campus and transfer credits from accredited institutions will be evaluated by the Program Coordinator for recentness and appropriateness to the student's course of study. Approval for up to 10 transfer credits may be given. Documented applications for credit for work experience will be evaluated by students' masters committees, made up of members of the graduate faculty. Approval for up to 6 credits may be given. If granted, approval for this credit can take the place of the fieldwork usually undertaken in CMPSY 522, Practicum. The student must register for the number of credits approved, either in CMPSY 522, or, if the student prefers, after having asked for a waiver of the CMPSY 522 requirement, in additional elective course work, chosen with help from an adviser.

Courses in the program are sequenced on the assumption that students will be entering in the fall semester. Students may apply for admission for the spring (but not the summer) semester, but they may not start taking 500-level required courses until the following fall.

Admission to the Community Psychology program is based on clear suitability for the program as evidenced by the application as a whole; it is limited to the number of spaces available for masters project supervision.

Applicants must submit the following:

1. A completed application form and application fee.
2. Two copies of official transcripts from colleges or universities previously attended (including Penn State)
3. Admission Essay: We are interested in learning something about your writing and analytical abilities, and about you as a person. Please take two to six double-spaced pages to answer the following question.

   C. Wright Mills wrote: "The sociological imagination enables its possessor to understand the larger historical scene in terms of its meaning for the inner life and the external career of a variety of individuals....The sociological imagination enables us to grasp history and biography and the relations between the two within society. That is its task and its promise. To recognize this task and this promise is the mark of the classic social analyst ... ."

   Discuss the intersection of your biography with history and society. How have the society and the times in which you live helped to shape who you are? What do you hope to accomplish in life? How do you think our graduate program will help you to reach your goals?

1. A letter of about 500 words outlining significant community or work experience, along with career and academic objectives.
2. Three professional letters of recommendation, special forms provided. Please include at least two essays from academic sources.

Program Requirements

An important part of this degree is a master's project, made up a total of 9 credits, comprising from 3 to 6 credits of Practicum (CMPSY 522), and from 3 to 6 credits of Research (CMPSY 594). The project is planned in the context of the course Roles and Methods in Community Psychology (CMPSY 521); it is supervised by a master's committee of graduate faculty. The particular mix of practicum and research is worked out by the student in consultation with the faculty. The variable mix of practicum and of research credits results in the student's being able to choose course work that emphasizes study in the area in which she or he needs most skill-development. In the usual case, a student with a strong background in fieldwork would be asked to emphasize research in her or his master's project, and a student with a strong research background, but with limited fieldwork, would be asked to emphasize the practicum. The output of CMPSY 522 is a practicum; the output of the research course CMPSY 594 is a required master's paper of at least 3 credits. The master's paper may be based on the field experience. Students often choose to structure their master's paper around a specific community research problem. Again, students can apply for Practicum (522) credit, or, at their choice, ask for a waiver of the requirement, on the basis of documented prior experience. Decisions about such applications are made by the student's master's committee.

Part-time students who are able to take two courses at a time can complete the degree in seven to eight semesters. Since the processes of designing a master's project and of writing a master's paper are labor-intensive and frequently take more time than the student expects, even full-time students will often take six or more semesters to complete the degree.

The program offers three concentrations, each including all the required Community Psychology courses. The Children, Youth, and Families Concentration uses as its electives 9 approved credits from courses in psychology, education, and sociology. The Environmental Issues Concentration uses electives approved by an adviser and drawn from special courses in environmental issues and from various other programs. The Individualized Concentration uses as its elective courses chosen to meet individual needs, with the approval of an adviser.

Graduation Requirements

To qualify for the degree, 36 credits are needed, 24 of which must be at the 500 level. There is a sequence of substantive courses, starting with Theories and Issues in Community Psychology (CMPSY 500).

Required Courses (27 credits)

COMMUNITY PSYCHOLOGY (CMPSY)

- 500. Theories and Issues in Community Psychology (3)
- 510. Change Processes (3)
- 511. Social Impacts on Psychological Functioning (3)
- 519. Research Methods I (3)
- 520. Research Methods II (3)
- 521. Roles and Methods in Community Psychology (3)
- 522. Practicum (3-6)
- 594. Master's Paper (3-6)

Elective Courses (9 credits)

Concentrations

In addition to the core curriculum, students will complete the requirements of one of the three concentrations described below:

Children, Youth, and Families Concentration

Students working toward a Master of Arts degree in Community Psychology and Social Change with this concentration must complete three of the following courses. Students should check for prerequisites when deciding on which courses to take.

EDUCATION (EDUC)

- 404. Young Children's Behavior: Observation and Evaluation (3)
- 410. The Child and Social Institution. (3)

PSYCHOLOGY (PSYC)

- 405. DEVELOPMENTAL PSYCHOLOGY (3)

SOCIOLOGY (SOCIO)

- 462. Perspectives on Aging (3)
- 463. The Family (3)

Environmental Issues Concentration

Students working toward a Master of Arts degree in Community Psychology and Social Change with this concentration must complete three of the following courses. Students should check for prerequisites when deciding on which courses to take.

CIVIL ENGINEERING (C E)

- 471. Environmental Sanitation (3)
- 497. The Human Environment (1-9)

ENVIRONMENTAL ENGINEERING (ENVE)

- 487. Environmental Law (3)

PUBLIC ADMINISTRATION (P ADM)

- 531. Environmental Policy (3)

SOCIOLOGY (SOCIO)

- 470. Environmental Sociology (3)
- 471. Environmental Movements (3)
- 472. Justice and the Environment (3)

Individual Concentration

Students choose electives from a wide variety of courses offered by the Behavioral Science and other faculties. The object is to support a special interest or mix of interests, in, for instance, environmental issues, adult education, criminal justice, urban sociology, women's studies, or issues of class-ism, racism, or sexism. Students work with faculty advisers in gaining approval of electives and in choosing topics for master's projects.

Student Aid

A number of scholarships, fellowships, and graduate assistantships are available. Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

CIVIL ENGINEERING (C E) course list

COMMUNITY PSYCHOLOGY (CMPSY) course list

EDUCATION (EDUC) course list

ENVIRONMENTAL ENGINEERING (ENVE) course list

PSYCHOLOGY (PSYC) course list

PUBLIC ADMINISTRATION (P ADM) course list

SOCIOLOGY (SOCIO) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/26/04

Faculty linked: 8/14/14

Criminal Justice (CRIMJ)

Program Home Page

DON HUMMER, *Program Coordinator, Master of Arts in Criminal Justice*
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777 W. Harrisburg Pike
Middletown, PA 17057-4898
Phone: 717-948-6042

Degree Conferred:

M.A.
Integrated B.S./M.A. in Criminal Justice

The Graduate Faculty

The Program

The program reflects the numerous complexities of the discipline. It provides academic leadership for students to work within corrections, institutionalized and non-institutionalized settings, victim services, adult and juvenile services, policing and law enforcement, private security, courts, and other human service organizations serving the clients of these institutions. It also helps develop research acumen for those students who may wish to consider doctoral studies.

Strong ties developed in state, local, and federal level law enforcement, corrections, drug treatment, victimization, and crime control policy organizations provide research and learning opportunities for interested students.

The degree may be earned by full or part-time study. Most courses will be offered in the evening, although some will be offered during the day or on weekends.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

- A completed Graduate School application for admission with the non-refundable application fee.
- Official transcripts from all post-secondary institutions attended.
- Three letters of recommendation.
- A brief (two-page) statement of purpose or a writing sample.
- Minimum GPA of a 3.0 for the last 60 credits of undergraduate study. Satisfactory scores on the Graduate Record Examination (GRE), Graduate Management Admissions Test (GMAT), or Law School Admissions Test (LSAT) are required if the GPA is less than 3.0. *Note: All students who seek funding must take one of these standardized tests, preferably the GRE.*
- The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.
- Some foundational course work may be required for those students who did not major in criminal justice as an undergraduate. This decision will be made by the MACJ Program Coordinator after a close review of the undergraduate transcript.
- In exceptional cases, the program may also approve admission by reason of special backgrounds, abilities, and interests.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

1. The thesis track requires 30 credits. Six of the credits (CRIMJ 600) will be for the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.
2. The master's paper track requires 30 credits. Three of these credits will be awarded for successful completion of a master's paper, for which a student will register for three credits of CRIMJ 594.
3. For students completing the thesis track, all credits must be at the 400, 500, 600, or 800 level, with a minimum of 18 credits at the 500 or 600 level.
4. A minimum grade-point average of a 3.0 must be earned for course work taken as a graduate student.
5. Students are required to take 15 credits in the following core courses: CRIMJ 500, CRIMJ 501, CRIMJ 502, CRIMJ 503, and CRIMJ 504.
6. Students must complete a 9 credit concentration. Students in the non-thesis track will also be required to complete an additional 3-credit elective. A list of courses required for each concentration and additional approved elective courses is maintained by the graduate program office.
7. Students who believe they have completed a course substantially similar to one of the specific course requirements may apply to have their previous work evaluated for the purposes of exemption to that requirement. If approved, another course will be taken in place of that requirement.
8. A maximum of 10 credits of completed graduate work may be transferred in from another accredited institution, subject to restrictions outlined in the Transfer Courses section of the Graduate Bulletin.

Integrated B.S./M.A. in Criminal Justice

The Criminal Justice Program offers an integrated B.S./M.A. program that is designed to allow academically superior baccalaureate students enrolled in the Criminal Justice major to obtain both the B.S. and the M.A. degrees in Criminal Justice within five years of study. The first two years of undergraduate coursework typically include the University General Education requirements and lower-level courses. In the third year, students typically take upper-division coursework in Criminal Justice and define areas of interest. The fourth year involves graduate-level Criminal Justice coursework including required courses in Criminal Justice Theory and Policy (CRIMJ 500; CRIMJ 502). The fifth and final year of the program typically consists of graduate coursework in Criminal Justice including Advanced Research Methods and Statistics in Criminal Justice (CRIMJ 501; CRIMJ 503) and identification of an original research project that will culminate in the completion of a thesis (CRIMJ 600) or master's paper (CRIMJ 594).

If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Admission Requirements

The number of openings in the integrated B.S./M.A. program is limited. Admission is selective based on specific criteria and the unqualified recommendation of faculty. Applicants to the integrated program:

1. Must be enrolled in the B.S. program in Criminal Justice and meet the admission requirements of the Criminal Justice M.A. program at Harrisburg.
2. Must apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School.
3. Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.
4. Must submit transcript(s) of undergraduate work taken outside of Penn State, recommendations from two faculty members, writing sample, and statement of goals.
5. Must have an overall GPA at or above 3.0 (on a 4.0 scale) in undergraduate coursework and a GPA at or above 3.25 in all coursework completed for their major.

6. Must present a plan of study approved by the student's adviser in the application process. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.S. in Criminal Justice are listed in the Undergraduate Bulletin. Degree requirements for the M.A. degree are listed in the Degree Requirements section above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. The courses that are eligible to double count for both degrees are: CRIMJ 450W, CRIMJ 465, CRIMJ 500, CRIMJ 501, CRIMJ 502, and CRIMJ 504.

Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count towards the graduate degree. If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

CRIMINAL JUSTICE (CRIMJ) course list

Last Revised by the Department: Fall 2017

Blue Sheet Item #: 46-04-086 (Integrated)

Review Date: 1/9/18

Faculty linked: 8/14/14

Contact info updated: 1/24/17

Communication Sciences and Disorders (CSD)

Program Home Page

DIANE L. WILLIAMS, *Head of the Department of Communication Sciences and Disorders*
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Degrees Conferred:

Ph.D., M.S.
Dual-Title Ph.D. in Communication Sciences and Disorders and Language Science

The Graduate Faculty

The Program

The goals of the program in Communication Sciences and Disorders are to train professionals to conduct research and be consumers of research in communication sciences and disorders and to prepare competent professionals to habilitate and rehabilitate individuals who have speech, language, and/or hearing problems. The program also serves to provide students in other curricula at Penn State with orientation toward and information about communication sciences and disorders.

Facilities for student training and research include in-house clinical therapy and diagnostic services, laboratories in speech science and audiology, and affiliated schools and clinics. The program enjoys academic, research, and clinical relationships with a number of related programs at Penn State and draws upon academic work from related areas as part of the graduate training in communication sciences and disorders. Preparation is given for school and professional certifications and licensure. The CSD academic program is accredited by the Council of Academic Affairs of the American Speech-Language-Hearing Association. Master's-level graduate study requires a full-time externship experience, ordinarily occurring during the final semester of study.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Approximately 35 credits are required for admission, distributed among speech pathology, audiology, speech science, education, and psychology, and including a course in statistics. Students entering without an undergraduate degree in CSD will be required to take additional make-up work.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Usually students earn a master's degree in communication sciences and disorders prior to being considered for doctoral study, although persons with master's degrees in other fields will be considered for a doctoral program.

Master's Degree Requirements

The master's degrees require a minimum of 50 graduate credits beyond admission standards. Students usually earn 55 to 65 credits to complete a degree, over four semesters and a summer of study.

There is a nonthesis option for the Master of Science degree, requiring a paper and additional course credits in lieu of a thesis. The master's program of study provides course work and practicum for advanced and/or professional-level licensure.

Doctoral Degree Requirements

The Doctor of Philosophy degree normally requires a master's degree in communication sciences and disorders or a related field, plus a minimum of two years of advanced study, and presentation and oral defense of a research-based dissertation.

The communication and foreign language requirement is a minimum of 6 credits of statistics beyond the first course, plus 9 credits selected from among statistics, technical writing, computer science, research design, or a foreign language.

Two research exercises, one of which is used for doctoral candidacy evaluation early in the doctoral program, are required prior to the dissertation. Comprehensive written examinations in the areas of a student's interest and an optional minor field examination, plus an oral examination prior to dissertation, are required.

Details of a student's doctoral program are determined by the doctoral committee.

Dual-Title Ph.D. Degree in Communication Sciences and Disorders and Language Science

Graduate students with research and educational interests in language science may apply to the Communication Sciences and Disorders and Language Science Degree Program. The goal of the dual-title degree in Communication Sciences and Disorders and Language Science is to enable graduate students from Communication Sciences and Disorders to acquire the knowledge and skills of their major area of specialization in Communication Sciences and Disorders, while at the same time gaining the perspective of the various disciplines contributing to the study of language science.

Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to the Communication Sciences and Disorders graduate program and the Graduate School. Students considered for admission to the doctoral program have a Masters program GPA above 3.0/4.0, outstanding letters of recommendation, a written statement of scholarly interests and goals, and have completed the GRE. New graduate students in Communication Sciences and Disorders will receive information about the Language Science dual-title program, and may discuss their interest with one or more Language Science faculty in the Department of Communication Sciences and Disorders, in order to obtain a recommendation for admission to the Language Science program. Once accepted into the Communication Sciences and Disorders program, and with a recommendation from a Language Science program faculty member in that department, the student may apply to the dual-title Ph.D. program in Communication Sciences and Disorders and Language Science by submitting a letter describing the student's interest in the program. The student's letter will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science. The admission requirements of the Language Science dual-title Ph.D. program are that the student must meet the admission requirements of the Graduate School and the major department. The admission requirements of the doctoral program in Communication Sciences and Disorders listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Communication Sciences and Disorders program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Language Sciences program committee. Within this framework, final course selection is determined by the student and their Communication Sciences and Disorders program advisor.

The doctoral degree in Communication Sciences and Disorders and Language Sciences is awarded only to students who are admitted to the Communication Sciences and Disorders doctoral program and admitted to the dual-title degree in Language Science. The minimum requirements for the dual-title Ph.D. degree in Communication Sciences and Disorders and Language, in addition to the Communication Sciences and Disorders requirements are as follows:

Course Work: 21 credits of 500-level courses

6 credits:
LING 521 Proseminar in the Language Science of Bilingualism
LING 522 Proseminar in Professional Issues in Language Science

3 credits Research Methods/Statistics in Language Science:
LING 525 Experimental Research Methods in Psycholinguistics
PSY 507 Analysis of Psychological Data I
PSY 508 Analysis of Psychological Data II

3 credits in Theoretical Linguistics
LING 500 Syntax II
LING 504 Phonology II

3 credits in Cognitive Neuroscience or Psycholinguistics
LING 520 Seminar in Psycholinguistics
PSY 511 Seminar in Contemporary Psychology
PSY 520 Seminar in Psycholinguistics

6 credits in Research Internships
These internships will provide experience in the conduct of research; at least on internship must be with a mentor other than the student's dissertation advisor. (Students will choose one course among the following CSD 596, GER 596, LING 596, PSY 596, SPAN 596).

Particular courses may satisfy both the Communication Sciences and Disorders requirements and those in the Language Science dual-title program. Final course selection is determined by the student in consultation with their doctoral advisor and committee. In most cases, the number of total credits earned by a dual-title student will be from 6-12 more than those normally earned by a student in Communication Sciences and Disorders. Some courses which meet Language Science requirements (e.g., theoretical linguistics, neuroscience, psycholinguistics) may also fulfill the Communication Sciences and Disorders requirements for a related area outside the department; however, dual-title students are not required to count any particular Language Science requirement as their outside area. Dual-title students who choose an outside content area not related to Language Science will require more time to complete their program.

Students are expected to participate in weekly Language Science Research meeting each semester in residence.

Student Aid

Student Aid Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMMUNICATION SCIENCES AND DISORDERS (CSD) course list

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-07-006

Review Date: 06/22/2010

Faculty linked: 6/5/14

Computer Science and Engineering (CSE)

Program Home Page

CHITARANJAN DAS, *Head of the Department*
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814-865-9505

Degrees Conferred:

Ph.D., M.S., M.Eng.
Dual-Title Ph.D., M.S., and M.Eng. in Operations Research

The Graduate Faculty

The Program

The department offers courses and is prepared to direct research in a variety of subfields of computer science and engineering, including VLSI, computer architecture, parallel/distributed processors and processing, multiprocessors, interconnection networks, pattern recognition and image processing, performance evaluation, reliability, fault tolerance, theory of computation, computer systems, numerical analysis and optimization, programming methodology, and analysis of algorithms. Research and instruction are supported by extensive computing facilities within the University's Information Technology Services and by the computer laboratories operated by the department.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

All applicants must provide a one-page statement of purpose and scores from the Graduate Record Examinations (GRE) Aptitude Test (verbal, quantitative, and analytical). A subject test in the GRE is not required, but the subject test in Computer Science is recommended.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Those students seeking an assistantship in Computer Science and Engineering ARE REQUIRED to submit a Test of Spoken English (TSE) or the TOEFL iBT. A score of 26 on the speaking section of the TOEFL iBT is equivalent to passing the TSE. A lower score would require remedial English as a Second Language courses. For score reporting for TOEFL, the institution code is 2660 and the department code is 78.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

All students are expected to have completed appropriate courses in computer architecture and machine organization, data structures and analysis of algorithms, programming languages, operating systems, and logical design/switching theory or theory of automata. Students who do not meet background requirements will be required to take the appropriate 400-level courses to prepare them for the 500-level courses. At most, 3 credits of background course work can be used to satisfy the degree requirements except as specified for the M.Eng. degree. Students admitted to the M.S. program will not be permitted to switch to the M. Eng. program at a later time, except under extenuating circumstances and at the discretion of the program.

A minimum of 30 credits is required for the M.S. degree:

- 15 credits of courses numbered CSE 500 through 589, including a minimum of 9 credits that satisfy a breadth requirement. The list of courses that will satisfy the breadth requirement is maintained by the program office;
- 9 credits of 400-, 500-, or 800-level courses (excluding independent studies courses). This must include at least 1, and at most 2, credits of CSE 590 (Colloquium);
- 6 credits of thesis research (CSE 600 or 610)

Students must complete and defend an M.S. thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School.

A minimum of 30 credits is required for the M. Eng. degree:

- Fall Semester: CMPSC 465(3); either (CMPSC 443(3) and CMPSC 431(3)) or (CMPEN 431(3) and CMPEN 472(3)); and 3 credits in CSE 500-589 or 597.
- Spring Semester: 12 credits in CSE 500-589 or 597.
- Summer Semester: CSE 820(3) and CSE 594(3).

The culminating experience for the program is a paper completed while the student is enrolled in CSE 594.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students applying for and gaining admittance to the Ph.D. program will not be permitted to switch to the master's program at a later date, except under extenuating circumstances, at the discretion of the program. To qualify for a Ph.D. degree, students who do not have an M.S. degree in Computer Science or Computer Engineering must take a minimum of 33 credits, including:

- 6 credits of CSE 565(3), CSE 511(3), or CSE 530(3);
- 15 credits of CSE courses, excluding CSE 596 and 598;
- 9 credits of 400-, 500-, or 800-level courses in CSE/EE/MATH/STAT, or 500- or 800-level IST courses (which may include up to 3 credits of CSE 596);
- 2 credits of CSE 590 Colloquium; and
- 1 credit of CSE 591.

Students admitted to the Ph.D. program with an M.S. degree in Computer Science or Computer Engineering must take a minimum of 21 credits, including:

- 6 credits of CSE 565(3), CSE 511(3), or CSE 530(3);
- 9 credits of CSE courses, excluding CSE 596 and 598;
- 3 credits of 400-, 500-, or 800-level courses in CSE/EE/MATH/STAT, or 500- or 800-level IST courses (which may include up to 3 credits of CSE 596);
- 2 credits of CSE 590 Colloquium; and
- 1 credit of CSE 591

A student must pass the Ph.D. candidacy examination by the third regular semester after entering the program. After completion of most of the course work and meeting the English competency requirement, students must pass the Ph.D. comprehensive examination. A dissertation must be completed under the direction of the doctoral committee and the results must be successfully defended in the final oral examination.

To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D., M.S., and M.Eng. in Operations Research

Admissions Requirements

Students must apply and be admitted to the graduate program in Computer Science and Engineering and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page. Doctoral students must be admitted into the dual-title degree program in Operations Research prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Computer Science and Engineering, listed above. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Computer Science and Engineering and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Computer Science and Engineering and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Computer Science and Engineering and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Computer Science and Engineering and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMPUTER SCIENCE AND ENGINEERING (CSE) course list

Last Revised by the Department: Spring Semester 2017

Blue Sheet Item #: 45-06

Review Date: 4/4/2017

Faculty linked: 6/5/14

Clinical and Translational Sciences (CTS)

Heads:

GAIL D. THOMAS, Ph.D.
H047 Medicine, Hershey Medical Center
717-531-0003 x287087

JAMES PAWELCZYK, Ph.D.
107 Noll Lab, University Park
814-865-3453

Degree conferred:

Students electing to pursue this program through participating departments will earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in [major program name] and Clinical and Translational Sciences.

The Graduate Faculty

The Program

The College of Medicine provides academic leadership of the CTS dual-title graduate degree program. It is administered jointly on the University Park and Hershey campuses through the College of Health and Human Development and the College of Medicine, respectively, in conjunction with Penn State's Clinical and Translational Science Institute (CTSI) and in coordination with the student's primary graduate program. The CTSI Education and Training Internal Advisory Committee, which includes representatives from colleges and departments participating in the CTSI, maintains the program's definition and goals, identifies faculty and courses relevant to the CTS dual-title graduate degree program, and recommends policies and procedures for the program's operation.

The dual-title graduate degree program in CTS is designed to provide students with the aptitudes and skills necessary to expand research in their major field of study to impact clinical medicine and public health. The dual-title graduate degree program will provide opportunities to synthesize expertise across disciplinary boundaries and to evaluate the effectiveness of research to create improved clinical and/or health outcomes. This program enhances the training in the major field of study by providing value-added skill sets in patient-oriented, epidemiological, behavioral, outcomes and health services research that transitions scientific findings from the laboratory to the clinical setting to best practices in the community. Clinical and translational sciences are expanding, with career paths in academic, medical and industrial settings.

Because the dual-title Ph.D. complements the primary program of study, CTS program representation must be included at all phases of graduate study, including the candidacy exam, comprehensive exam, and dissertation defense.

Admission Requirements

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the CTS dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CTS dual-title program. Doctoral students must be admitted into the dual-title degree program in CTS prior to obtaining candidacy in their primary graduate program.

An admissions committee comprised of faculty affiliated with the CTS dual-title graduate degree program will evaluate students. Applicants must have a graduate GPA of at least 3.5 in an area that relates to clinical and translational sciences. Applicants will be required to provide a statement of purpose that addresses the ways their research and professional goals will be enhanced by interdisciplinary research.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the degree requirements for the dual-title in CTS listed below.

General requirements for the dual-title Ph.D. in [major program name] and Clinical and Translational Sciences are listed below:

- CTS 590 (1) Seminar in Clinical and Translational Sciences (two semesters)
- CTS 595 (1-6) Clinical Research Internship or BMS 571 (1-3) Graduate Clinical Rotation (6 credits)
- 18 additional credits from a list of approved electives in the following areas:

Statistics (3 credits)
Epidemiology (3 credits)
Bioinformatics (3 credits)
Experimental design and interpretation (3 credits)
The regulatory environment (3 credits)
Scientific communication (3 credits)
The choice of CTS electives may be proposed by the student, subject to approval by the student's academic advisers from the primary and CTS programs. They should complement the student's work in the primary program. A list of approved electives is available on the CTS program home page.

- Successful completion of candidacy and comprehensive examinations in clinical and translational sciences and the related field.The specific format and content is determined in consultation with the primary program.
- Successful defense of a dissertation in the major field with a substantial component that is clinical or translational in nature.
- Scholarship and Research Integrity (SARI) training (required of all Penn State graduate students)
- Institutional Review Board and/or Institutional Animal Care and Use Committee training (as appropriate)

Candidacy Requirement

Typically, candidates to the program will be accepted during their first year of study. In some circumstances candidates may be considered during the second year. To be admitted to the CTS dual-title graduate degree program students must meet the Ph.D. candidacy requirements in both their major area of study and the dual-title area. The candidacy exam will include both elements. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The candidacy examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the CTS program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a CTS dual-title doctoral degree student must include at least one member of the CTS Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair.

Comprehensive Exam

The CTS representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The comprehensive exam will require the student to demonstrate an understanding of the methods of translational sciences and an ability to apply them to problems in the student's major field of study. When appropriate, the student will be expected to demonstrate a working knowledge of methods to evaluate and compare the outcomes of his/her research to related approaches already in existence.

Dissertation

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in both their primary graduate program and CTS. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2017

Review Date: 4/4/2017

Faculty linked: 8/14/14

Demography (DEMOG)

Program Home Page

STEPHEN A. MATTHEWS, *In Charge*
601 Oswald Tower
814-865-0486
demography@pop.psu.edu

Degrees Conferred:

Students electing this option through participating programs will earn a degree with a dual title at both the Ph.D. and M.A./M.S. levels, i.e., Ph.D. in (graduate program name) and Demography, or M.A. or M.S. in (graduate program name) and Demography.

The following graduate programs offer dual degrees in Demography: M.A. and Ph.D. in Sociology and Demography; M.A. and Ph.D. in Economics and Demography; M.A. and Ph.D. in Anthropology and Demography; M.S. and Ph.D. in Rural Sociology and Demography; M.S. and Ph.D. in Human Development and Family Studies, and Demography; M.S. and Ph.D. in Energy, Environmental, and Food Economics, and Demography; M.S. and Ph.D. in Health Policy and Administration.

The Graduate Faculty

The Program

The Demography dual-title degree program option is administered by the Demography Program Committee, which is responsible for management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the option, and recommends policies and procedures for its operation to the dean of the Graduate School. This dual-title degree program is offered as an option to graduate major programs in three colleges: Agricultural Sciences, Health and Human Development, and the Liberal Arts. The option enables students from diverse graduate programs to attain and be identified with the content, techniques, methodology, and policy implications of demography, while maintaining a close association with areas of application. Through demography, students study (1) the size, composition, and distribution of the population; (2) changes in these characteristics; (3) the processes that determine these changes--fertility, migration, and mortality; and (4) their social, economic, and cultural causes and consequences. To pursue a dual-title degree in Demography, the student must apply to the Graduate School and be admitted to one of the following graduate programs: Energy, Environmental and Food Economics, Health Policy and Administration, Anthropology, Economics, Human Development and Family Studies, Rural Sociology, or Sociology.

Admission Requirements

Students applying for admission to the dual-title in Demography must provide a positive recommendation by a Demography Graduate Faculty member in their graduate major program.

Applicants should have a junior/senior cumulative grade-point average of well above 3.00 (on a 4.00 scale) and appropriate courses in statistics and in the social science department to which they are applying. The application should include three letters of reference and a statement describing and explaining the applicant's interest in demography and goals during and after graduate study. Doctoral students must apply and be admitted to the Demography dual-title program prior to taking the candidacy exam.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the graduate program in which they are enrolled, including the communication/foreign language requirements, if any. In addition, they must satisfy the minimum requirements for the dual-title in Demography described here, as established by the Demography Program Committee. Within this framework, final course selection is determined by students and their degree committees. All dual-title degree candidates who are in residence must enroll in DEMOG 590 for 1 credit each year in residence.

Master's Degree: For the M.A. and M.S. degree with the Demography option, 12 course credits are required in addition to the colloquium credit or credits. A minimum of 3 credits is required in each of the following areas: (1) disciplinary perspective courses; (2) demographic methods courses (SOC 573 is required of all candidates); (3) seminars in demographic processes; (4) seminars in population studies. See a complete course list on theprogram home page.

Particular courses may satisfy both the graduate major program requirements and those of the Demography option. The thesis supervisor must be a member of the Graduate Faculty recommended by the chair or the graduate officer of the program granting the degree and a member of the Demography faculty.

Ph.D. Degree: For the Ph.D. degree with a dual-title in Demography, a minimum of 24 credits is required in addition to the colloquium credits. For students entering with a master's degree from another institution, equivalent course credits may be accepted. The following minimum number of credits is required in each curriculum category: 3 credits of disciplinary perspective courses; 6 credits of demographic methods courses; SOC 573 is required of all candidates; 6 credits of seminars in demographic processes; 3 credits of seminars in population studies; and 6 credits of electives. Final course selection is determined in consultation with the doctoral committee.

The candidacy examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Demography program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both the primary graduate degree program and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the chair and at least one additional member of the doctoral committee must be members of the graduate faculty in Demography. The Demography faculty members on the student's committee are responsible for administering an examination in demography that constitutes a portion of the comprehensive examination of the dual-title doctoral student. Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in both their primary graduate program and Demography. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Other Relevant Information

A Ph.D. minor in Demography is available for doctoral students in graduate programs other than the dual-title participating programs who find it advantageous to include demographic content, methods, and policy analysis in their program of study. The student's doctoral committee must approve the choice of this minor, and one member of the doctoral committee must be from the Demography Graduate Faculty.

To qualify for a minor in Demography, students must satisfy the requirements of their graduate major program and take at least 15 credits in demography in addition to colloquium credits. A minimum of at least 6 credits must be at the 500 level. A minimum of at least 3 credits each in (1) disciplinary perspective, (2) demographic methods courses (SOC 573 is required of all candidates), (3) seminars in demographic processes, and (4) seminars in population studies is required. Students must enroll in DEMOG 590 for 1 credit during each year enrolled in the program and in residence.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate*

Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*. In addition, the following awards typically have been available to graduate students in this program:
Affiliated departments and The Population Research Institute Assistantships, and the NICHD Traineeship awards.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

DEMOGRAPHY (DEMOG) course list

Last Revised by the Department: Summer Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Faculty linked: 6/5/14

Electrical Engineering (E E)

Program Home Page

KULTEGIN AYDIN, *Head*
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grad_info_ee@engr.psu.edu

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

The general areas of graduate research in Electrical Engineering are electromagnetics and optics; electronics and photonics; communications, computers, networking, and signal processing; and control and power systems. Specializations available within these areas include microwaves, antennas, and propagation; electro-optics and nonlinear optics; remote sensing and space systems; materials and devices; circuits and networks; VLSI; communications; networking; signal and image processing; computer vision and pattern recognition; control systems; and power systems.

For information about areas of specialization, laboratory and research facilities, fellowships, assistantships, and other sources of financial assistance, write directly to the Graduate Program Coordinator, Department of Electrical Engineering, 121 Electrical Engineering East, University Park, PA 16802-2705, or review the Web pages at www.ee.psu.edu.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants are required to submit scores from the GRE General Test, three letters of reference, and a personal statement of relevant experience and goals, a resume, official transcripts from all post-secondary institutions attended, and a supplemental application.

Master of Science Degree Requirements

The Master of Science requirements include the general requirements of the Graduate School as listed under Master's Degree Requirements in the *Graduate Bulletin*.

Specific course requirements: (1) Thesis option--a total of 32 credits (at least 18 at the 500-and 600-level combined) including: 24 credits in course work, with at least 12 credits in courses with the E E designation; 2 colloquium credits (E E 500); 6 thesis credits (E E 600 or 610); and a thesis accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School; (2) Paper option--a total of 32 credits (at least 18 at the 500-level) including: 27 credits in course work, with at least 14 credits in courses with the E E designation; 2 colloquium credits (E E 500); 3 paper credits (E E 594); and a satisfactory scholarly paper.

Doctoral Degree Requirements

The Doctor of Philosophy requirements include the general requirements of the Graduate School as listed under Doctoral Degree Requirements in the *Graduate Bulletin.*

Specific requirements: The communication requirement is met by adequacy in both spoken and written English. This is accomplished through testing and remedial course requirements. All doctoral students must pass a candidacy examination, a comprehensive examination, and a final oral examination. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School. The candidacy examination consists of both written and oral parts; the oral comprehensive examination is preceded by the writing of a dissertation proposal. The program requires a minimum of 39 course credits and 2 colloquium credits (E E 500) beyond the B.S. degree.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

PAUL F. ANDERSON GRADUATE FELLOWSHIP
MELVIN P. BLOOM MEMORIAL GRADUATE FELLOWSHIP
LUTHER B. AND PATRICIA A. BROWN GRADUATE FELLOWSHIP
JOSEPH R. AND JANICE M. MONKOWSKI GRADUATE FELLOWSHIP
JAMES R. AND BARBARA R. PALMER FELLOWSHIP
PONTANO FAMILY SCHOLARSHIP IN ELECTRICAL ENGINEERING
SOCIETY OF PENN STATE ELECTRICAL ENGINEERS (SPSEE) GRADUATE FELLOWSHIP
FRED C. AND M. JOAN THOMPSON GRADUATE FELLOWSHIP
BESS L. AND MYLAN R. WATKINS GRADUATE FELLOWSHIP

Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ELECTRICAL ENGINEERING (E E) course list

Last Revised by the Department: Spring Semester 2016

Blue Sheet Item #: 44-06-000

Review Date: 04/5/2016

Faculty linked: 6/9/14

Electrical Engineering

Program Home Page

MOHAMMED-REZA TOFIGHI, *Program Coordinator*
Penn State Harrisburg
777 W. Harrisburg Pike
W211 Olmsted Building
Middletown, PA 17057
717-948-6109

Degrees Conferred:

M.Eng., M.S.
Integrated B.S./M.S.

The Graduate Faculty

M.Eng. (E E)

Admission Requirements

A prospective graduate student in Electrical Engineering at Penn State Harrisburg must fulfill the admission requirements as set forth by Graduate Council, and have a bachelor of science degree in an electrical engineering program accredited by the Accreditation Board of Engineering and Technology (ABET), or the equivalent. An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale is required for admission. Exceptions to this will be based on professional experience and other factors such as GRE scores. In addition, a student who does not meet the overall 3.0 grade-point average may be considered for admission if the student has a 3.0 junior/senior grade-point average. Up to 15 credits earned in three semesters or fewer, as a nondegree student, may be applied toward the master's degree.

Those applying for admission as a master of engineering candidate without an electrical engineering degree may be admitted with the stipulation that deficiencies in background, if any, will be remedied early in the program and that these courses will be in addition to the required number of credits for the degree. Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

Applicants must submit the following:

- **online** Graduate School application and payment of the application fee;
- official undergraduate transcripts;
- test scores from the Graduate Record Examinations (GRE) (preferable, but not required);
- three (3) letters of reference, especially those from faculty who can evaluate academic potential;
- a personal statement of technical interest, goals, and experience.

Test scores from the Graduate Record Examination (GRE) are required ONLY for those applicants indicating interest in an assistantship. Assistantships are only available to students in residence.

English Proficiency-- The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT).

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

Degree Requirements

A total of 30 credits is required for a Master of Engineering degree, of which at least 21 must be taken through Penn State Harrisburg engineering graduate programs. Up to 9 credits of graduate work may be transferred from other institutions provided (a) credits are suitable for the particular engineering discipline, and (b) students have earned a grade of B or better. At least 18 credits must be at the 500 level, which includes 3 credits of EE 594.

Students enrolled in the program for the Master of Engineering degree in Electrical Engineering must earn 9 credits in the required core courses (i.e., courses with the E E prefix).

A candidate for the M.Eng. EE degree must write a scholarly paper and present it before two faculty members. The paper, completed in EE 594 Research Projects, is intended to be a relatively short document that includes a relevant literature review on a selected research topic identified by the adviser and to be prepared in a prescribed format (e.g. as papers in IEEE Transactions).

Students must have a 3.00 grade-point average in both prescribed and supporting courses approved by the program to graduate. Students pursue the program on a part-time basis. A student may complete the program within two years, based on completion of two courses a semester.

M.S. (E ENG)

Admission Requirements

Admission into the Master of Science (M.S.) Electrical Engineering program will be granted only to candidates who demonstrate high potential for success in graduate studies.

Applicants should have undergraduate degrees in engineering or technology-related fields from an accredited university and must meet the admission requirements as set by Penn State's Graduate Council. An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the GRE are required for admission.

Applicants must submit the following:

- a completed Graduate School online application with the application fee;
- official copies of undergraduate transcripts;
- three (3) letters of professional recommendations from individuals who can evaluate the applicant’s potential;
- a personal statement of technical interest, goals, and experience;
- test scores from the Graduate Record Examination (GRE); and
- statement of interest in graduate assistantship, if desired.

English Proficiency - The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the

internet-based test. Applicants with IBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5.

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

Completed International Application material must be submitted by the following deadlines: May 31 for the fall semester; September 30 for the spring semester; February 28 for the summer session. Applications received after these deadlines will be processed for the following semester.

Degree Requirements

All graduate students in Electrical Engineering are required to adhere to the requirements of the Graduate Council, as found in the Graduate Degree Programs Bulletin. The requirements of the Graduate Council, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduate students pursuing the MS in Electrical Engineering degree at Penn State Harrisburg. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student's personal responsibility to see that all requirements are satisfied.

The MSEE program at Penn State Harrisburg is structured into two areas of concentration to fully take advantage of the specialty areas represented in the E E graduate faculty. The areas are Electronics- Electromagnetics-Optics (EEO) and Systems. The program requires 31- credits, including 24 course credits with at least 15 credits at the 500 level, one colloquium credit, and 6 thesis credits (600-level). All students are required to take a 500-level analysis course (EMCH 524A) in addition to prescribed courses in one of the two concentration areas. The prescribed courses are intended to establish the fundamentals of the technical areas. To incorporate some breadth into the program, students are required to take at least one course in the second concentration area. A maximum of three 400-level courses (9 credits) may be taken for the MSEE degree

Original research, usually requiring at least two semesters of work (nominal 6 credits), is expected for a thesis. Students must write and submit a thesis. The thesis work should be an in-depth investigation intended to extend the state of knowledge in some specialty area. The thesis committee consists of three graduate faculty members, including the thesis adviser. For thesis guidelines and timelines, students are referred to the Penn State Graduate School web site (http://www.gradschool.psu.edu/).

The E E program has established a six-year time limit for completion of the M.S. degree. Any extension beyond six years requires the approval of the E E program Graduate Faculty.

The student must maintain a minimum grade point average (GPA) of 3.00 or better on a 4.00 scale in 500- and 400-level courses listed on his/her Plan of Study.

Penn State Harrisburg's MSEE program is distinct and independent of the MSEE program offered at the University Park campus.

Integrated B.S./M.S. in Electrical Engineering

The Electrical Engineering program offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science and the Master of Science in Electrical Engineering. The ability to coordinate as well as concurrently pursue the two degree programs enables students to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. However, the total course load is reduced due to the maximum of 12 credits that can count towards both degrees. A minimum of 7 credits proposed to count for both degrees must be at the 500 level. Thesis credits may not be double counted. The fourth year of the IUG program differs from the fourth year of the Bachelor of Science program due to the courses that count toward the Master of Science Degree requirements. Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student's academic performance will be conducted at the end of the first semester of the senior year for a typical student in the program. Students who have not maintained a 3.4 GPA in their Math and Electrical Engineering courses will be put on probationary status with respect to the IUG program. Their ability to continue in the IUG program will be based on academic performance in the last semester of their senior year. As part of the review in the senior year, students will be advised about the thesis requirement in the graduate program.

Students have the choice of receiving the B.S. degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years. If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Science degree, the student will be permitted to receive the Bachelor of Science degree assuming all the undergraduate degree requirements have been satisfactorily completed. If students successfully complete courses listed in the recommended schedule, they will satisfy the requirements for the Bachelor of Science degree by the end of their fourth year.

Admission Requirements

To initiate the application process, students must submit an *Integrated Undergraduate-Graduate (IUG) Degree in Electrical Engineering Application Form,* an official transcript, three letters of professional recommendation from individuals who can evaluate the applicant's potential, and a personal statement of technical interest and goals. A faculty adviser will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program. In order to apply for the IUG program, students must have completed a minimum of 81 credits; therefore a typical student would apply after completing the fifth semester and before the end of the sixth semester. Students will be admitted no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. For consideration for acceptance into the program, students must have cumulative grade point average (GPA) of 3.4 or better and collective GPA of 3.4 or better in the following courses: CMPEN 271, CMPEN 275, E E 315 (or equivalent) , E E 341, CMPEH 472 and all the designated MATH, PHYS, and CMPSC courses. Applications will be evaluated based on students' overall academic performance, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee of the Electrical Engineering program.

Degree Requirements

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Science degrees. The total course load is reduced due to the maximum of 12 credits that can count towards both degrees. The minimum of 6 credits double-counted must be at the 500 level. Thesis credits may not be double counted.

M.S. Degree Portion:

TOTAL M.S. REQUIREMENTS: 31 credits
(12 double-counted with B.S. Requirements)

All graduate students in Electrical Engineering are required to adhere to the requirements of the Graduate Council, as found in the Graduate Degree Programs Bulletin. The requirements of Graduate Council, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduate students pursuing the MS in Electrical Engineering degree at Penn State Harrisburg. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student's personal responsibility to see that all requirements are satisfied.

The MS E ENG program at Penn State Harrisburg is structured into two areas of concentration to fully take advantage of the specialty areas represented in the E E graduate faculty. The areas are Electronics-Electromagnetics-Optics (EEO) and Systems. The program requires 31 credits, including 24 course credits with at least 15 credits at the 500 level, one colloquium credit, and 6 thesis credits (600-level). All students are required to take a 500-level analysis course (E MCH 524A) in addition to prescribed courses in one of the two concentration areas. The prescribed courses are intended to establish the fundamentals of the technical areas. To incorporate some breadth into the program, students are required to take at least one course in the second concentration area. A maximum of three 400-level courses (9 credits) may be taken for the MS E ENG degree.

Original research, usually requiring at least two semesters of work (nominal 6 credits), is expected for a thesis. Students must write and submit a thesis. The thesis work should be an in-depth investigation intended to extend the state of knowledge in some specialty area. The thesis work should be an in-depth investigation intended to extend the state of knowledge in some specialty area. The thesis committee consists of three graduate faculty members, including the thesis adviser. For thesis guidelines and time lines, students are referred to the Penn State Graduate School website (http://www.gradschool.psu.edu/) The E E program has established a six-year time limit for completion of the M.S. degree. Any extension beyond six years requires the approval of the E E

program's Graduate Faculty.

Students must maintain a minimum grade point average (GPA) of 3.00 or better on a 4.00 scale in 500- and 400-level courses listed on their Plan of Study.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

For course information specific to the Electrical Engineering M.S. and M.Eng. programs at Penn State Harrisburg, refer to the program home page.

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-05-065A

Review Date: 02/24/2015

Faculty linked: 8/14/14

Program Coordinator updated: 6/1/16

Business Administration, Executive Master of (exMBA)

Dr. Brian H. Cameron, Associate Dean for Professional Graduate Programs
The Smeal College of Business
220S Business Building
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Jason Stieg, *Director of EMBA Program*
220 Business Building

Degree Conferred:
M.B.A.

The Graduate Faculty, MBA programs

The Program

The Executive MBA program is a cohort program with a class of approximately forty students moving in lockstep through the program. Classes are taught primarily on the weekends in the Philadelphia area, complemented with several residence weeks on the University Park campus.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.
Criteria for evaluating applicants include professional and academic accomplishments, recommendations, and personal data from application forms that provide indications of future academic and professional accomplishment. Applications for the Executive M.B.A. degree are only accepted for Fall semester admission.

Executive MBA Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.
The EMBA program consists of two distinct portions: (1) preprogram competency expectations, including accounting, mathematics, and statistics; and (2) a minimum of 40 credits at the 400, 500, or 800 levels, and a minimum of 18 credits at the 500 or 800 level, with at least 6 credits at the 500 level. Of the minimum 40 credits, 28 credits are required core courses: The remaining 12 elective credits must be chosen from a list of approved concentration elective courses maintained by the graduate program office.

EMBA Proposal	Credits
BA 817: Comm. Skills for Lship	2
BA 811: Financial Accounting	2
BA 801: Management	2
BA 815: Statistics	2
BA 802: Team Process and Perf.	1
BA 533: Economics for Mgrs.	2
BA 831: Foundations in Finance	2
BA 810: Supply Chain & Ops	2
BA 571: Strategic Management	2

BA 512: Quantitative Analysis for Managerial Decision Making	2
BA 800: Marketing Mgmt	2
BA 832: Global Business Envir.	1
BA 821: Foundation in Managerial Accounting	2
BA 805: Negotiation Theory and Skills	1
BA 804: Ethical Leadership	2
BA 835: Global Perspectives	1
Total Core Credits	28
Electives (Min-Max)	12-18
Total Credits (Min-Max)	40-46

Twelve concentration elective credits must be chosen from a list of approved elective courses maintained by the graduate program office. An example of electives is shown below.

Concentration Elective Courses	Credits
Strategy Elective (e.g., Strategy Implementation)	2
Management Elective (e.g., Management and Change)	2
Finance Elective (e.g., Global Finance)	2

Marketing Elective (e.g., Marketing Comm. and Brand Mgt)	2
Supply Chain Elective (e.g., Supply Chain for the C-suite)	2
Capstone Elective (e.g., Strategic Leadership)	2
Total Credits	12

The culminating experience for the M.B.A. is the capstone course BA 571 Strategic Management. . This course is designed to bring together the many functional areas previously studied and integrate them into a strategic analysis of the firm.
In addition to 12 concentration electives, students may be offered optional electives. An example of optional electives is shown below.

Optional Electives	Credits
Entrepreneurship	3
Global Immersion	3
Total Credits	6

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall 2017

Review Date: 11/14/2017

Engineering Management (E M)

Home Page

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School of Science, Engineering, and Technology
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Degree Conferred:

M.P.S.

The Graduate Faculty, School of Science, Engineering, and Technology

The Graduate Faculty, School of Business Administration

The Program

The Master of Professional Studies (M.P.S.) Engineering Management degree program is a graduate professional degree program that integrates engineering with business and management principles. The program provides engineers with business and management perspectives and enhances their capabilities in the management of major projects, business initiatives, policies, and other activities in both the public and private sectors. Furthermore, it highlights the importance of technology strategy and intellectual properties management, and offers an environment for personal and professional networking that could hold significant future dividend.

The program is offered at Penn State Harrisburg as a partnership between the School of Science, Engineering, and Technology and the School of Business Administration, which is accredited at the undergraduate and graduate levels by AACSB International---the Association to Advance Collegiate Schools of Business International.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission.

Applicants must have undergraduate degrees in engineering or technology from an accredited university and must have completed undergraduate course work in calculus and economics.

An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission. Students demonstrating high potential but failing to meet the minimum GMAT or GRE score requirements may be considered on the basis of professional accomplishments and other criteria that may predict success in the program.

Applicants must submit the following:
---a complete Graduate School application for admission with the nonrefundable application fee.
- - -official transcripts from all post-secondary institutions attended.
---three (3) letters of reference, especially from faculty who can evaluate academic potential
---a personal statement of technical interest, goals, and experience
---test scores from the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) [GRE scores are required for those indicating interest in an assistantship and to be eligible for many graduate fellowship opportunities.]

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admissions Procedures page for more information.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

All graduate students in Engineering Management are required to adhere to the requirements of the Graduate School, as listed in the Graduate Degree Programs Bulletin. The requirements of the Graduate School, however, are minimum requirements and the policies, procedures, and regulations listed below are additional and more specific for graduate students pursuing the M.P.S. degree in Engineering Management. Advisers will call pertinent regulations to the attention of their advisees, but it should be understood that it is the student's personal responsibility to see that all requirements listed are satisfied.

The M.P.S. in Engineering Management is a 33-credit graduate program that integrates engineering with business and management principles. The multidisciplinary, broadly based M.P.S. program provides engineers with business and management perspectives to enhance capabiities in management of large projects.

All M.P.S. students are required to take seven core courses (21 credits) focusing on economic analysis, communication and teamwork, management processes, corporate finance, energy and the environment, and engineering analysis. The core required courses are: ACCT 501 (3 cr.), EMCH 524A (3 cr.), ENGMT 511 (3 cr.), FINAN 521 (3 cr.), MNGMT 511 (3 cr.), MRKT 513 (3 cr.), and SYSEN 505 (3 cr.).

The curriculum requires the completion of two free electives (6 credits) in any of the engineering disciplines. A list of approved elective courses is maintained by the graduate program office. All students are required to complete a culminating experience through a two-course capstone course sequence (6 credits) comprised of BUS 588 Strategic Management (3 cr.) and MFGSE 550 Design for Manufacturability I (3 cr.). Of the 33 credits required for the degree, 30 must be earned in 500-level graduate courses.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised: Spring 2018

Report: 2/20/2018

Faculty linked: 8/14/14

Program Coordinator updated: 6/1/16

Environmental Pollution Control (E P C)

Program Home Page: M.S.; Program Home Page: M.E.P.C.

SHIRLEY E. CLARK, *Program Coordinator*
W236 Olmsted Building
Penn State Harrisburg
717-948-6127

Degrees Conferred:

M.S., M.E.P.C. (Penn State Harrisburg, Penn State University Park)

The Graduate Faculty--Penn State Harrisburg

The Program

This intercollege master's degree program, available at Penn State Harrisburg and Penn State University Park, deals with the various aspects of air, land, and water pollution control. Graduate instruction is under the direction of an interdisciplinary faculty committee and the departments participating in the program. The EPC faculty have teaching and research interests in the area of environmental pollution control, and where projects are being funded, support opportunities may be available. Currently, faculty from sixteen departments in four colleges are participating in the program at University Park and faculty from four graduate programs participate at Penn State Harrisburg. A student is affiliated with one of these departments on the basis of his/her specific area of interest and is advised by an EPC faculty member in that department. Maximum flexibility is maintained by the program in an effort to meet both the needs of the individual student and the pollution control activity in which he/she wants to participate.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

The EPC program is designed for students with backgrounds in science or engineering. Admission will be granted if the applicant has the necessary program prerequisites and a faculty member in the student's interest area agrees to serve as adviser. Normal admission requirements include mathematics through integral calculus plus two courses each in both general chemistry and physics.

Students with a 3.00 junior/senior average and with appropriate backgrounds in mathematics and science will be considered for admission. The best-qualified applicants will be admitted up to the number of places that are available for new students. Applicants to the Environmental Pollution Control program are required to provide a statement of objectives, three letters of recommendation, and scores from the Graduate Record Examination (GRE) Aptitude Test (verbal, quantitative, analytical) to complete the admission process. Entering graduate students for whom English is not their first language are required to have a score of at least 560 on the TOEFL (Test of English as a Foreign Language) examination. There is no foreign language requirement.

Degree Requirements

All candidates are required to take a core course in each of four environmental areas--air, water, solid waste, hazardous waste management, and policy/risk--and 1 credit of the E P C 590 seminar for a minimum core requirement of 12 credits. All but 6 of the total 30 credits required must be selected from a recommended course list. If the option to prepare a thesis is selected (M.S. only), students must schedule at least 12 credits at the 500 level, take at least 6 credits of 600-level thesis research in their thesis adviser's academic department, and write a thesis on an area concerned with environmental pollution. Only 6 credits of 600-level course work may count toward the 30-credit minimum degree requirement. Students who select the nonthesis option must schedule at least 18 credits at the 500 level, which may include 1 credit of E P C 590 and a maximum of 3 paper-writing credits. The M.E.P.C. E P C degree requires submission of a scholarly master's paper.

Watershed Stewardship Option

The Graduate Option in Watershed Stewardship is a graduate option intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in a graduate degree program within Environmental Pollution Control at the University Park campus. The objective of the Graduate Option in Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at natural resources conservation and environmental problems encountered in Pennsylvania communities, especially non-point source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate coursework: 12 credits of breadth courses, 2 credits of Watershed Stewardship Seminar courses (FOR 591A and FOR 591B or LARCH 510.2), and 8 credits of Watershed Stewardship Practicum I and II courses (FOR 570 and FOR 571 or LARCH 540.2 and LARCH 550.2). Breadth courses will consist of three graduate credits of coursework from each of four subject matter areas: 1) water resources science, 2) social science, public policy and economics, 3) humanities, and 4) communications and design. In the watershed stewardship practicum courses students work in teams with community, government and business leaders to analyze and understand natural resources and environmental pollution problems and creatively synthesize appropriate solutions in the form of a written watershed management plan.

A representative pattern of scheduling for the Graduate Option in Watershed Stewardship in addition to a student's other degree requirements might be:

First Year:

Fall Semester
Breadth electives - 6 credits
FOR 591A or LARCH 510.2
Watershed Stewardship Issues
Colloquium, 1 credit

Spring Semester
Breadth electives - 6 credits
FOR 591B or LARCH 510.2
Watershed Stewardship
Planning Colloquium, 1 credit

Second Year:

Fall Semester
FOR 570 or LARCH 540.2, 3 credits
Keystone Project

Spring Semester
FOR 571 or LARCH 550.2, 5 credits
Keystone Project

A list of acceptable breadth courses from each category is provided in the Graduate Option in Watershed Stewardship Handbook. Students will be allowed to petition to the Center for Watershed Stewardship to substitute higher level or equivalent courses in a major field to suit their specific backgrounds and goals. Courses taken for the Graduate Option in Watershed Stewardship may be used to satisfy other EPC degree requirements with concurrence of their adviser and graduate committee and only if such courses are approved EPC core requirements or are on the currently approved list of additional 400- and 500-level

course for the EPC major. The graduate committee for a student enrolled in the Option in Watershed Stewardship must include a faculty representative from the Center for Watershed Stewardship.

Students enrolled in M.E.P.C. or M.S. degree program within Environmental Pollution Control may apply to participate in the Graduate Option in Watershed Stewardship. EPC students may prepare their thesis or paper on a topic related to their watershed management plan, but the thesis or paper must reflect independent thought and scholarly effort above and beyond the requirements of FOR 570 and FOR 571 or LARCH 540.2 and LARCH 550.2.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.*

Last Revised by the Department: Fall Semester 2016 (Joing Degree Removed)

Blue Sheet Item #: 33-03-311

Review Date: 11/23/04

Coordinator updated: 9/26/14

Faculty linked: 8/14/14

Engineering Science and Mechanics (E SC; ESMCH)

Program Home Page

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MICHAEL LANAGAN, *Graduate Officer*
212 Earth-Engineering Sciences Building
814-865-6992

Degrees Conferred:

- Ph.D. in Engineering Science and Mechanics
- M.S. in Engineering Science and Mechanics
  - Thesis Track
  - Non-Thesis Track
- M.Eng. in Engineering Mechanics
- Integrated Undergraduate/Graduate Study - B.S. in Engineering Science - M.S. in Engineering Science and Mechanics
- Joint M.D./Ph.D. in Engineering Science and Mechanics

The Graduate Faculty

Opportunities for graduate studies are available in interdisciplinary and multidisciplinary research areas including: biomechanics; composite materials; continuum mechanics; electrical, magnetic, electromagnetic, optical, thermal, and mechanical properties of thin films; experimental mechanics; lithography; microelectromechanical systems (MEMS) and microoptoelectromechanical systems (MOEMS); micromechanics; molecular beam epitaxy; numerical methods; photovoltaic materials and devices; nanotechnology and nanobiotechnology; properties of materials; shock, vibration acoustics and nonlinear dynamics; structural health monitoring; structural mechanics; wave-material interactions; non-destructive evaluation and testing; and failure analysis.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants who hold a baccalaureate degree in engineering, the sciences, mathematics, engineering science, and materials who present at least a 3.00 grade-point average will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Applicants will be accepted up to the number of places available for new students.

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of the Graduate Officer, a student may be granted provisional admission pending receipt of acceptable GRE scores.

M. Eng. (E MCH) Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

At least 31 credits at the 400 level of higher must be earned, with at least 18 at the 500 or 800 level, and at least 6 at the 500 level. Of these, 22 must be from lecture/laboratory courses approved by the department. The program includes 19 required credits and 12 elective credits. The 19 required credits include 1 credit of graduate seminar (E SC 514 or E MCH 514), 3 credits of E SC 596 or E MCH 596, and 15 credits in E SC or E MCH courses as follows: 3 credits are required in the area of Analysis; 3 credits in the area of Fields; 3 credits in the area of Motion; 3 credits in the areas of Materials Performance/Reliability or Materials Processing/Structure/Characterization; and 3 additional credits from any one of the four categories. A scholarly written report on a developmental study involving at least one area represented in the course work must be written while enrolled in either E SC 596 or E MCH 596. This scholarly paper should reflect the high quality of research required to meet the Engineering Science and Mechanics M.Eng. degree standards, as determined by the ESM Graduate Officer and the ESM Graduate Curriculum Committee. A 3.0 minimum grade point average is required to maintain good academic standing and for graduation.

M.S. (ESMCH) Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Thesis Track: At least 32 credits at the 400 level or above must be earned, with at least 18 credits at the 500 and 600 levels combined, and 24 credits must be from 400- and 500-level lecture/laboratory courses approved by the department. No more than 6 credits may be earned from 400-level courses. Three credits are required in the area of Mathematical Methods in Engineering (E MCH 524A, or an equivalent or more advanced course); 3 credits in the area of Mechanics; 3 credits in the area of Materials; and 3 credits in the area of Engineering Science. In addition, 2 credits of graduate seminar (E MCH 514 or E SC 514) must be earned. A thesis is required and at least 6 credits of thesis research (E MCH 600/610 or E SC 600/ 610) must be included in the student's program of study. The thesis must be a well-organized account of research undertaken by the student and must show initiative and originality. A 3.0 minimum grade-point average is required to maintain good academic standing and for graduation. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Non-Thesis Track: At least 32 credits at the 400 level or above must be earned, with at least 18 credits at the 500-level, and 27 credits must be from 400- and 500-level lecture/laboratory courses approved by the department. No more than 6 credits may be earned from 400-level courses. Three credits are required in the area of Mathematical Methods in Engineering (E MCH 524A, or an equivalent or more advanced course). In addition, 2 credits of graduate seminar (E MCH 514 or E SC 514) must be earned. The student is required to complete an independent research experience resulting in a scholarly paper, for which 3 credits of E SC or E MCH 596 will be earned. This scholarly paper should reflect the high quality of research required to meet the Engineering Science and Mechanics M.S. degree standards, as determined by the ESM Graduate Officer and the ESM Graduate Curriculum Committee. A 3.0 minimum grade-point average is required to maintain good academic standing and for graduation.

Ph.D. (ESMCH) Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students may enter the Ph.D. program after completing an M.S. degree or directly from the B.S. degree. The student must have completed an appropriate baccalaureate or master's degree prior to admission. In addition: 1) at least 18 credits must be earned in 400- and 500-level lecture/laboratory courses approved by the department; and, 2) 3 credits of a graduate seminar (E MCH 514 or E SC 514) must be earned beyond the master's degree requirements. The student must demonstrate English competency, and pass a candidacy examination, a comprehensive examination, and a final oral examination. A doctoral dissertation on an appropriate topic is required. It must be a well-organized account of research undertaken by the student and show initiative and originality. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School. A minimum grade-point average of 3.00 for work done at the University is required for admission to the candidacy examination, the comprehensive examination, and the final oral examination, and for graduation. .

Integrated Undergraduate/Graduate Study - B.S. in Engineering Science - M.S. in Engineering Science and Mechanics

Introduction

The flexibility and strength in fundamentals of the Engineering Science curriculum provides an opportunity for Engineering Science undergraduate students to participate in the ESM Integrated Undergraduate Graduate (IUG) program. The IUG program promotes the interchange of ideas across all branches of the scientific and engineering disciplines from both a theoretical and experimental perspective. Students in the integrated degree program are expected to pursue interdisciplinary studies in areas that encompass nano- and bionanotechnology, advanced materials, electromagnetic, mechanics, microelectronics, nanoelectronics and bioelectronics, neural engineering, photonics and photovoltaics (among others) and they are expected to embrace multidisciplinary perspectives across departmental, College, and University boundaries.

Application for IUG status may be made in the fifth or subsequent semesters. Students must apply to the program via the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the Engineering Science and Mechanics graduate program for the Master of Science degree. Students must be admitted to the IUG program no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

To earn the Master of Science degree in Engineering Science and Mechanics, students in the IUG program must complete all of the degree requirements for the M.S. degree, described above. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

The following is a list of courses that may be double counted towards both degrees:

- E MCH 400 Advanced Strength of Materials and Design
- E SC 419 Electronic Properties and Applications of Materials
- E MCH 407 Computer Methods in Engineering Design
- E SC 404H Analysis in Engineering Science
- E MCH 524A Mathematical Methods in Engineering
- E SC 501 Solar Cell Devices
- E SC 551 High Power Energy Storage

At least 6 of the double-counted credits must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Joint M.D./Ph.D. Program in Engineering Science and Mechanics (M.D./Ph.D., ESMCH)

Admission Requirements

All students must process an application via the American Medical College Application Service and be accepted for admission by the M.D./Ph.D. admissions committee. Admission to the program requires a minimum GPA of 3.5 and a Medical College Admission Test (MCAT) score of 32. Exceptions to the minimum requirements may be made at the discretion of the program for students with special backgrounds, abilities, and interests. Applicants will be accepted up to the number of places available for new students. Students must successfully complete Years M1 and M2 and Step 1 of the United States Medical Licensing Examination (USMLE) before entering the graduate degree program. All requirements for the Ph.D. degree must be completed prior to Year M3 of medical studies.

Students must apply to the Graduate School for admission to the graduate program. Applicants holding undergraduate degrees in engineering, the mathematical sciences, mathematics, engineering science, and materials science and engineering who present a minimum 3.5 grade-point average will be considered for admission. Exceptions to the minimum 3.5 grade-point average may be made at the discretion of the program for students with special backgrounds, abilities, and interests. Applicants will be accepted up to the number of places available for new students.

Scores from the Graduate Record Examination (GRE) are required for admission. At the discretion of the Graduate Officer, a student may be granted provisional admission pending receipt of acceptable GRE scores.

All program-specific documents for admission (e.g., transcripts, letters of recommendation, etc.) must be submitted by all applicants.

Degree Requirements

The Joint M.D./Ph.D. Program in Engineering Science and Mechanics (M.D./Ph.D., ESMCH) will form the basis for an interdisciplinary, transformational program that will educate a new generation of Physician Engineering Scientists, working at the frontiers of clinical and translational research. This Joint Degree Program responds to the national call to expedite the incorporation of clinical and translational research into improved healthcare.

Students in the Joint M.D./Ph.D. Program in Engineering Science and Mechanics will complete 4 years of medical studies (designated years M1 through M4) at the Medical School, College of Medicine, and 3 or more years of Graduate Study (designated years G1 through G3 or GX) in the Engineering Science and Mechanics (ESM) Department.

After successful completion of the first 2 years of medical school, including all required rotations and Step 1 of the United States Medical Licensing Examination (USMLE), the candidate will apply for admission to the Ph.D. program in Engineering Science and Mechanics.

Students will complete all degree requirements for the Ph.D. Degree in Engineering Science and Mechanics, including SARI (Scholarship and Research Integrity) training for the Responsible Conduct of Research (RCR) that must be met by students admitted to the program with either a baccalaureate or a master's degree, with the following exceptions:
• students admitted to the program with a baccalaureate degree will be allowed to double count 14 professional credits toward graduate course credit for the Ph.D. degree; and,
• students admitted to the program with a master's degree will be allowed to double count 7 professional credits toward graduate course credit for the Ph.D. degree.

Students will complete all requirements for the M.D. Degree that must be met by students admitted to the program with either a baccalaureate or master's degree, with the following exceptions:
• baccalaureate degree holders will be allowed to double count 10 research credits (E SC 600/E MCH 610) toward professional credits for the M.D. degree; and,
• master's degree holders will be allowed to double count 5 research credits (E SC 600/E MCH 610) applied to the Ph.D. ESMCH degree toward professional credits for the M.D. degree.

Students may take the Candidacy Examination after completing 18 credits of approved graduate course work.
• master's degree holders accepted into the Joint M.D./Ph.D. program may take the Candidacy Examination in the Spring Semester of Year G1, but no later than the Fall Semester of G2.
• baccalaureate degree holders accepted into the Joint M.D./Ph.D. program may take the Candidacy Examination within 3 semesters of entry into the Ph.D. program (expected to be the Fall Semester of G2).

Following completion of the Ph.D. dissertation, students will return to medical school to complete Years M3 and M4 of the professional M.D. degree.

Student Aid

Research and Teaching Assistantships (half time) are granted to a majority of graduate students in good academic standing. Financial supported is ordinarily

limited to three semesters for full-time master's degree students, and six semesters for full-time Ph.D. students. Students on graduate assistantships must adhere to thecourse load limits set forth in the *Graduate Bulletin.*

In addition to the fellowships, traineeships, graduate assistantships, or other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin,* the following awards typically have been available to graduate students in this program.

THEODORE HOLDEN THOMAS, Jr., MEMORIAL SCHOLARSHIP-Available to undergraduate or graduate students who display outstanding ability and have enrolled in the Department of Engineering Science and Mechanics. Apply to the Department of Engineering Science and Mechanics, 212 Earth-Engineering Sciences Building. Deadline is February 1.

SABIH AND GÜLER HAYEK GRADUATE SCHOLARSHIP IN ENGINEERING SCIENCE AND MECHANICS-Provides recognition and financial assistance to outstanding graduate students enrolled or planning to enroll in the Department of Engineering Science and Mechanics. Apply to the Department of Engineering Science and Mechanics, 211 Earth-Engineering Sciences Building. Deadline is February 1.

DR. RICHARD LLORENS GRADUATE AWARD IN ENGINEERING SCIENCE AND MECHANICS - Provides recognition and financial assistance to graduate students pursuing a degree in Engineering Science and Mechanics who have achieved academic excellence. Apply to the Department of Engineering Science and Mechanics, 211 Earth-Engineering Sciences Building. Deadline is February 1.

RICHARD P. MCNITT SCHOLARSHIP IN ENGINEERING SCIENCE AND MECHANICS - Available to undergraduate or graduate students enrolled in the Department of Engineering Science and Mechanics who have achieved superior academic records or who manifest promise of outstanding academic success. Apply to the Department of Engineering Science and Mechanics, 212 Earth-Engineering Sciences Building. Deadline is February 1.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ENGINEERING MECHANICS (E MCH) course list

ENGINEERING SCIENCE (E SC) course list

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-01-000

Review Date: 8/23/2016

Faculty linked: 6/9/14

Engineering Science (E SC)

Home Page

SCOTT VAN TONNIGEN, *Program Coordinator*
Penn State Harrisburg
School of Science, Engineering, and Technology
777 W. Harrisburg Pike
W211 Olmsted Building
Middletown, PA 17057-4898
717-948-6109

www.hbg.psu.edu

Degree Conferred:

M.Eng.

The Graduate Faculty, Penn State Harrisburg

The Program

A program leading to the degree of Master of Engineering with a major in Engineering Science is offered at Penn State Harrisburg. The program is designed to provide a broad, advanced education in the engineering sciences with some specialization permitted in the area of the student's major interest. It is offered specifically to permit practicing engineers to pursue advanced studies through evening classes while in full-time employment in industry in the area. Courses offered for the program are all established and authorized by the resident departments at the University Park campus.

Admission Requirements

Scores from the graduate Record Examinations (GRE) are not required for students holding baccalaureate degrees from accredited U.S. educational institutions. At the discretion of a graduate program, students may be admitted for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements state in the GENERAL INFORMATION section of the Graduate Bulletin.

Students may be admitted to the program from a wide variety of disciplines. Students applying for admission are expected to have completed the following core courses: (1) physics through modern physics; (2) mathematics through differential equations; (3) one course in engineering thermodynamics; (4) one course in electrical circuits; (5) basic courses in engineering statics, dynamics, and strength of materials; and (6) computer programming. Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

English Proficiency—The language of instruction at Penn State is English. All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System) and submit the results of that test with the application for admission. Departments and programs may have more stringent requirements and may require all international applicants to submit a TOEFL or IELTS score regardless of their academic background. A TOEFL score of at least 550 (paper-based test), 213 (computer-based test) or a total score of 80 on the Internet-based test (iBT), with a minimum of 19 points on the speaking section, is required for admission. Graduate programs may require a higher score. The International English Language Testing System (IELTS) module provides an exam to test four mandatory skill areas: listening, reading, writing and speaking. All four modules are equally weighted in the evaluation process. The International English Language Testing System has been approved by the Graduate Council as an alternative exam to the TOEFL for international students applying to Penn State. A minimum composite score of 6.5 on the IELTS test is required for admission.

Completed International Application material must be submitted by the following deadlines: May 31 for the fall semester; September 30 for the spring semester; February 28 for the summer session. Applications received after these deadlines will be processed for the following semester.

Applicants should submit the following:
—A graduate **online** application with the application fee;
—Official copies of undergraduate transcripts;
—Three (3) letters of reference, especially those from faculty who can evaluate academic potential;
—A personal statement of technical interest, goals, and experience.

NOTE: Test scores from the Graduate Record Examination (GRE) are required ONLY for those applicants indicating interest in an assistantship.

Degree Requirements

The credit requirements in this major will be satisfied by an appropriate combination of core courses and elective courses. The core courses include offerings in mathematics and in several branches of engineering that have been selected because of their general character and breadth of applicability to all fields of engineering. A minimum of 30 credits is required, of which at least 18 must be at the 500 level. Of the 30 credits, 6 credits of mathematics and a scholarly written report (3 credits) must be completed.

This program should be distinguished from the graduate program in Engineering Science at University Park campus, which offers the M.S. degree.

Other Relevant Information

More details regarding admission requirements are available from the directors of the graduate centers offering the program.

Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the STUDENT AID section of the Graduate Bulletin.

SCR 30-07-186

Faculty linked: 8/14/14

Program Coordinator updated: 6/1/16

Enterprise Architecture and Business Transformation (EABT)

Program Home Page

ANDREW SEARS, *Dean, College of Information Sciences and Technology*
MARY BETH ROSSON, *Associate Dean for Graduate and Undergraduate Studies*

Office of the Dean
College of Information Sciences and Technology
The Pennsylvania State University
332 Information Sciences and Technology Building
University Park, PA, 16802-6823
Dean's office: 814-865-3528; Graduate office: 814-865-8711

Degree Conferred:

M.P.S.

The Graduate Faculty

Program Description

The Master of Professional Studies Program in Enterprise Architecture and Business Transformation (MPS/EABT) is a unique program designed for professionals aspiring to advance to roles with enterprise wide scope and authority, such as that embodied by an enterprise architect. The MPS/EABT provides a comprehensive educational experience in the principles and practice of enterprise architecture (EA) and integrates both business and enterprise technical knowledge. The program includes courses in enterprise architecture foundations, business architecture, information technology architecture, enterprise security and risk architecture, organizational leadership, strategic management, and financial management.

Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

Since the program is multidisciplinary in nature, students from many disciplines may be acceptable for entry into the program. The most qualified applicants will be accepted in the program until all available spaces for new students are filled.

Consideration for admission into the program will be granted to individuals who meet one of the following sets of criteria:

- An approved baccalaureate degree with a minimum grade point average of 2.75 or above, (on a 4.0 scale) a minimum of five years of relevant work experience, three letters of reference, and a 1-3 page personal statement of relevant experience and goals.
- An approved baccalaureate degree with a minimum of a 3.00 (on a 4.00 scale) grade point average, a minimum of two years of relevant work experience, three letters of reference, and a 1-3 page personal statement of relevant experience and goals.
- A graduate degree, a minimum of one year of relevant work experience, three letters of reference, and a 1-3 page personal statement of relevant experience and goals.
- An approved baccalaureate degree, successful completion of three courses in the program with a minimum of a 3.50 (on a 4.00 scale) grade point average as a non-degree graduate student, at least two years of relevant work experience, and a 1-3 page personal statement of relevant experience and goals.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*. The Master of Professional Studies in Enterprise Architecture and Business Transformation (MPS/EABT) program requires a minimum of 33 credits at the 400, 500, or 800 level. At least 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500-level. A student will take 27 credits of required courses. The remaining 6 credits are selected from a list of approved elective courses. The courses are delivered online through Penn State World Campus.

Required Courses (27 credits)

EA 871(3), EA 873(3), EA 874(3), EA 876(3), EA 594(3), MBADM 816(3), MBADM 820(3), MBADM 571(3), BA 888(3)

Elective Courses (6 credits)

Elective concentrations are available in Supply Chain, Security Architecture, Business Architecture, and Project Management. A list of courses required for each concentration is maintained by the graduate program office.

Capstone Experience (3 credits). Each degree candidate must complete a capstone project on a topic related to enterprise architecture and agreed upon between the candidate and faculty member-in-charge while enrolled in EA 594.

Pattern of Course Scheduling

The program is highly flexible and is designed to meet the different needs of students and organizations. The courses are delivered online through the World Campus. With online delivery, the professional master program can easily fit into the work schedule of professionals from around the globe.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2018

Blue Sheet Item #: 46-04-000

Review Date: 1/9/2018

Faculty linked: 8/14/14; revised to full IST faculty link: 4/20/15; added program home page link: 7/16/15

Earth Sciences (EARTH)

Program Home Page

CHRIS J. MARONE, *Associate Head for Graduate Programs and Research*
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cjm38@psu.edu

Degree Conferred:

M.Ed.

The Graduate Faculty

The Program

The M.Ed. in Earth Sciences program is designed for secondary science teachers who seek to enrich their knowledge and practice through rigorous courses and individual projects supervised by Penn State faculty members. Combining graduate courses from academic departments in Penn State's College of Earth and Mineral Sciences, College of Education, and Eberly College of Science, the curriculum will prepare teachers to help students in grades 7 through 12 master educational objectives related to Earth and space science, as specified in National Science Education Standards (National Academy of Sciences, 1996). To accommodate working teachers who are only able to study part-time and at a distance, courses will be offered online through Penn State's World Campus. Fall, Spring, and Summer semester offerings will be available. Students will be granted licenses to use the courseware modules developed for the M.Ed. in Earth Sciences program in their secondary classrooms.

Admission Requirements

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a masters degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British west Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, The United States, and Wales.

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Students may initially enroll in M.Ed. in Earth Sciences classes as non-degree graduate students. Up to 15 credits earned in non-degree status may be counted toward the M.Ed. in Earth Sciences degree.

Master's Degree Requirements

The M.Ed. in Earth Sciences degree is conferred upon students who earn a minimum of 30 credits while maintaining an average grade of 3.0 or better in all course work, including at least 18 credits at the 500 level or above (with at least 6 credits at the 500 level), and who complete a quality culminating individual project in consultation with a graduate adviser. Students will have the opportunity to participate in face-to-face field experiences or workshops at University Park or other locations during Summer sessions.

Student Aid

Graduate assistantships are not available. Financial aid opportunities for part-time students who participate through the World Campus are discussed at http://worldcampus.psu.edu/StudentServices_Paying.shtml.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

EARTH SCIENCES (EARTH) course list

Last Revised by the Department: Summer Session 2008

Blue Sheet Item #: 36-06-187

Review Date: 4/15/08

Faculty linked: 8/14/14

Ecology (ECLGY)

Program Home Page

DAVID EISSENSTAT, *Chair*, *Intercollege Graduate Degree Program in Ecology*
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E-mail: dme9@psu.edu, jep32@psu.edu, mwr1@psu.edu

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

This intercollege program emphasizes the properties of ecosystems by focusing attention on interactions of single organisms, populations, and communities with their environment. It is designed to give students a basic understanding of ecological theory and hypothesis testing and is complementary to other environmental programs that emphasize the human role in ecosystems.

The program is administered by a committee drawn from faculty members in several departments and colleges of the University. This committee and its chair are appointed by the dean of the Graduate School. The instructional staff is composed of participating faculty in those departments offering graduate courses in fields closely allied to ecology.

The advisory committee is selected by the candidate and his/her adviser and approved by the Graduate School. The committee has the responsibility for determining the course program and research acceptable in satisfying degree requirements.

Four options for specialization are offered: Quantitative Ecology, Microbial Ecology, Conservation Biology and Physiological Ecology. Students are not required to select an option. The quantitative ecology option includes mathematical and statistical modeling and applications of statistics to experimental design and data analysis. The microbial ecology option includes basic aquatic and soil microbial ecology and applications to recycling of materials and release of genetically engineered organisms. The conservation biology option is concerned with problems of maintaining the rapidly disappearing diversity of organisms and their habitats, and the global reservoir of genetic diversity that these organisms represent. The physiological ecology option is concerned primarily with the function and performance of organisms in their environment. Each option entails extra course requirements plus a thesis directed by an ecology faculty member in the option. Additional information can be obtained from the option coordinators.

Admission Requirements

Scores from the Grade Record Examination (GRE), including verbal, quantitative, and advanced biology test, are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Candidates should have a strong science background, including chemistry through organic chemistry, mathematics through calculus, physics, and biology. A limited number of such courses can be made up while the student is pursuing graduate student.

Students with a background in another discipline that has potential value to original ecological work will be seriously considered. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale) is required.

Students are strongly urged to choose their research interests and initiate communication with the relevant faculty member(s) before applying for admission. A student will not be admitted without the commitment of a faculty member to serve as the student's research adviser. Teaching and research assistantships are available only through the student's faculty adviser.

The top sheet (white copy) of the application and application fee are to be sent to the Graduate School. The applicant should forward the following directly to the program chair: (1) pink copy of the application; (2) three or more letters of recommendation regarding the student's academic and professional promise; (3) a concise one-page statement describing the student's goals both within the program and in professional life; and (4) GRE scores (general test and the subject test in biology) Specific inquiries about the Ecology Program may be directed to the program chair. Applications should be submitted by February 1 for summer or fall semester admission.

Master's Degree Requirements

In addition to Graduate School requirements, the instructional program includes two graduate core courses in ecology (one each in two of the three core areas: population ecology, community/ecosystem ecology, and physiological ecology), an advanced 3-credit statistic course, two credits of colloquium, a minimum of six thesis credits, breadth courses selected by the student in consultation with the research adviser and research committee, and a thesis research project directed by the student's adviser. A nonthesis option is available for the M.S. degree, at the adviser's discretion.

Doctoral Degree Requirements

In addition to Graduate School requirements, the instructional program includes three graduate core courses in ecology (one each of three core areas: population ecology, community/ecosystem ecology, and physiological ecology), two advanced 3-credit statistics courses, 4 credits of colloquium, breadth courses selected by the student in consultation with the research adviser and research committee, a minimum of 15 thesis credits, and a thesis research project directed by the student's adviser.

The communication and foreign language requirement for the Ph.D. degree may be satisfied by strong performance in two semesters of one foreign language or the equivalent. Both the candidacy and comprehensive examinations will be written and oral.

Biogeochemistry Dual-Title Degree Program

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of biogeochemistry is required.

Watershed Stewardship Option

The Graduate Option in Watershed Stewardship is intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in the Intercollege Graduate Degree Program in Ecology at the University Park campus. The objective of the Graduate Option in

Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at natural resources conservation and environmental problems encountered in Pennsylvania communities, especially non-point source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate course work: 12 credits of breadth courses, 2 credits of Watershed Stewardship Seminar courses (FOR 591A and FOR 591B or LARCH 510.2), and 8 credits of Watershed Stewardship Practicum I and II courses (FOR 570 and FOR 571 or LARCH 540.2 and LARCH 550.2). Breadth courses will consist of three graduate credits of course work from each of four subject matter areas: (1) water resources science, (2) social science, public policy and economics, (3) humanities, and (4) communications and design. In the watershed stewardship practicum courses, students work in teams with community, government, and business leaders to analyze and understand natural resources and ecological issues and creatively synthesize appropriate solutions in the form of a written watershed management plan.

Other Relevant Information

Detailed descriptions of courses now available for students majoring in ecology may be found under the offerings of several ecologically oriented departments.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/24/04

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-06-185B

Review Date: 4/15/08

Faculty linked: 6/9/14

Economics (ECON)

Program Home Page

Barry W. Ickes, *Head of the Department*
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econgrad@psu.edu

Degrees Conferred:

Ph.D., M.A.

The Graduate Faculty

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the General Information section of the Graduate Bulletin.

Graduate study in Economics relies heavily on abstract mathematics. It is recommended that, at a minimum, applicants should have taken mathematics up through multivariate calculus.

We require that applicants take the 3-part general aptitude GRE. In judging applicants, we try to take into account that different applicants expend different amounts of effort in preparing for the GRE and that there are systematic differences among applicants from different countries. We require that the GRE be taken within 5 years prior to applying to our Ph.D. program. (Institution Code: 2660; Department Code: 1801)

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (IBT). Applicants with IBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. (Institution code: 2660; Department code: 84)

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

We place considerable weight on, and require three (3) letters of recommendation. Letters should be from people who know you well and who are familiar with graduate programs in Economics at leading universities. The most valuable letters are from people who can credibly compare you to others who have succeeded in such programs.

Highly successful Ph.D. students in Economics display a wide variety of research skills, including creativity. The questions we ask on the application are intended to elicit information about those skills. Also, if you have completed a paper that displays such skills, upload it via the GRADS online application system.

Requirements for Graduate Degrees

The Ph.D. - The Ph.D. program has 3 main parts taken in sequence: the core, subfields (of specialization), and the dissertation. Most students take 5 years to complete the program. Occasionally, but rarely, a student finishes in 4 years.

The Core - The core consists of 2 semesters of course work: a 2-semester sequence in microeconomic theory, a 2-semester sequence in econometrics, and a course in mathematics for economists followed by an intensive single-semester in macroeconomic theory. At the beginning of the third semester, students are required to take two 3-hour candidacy exams: one in microeconomics and one in macroeconomics. Students who fail an exam on their first attempt are allowed to take the exam a second time. Competence in econometrics must be demonstrated through satisfactory completion of the coursework. Students with prior graduate training may, however, obtain permission to skip some of the coursework in the core and take the candidacy exams earlier than the 3rd semester.

Subfields- Students must demonstrate competence in 3 subfields. Competence in a subfield is usually demonstrated by completing 6 credits in the subfield with no grade lower than a B.

The department offers the following subfields: development economics, econometrics, game theory, industrial organization, international economics, and macroeconomics.

With the permission of the student's advisor and the Director of Graduate Studies, a student may take a subfield in another department. For instance, students have taken subfield courses in Demography, Political Science, and Statistics.

Ph.D. Program					
Fall 1st Year	Spring 1st Year	Fall Candidacy Exams	Fall 2nd Year	Spring Candidacy Exams (if needed)	Spring 2nd year
Micro I (ECON 502)	Micro II (ECON 521)		Field 1.1		Field 1.2
Econometrics I (ECON 501)	Econometrics II (ECON 510)		Field 2.1		Field 2.2
Math for Econ (ECON 500	Macro I & II (ECON 503 & 522)		Field 3.1		Field 3.2
			Empirical Methods I (ECON 512A)		Empirical Methods II (ECON 512B)

- 3rd-year paper requirement must be completed before spring semester of 3rd year
- Comprehensive exam (dissertation proposal defense) must be completed before fall semester of 4th year

Empirical Methods Course I & II -- (ECON 512A & ECON 512B) In their **second year**, all students must enroll in ECON 512A Empirical Methods in Economics I (1 credit offered in the fall.) This course introduces students to computational methods used to numerically solve and simulate economic models and program econometric estimators. Also, all students in their second year must enroll in ECON 512B Empirical Methods in Economics II (2credits offered in the spring semester.) This course is a continuation of ECON 512A covering the modern computational methods used in both theoretical and empirical research in economics. Students will be required to work on a small project involving data analysis.

3rd-Year Paper - Students must complete a paper by the end of their 5th semester, the spring semester of their 3rd year. The paper must be approved by a 3-person faculty committee. The paper must contain original research and must be written in a form suitable for submission to a journal.

Dissertation Research - Most dissertations consist of several essays, each of which has the substance and quality of a journal article. However, a dissertation which has the substance and quality of a single major article in a leading journal is also acceptable. The comprehensive exam (dissertation proposal defense) must be completed before fall semester of 4th year. The student will spend the 4th year and the beginning of the 5th year completing the dissertation and will use the summer after the 4th year and the beginning of the 5th year in preparation for the job market.

Dual-Title Graduate Degree Programs - Occasionally students construct a dual-title graduate degree program. One such program is Economics and Demography. Another is Economics and Operations Research. Details may be obtained by clicking the links above or from the Graduate Director.

Good Standing. A student must remain in "good standing" while in the program. This means following the course sequence outlined above, maintaining a GPA of at least 3.0 and completing the candidacy, third-year paper and comprehensive exam requirements on time.

The M.A.

The M.A. degree in economics may be earned by (a) satisfactorily completing at least 24 credits of appropriate graduate course work, together with a master's dissertation for which 6 credits is granted, and passing a final oral examination; or (b) by satisfactorily completing 30 credits of appropriate course work, presenting a master's essay for which no graduate credit may be granted, and passing a final oral examination. The master's essay option, which most students elect, includes preparation of a paper which is written under the supervision of a faculty member. Under either option, at least 18 credit hours must be in approved graduate courses.

The department does not admit students who seek an M.A. as a terminal degree.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ECONOMICS (ECON) course list

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-03-118

Review Date: 11/13/2012

Faculty linked: 6/9/14

Educational Leadership (EDLDR)

Program Home Page

DANA MITRA, Director of Graduate Studies
302A Rackley Building
814-863-7020

Degrees Conferred:

Ph.D., D.Ed., M.Ed.

The Graduate Faculty

The Program

Graduate work in the Educational Leadership program encompasses two major career paths. The first path focuses on those who want to engage in a wide variety of leadership roles within and directly affecting schools and districts. These roles include, but are not limited to teacher leadership, instructional leadership, principal leadership, and district-level leadership. This path may also lead to certification and/or letters of endorsement in supervision, the principalship or the superintendency. The second path focuses on those who want to exercise leadership roles in educational policy arenas and/or engage in educational research. Possible roles include: intermediate unit officials, state and federal agency administrators and staff, professors of educational administration, and research and development personnel. The principalship certification is also available at Penn State Harrisburg. The teacher leadership path and principal certification may also be pursued in the online M.Ed.

The M.Ed. in Educational Leadership is designed for students who wish to pursue leadership positions in educational organizations.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

The Educational Leadership program requires all graduate program applicants to submit three letters of recommendation, official transcripts from all post-secondary institutions attended, a brief personal statement of intent, and a current resume or CV. Applicants must present evidence of at least a 3.0 grade-point average in the last two years of undergraduate work. A grade-point average of 3.50 in prior graduate work is required of those desiring admission to enter a doctoral program. The best-qualified students will be accepted up to the number of spaces available. Special backgrounds and experiences may allow for conditional admission to those not meeting stated criteria, at the discretion of the program.

Applicants are required to submit a writing sample. For master's degree applicants, this should be a reflection paper. Doctoral Degree students should submit a writing sample that reviews and critiques an academic article related to education leadership or education policy that affects education leaders.

Official scores from the GRE, the Miller Analogy Test, or the Law School Admissions Test (LSAT) from within the last 5 years are required.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

All candidates for the M.Ed. degree will complete a minimum of 30 credits, with at least 18 credits at the 500 or 800 level, and at least 6 credits at the 500 level. M.Ed. students also must complete a capstone project as described below.

Certification for various public school administrative positions requires additional graduate work beyond the master's degree and such requirements as specified on the program web page.

The three designated emphases for this M.Ed. are Teacher Leadership, School Leadership, or a "General" M.Ed.:

Teacher Leadership(online)	School Leadership(online)	General M.Ed.(residential)
EDLDR 540 Technology Applications in Educational Leadership (3 cr)	EDLDR 540 Technical Applications in Educational Leadership (3 cr)	18 credits of Educational Leadership coursework required, with a total of 30 credits, inclusive of EDLDR 596. Students may select their 18 credits of EDLDR courses from the following: EDLDR 480, 530, 540, 559, 560, 576, 579 or 568. This emphasis is created and defined through the interaction of student and adviser based on the student's career path.
EDLDR 559 School Improvement (3 cr)	EDLDR 559 School Improvement (3 cr)	
EDLDR 560 Principles of	EDLDR 560 Principles of	

Instructional Supervision (3 cr)	Instructional Supervision (3 cr)	
EDLDR 551 Curriculum Design: Theory and Practice (3 cr)	EDLDR 551 Curriculum Design: Theory and Practice (3 cr)	
C I 501 Teaching as Inquiry (3 cr)	EDLDR 480 Introduction to Educational Leadership (3 cr)	
EDLDR 801 Introduction to Teacher Leadership (3 cr)	EDLDR 530 Leadership for Inclusive Education (3 cr)	
EDLDR 802 How Schools Work (3 cr)	EDLDR 568 The Principalship (3 cr)	
EDLDR 563 Designing Staff Development Programs (3 cr)	EDLDR 576 The Law and Education (3 cr)	
ADTED 505 The Teaching of Adults (3 cr) OR EDPSY 421 Learning Processes in Relation to Educational Priorities (3 cr)	EDLDR 579 Financial Management for Schools (3 cr)	
EDLDR 894A Capstone Inquiry Course (3 cr)	EDLDR 595 Internship (3 cr)	EDLDR 596 Masters Paper (3 cr)

The final courses in all three emphases (EDLDR 894A, EDLDR 595 and EDLDR 596) are project-based courses that represent the culmination of academic work toward the M.Ed. degree. Course requirements involve the development of a final capstone project focused on evaluation, analysis, or application of concepts first introduced and developed over the course of the student's M.Ed. program. The project should be planned in coordination with an EDLDR faculty member who agrees to serve as the student's adviser for this project and must reflect an appropriate degree of graduate-level scholarship, as determined by the adviser.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Expectations of candidates for both the D.Ed. and Ph.D. are high in the field of research competence and require the ability to identify and conceptualize a research problem for the thesis. The D.Ed. is more appropriate for those with career goals in administration and policy making. The Ph.D. is more appropriate for those with career goals in research and scholarship.

A minimum of 36 credits is required for the Ph.D.:

- EDLDR Course Work (15 cr.): A minimum of 15 credits chosen in conjunction with the student's academic adviser from a list of areas of concentration and courses that have been approved by the program to fulfill this requirement.
- Research Course Requirements (12 cr.):
  - A 3-credit course with statistical focus up to multivariate inference
  - A 3-credit course with focus on qualitative research methods
  - A 3-credit advanced course in either of the above areas (including course work in Mixed Methods)
  - EDLDR 585 Research Design
- Supporting Field (9 cr.): A minimum of 9 credits selected from outside of the EDLDR program. All supporting field courses should be at the 500-level or above; however, appropriate 400-level courses may be approved by the adviser. As noted above, a student may choose to have research as a supporting field and substitute additional research courses to fulfill this requirement.

Ph.D. students may not enroll in more than 6 credits of independent study.

A minimum of 90 credits is required for the D.Ed., of which at least 30 credits must be earned in residence at University Park campus. A maximum of 30 credits from a completed master's degree earned at an institution that does not grant a doctorate in Higher Education may be accepted towards this minimum, subject to limitations listed in the Transfer Credit section of the Doctoral Degrees Bulletin page. A maximum of 60 credits beyond the baccalaureate may be accepted towards this minimum, subject to limitations listed in the Transfer Credit section of the Doctoral Degrees Bulletin page.

The 90 required credits must be earned in the following:

- Major Field (48 cr.): In the Major Field Area, D.Ed. students are required to take a minimum of 48 credits in Educational Leadership courses and courses related to the graduate major field. These courses should be selected in consultation with the student's adviser from a list of areas of concentration and courses that have been approved by the program to fulfill this requirement. If approved, transfer credits may be used to fulfill a portion of this requirement.
- Minor or General Studies Group (15 cr.): A graduate minor can be taken in any approved graduate degree program offered at Penn State, or in one of the approved stand-alone minors. A general studies group may include up to 6 credits taken as part of previous master's degree. These courses must be taken outside the EDLDR program. Selection of these courses should be done in close consultation with the student's academic adviser.
- Special Education Focused Course (3 cr.): a minimum of 3 credits concerning special education issues in a course approved by the program to fulfill this requirement.
- Research (9 cr.):
  - 3 credits of quantitative research
  - 3 credits of qualitative research
  - 3 credits of research design or advanced research methods
- Dissertation Research (15 cr.): EDLDR 600 or 610.

Doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. or the D.Ed. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D., D.Ed., and M.Ed. in Comparative and International Education

Admission Requirements

Students must apply and be admitted to the graduate program in Higher Education and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the

Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page. Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Higher Education, listed above. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page. Some courses may satisfy both Higher Education and Comparative and International Education degree requirements. Final course selection must be approved by the student's doctoral committee.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Higher Education and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Higher Education and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Higher Education and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Higher Education and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Joint Degree Program between Penn State Law (J.D.) and the Educational Leadership Program (M.Ed., D.Ed., and Ph.D.)

Penn State Law (PSL) and the Educational Leadership (EDLDR) Program offer a joint degree program leading to a Juris Doctor (J.D.); and either a Master of Education (M.Ed), a Doctor of Education (D.Ed) or a Doctor of Philosophy (Ph.D.) in Educational Leadership.

Admission Requirements

Applicants to the joint degree program must apply and be admitted first to Penn State Law, and subsequently to the Educational Leadership graduate program. Admissions requirements and applications for admission for Penn State Law are listed in the J.D. Admissions section of the Penn State Law website. The admission requirements for the Educational Leadership graduate program are listed above. When applying to the Educational Leadership graduate program, applicants must include two letters of recommendation from Penn State Law faculty members and a career statement. Applicants to the joint degree program may submit LSAT scores instead of GRE scores. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

Residency

Students will normally spend four semesters in residence at the Law School and as many additional semesters in residence as needed to complete the additional requirements for the pertinent EDLDR degree. Ph.D. candidates must arrange the sequence of semesters to ensure that they are in residence as full-time students in the EDLDR program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month perioc

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website. Degree requirements for the Ph.D., D.Ed., and M.Ed. degrees are listed above.

PSL: A maximum of twelve credits for EDLDR course work may be double-counted for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited toward the J.D. degree. The following EDLDR courses may qualify for credit in PSL: (1) EDLDR 533 (The Politics of Local School Districts; (2) EDLDR 565 (Personnel Management and Contract Administration); (3) EDLDR 568 (The Principalship); (4) EDLDR 569 (Decision Making in Educational Organizations); (5) EDLDR 573 (Public School Finance); (6) EDLDR 576 (The Law and Education); and (7) EDLDR 577 (The Law and Ethical Decision Making).

EDLDR: The courses that may be double-counted will be determined by the student's degree program. Normally a maximum of twelve credits of PSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the student's advisory committee. Normally, a maximum of 30 credits from a master's degree program will be counted for credit for the minimum requirements for a Ph.D. or D.Ed. degree.

Sequence: The sequence of courses will be determined by the students and their advisers.

Recommended Program of Study and Advising: All students in the program will have two advisers, one from PSL and one from EDLDR. Periodic interaction between the two advisers is encouraged.

Tuition: Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the EDLDR degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships: Decisions on financial aid and assistantships will be made by each school according to that school's procedures.

Fulfillment of Degree Requirements and Graduation: All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the EDLDR degree if all EDLDR degree requirements have been satisfied.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2017

Blue Sheet Item #: 45-06-000

Review Date: 4/4/17

Faculty linked: 8/14/14

Educational Psychology (EDPSY)

Program Home Page

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Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

The graduate program in Educational Psychology focuses on the study of learning, instruction, and measurement across the life span. The learning and instruction emphasis applies the study of cognitive psychology to research on learning and instruction in applied settings like schools. The course of study provides a strong foundation in psychological theory, principles related to instructional applications, and quantitative methodology. The measurement emphasis applies cognitive psychology and theories of measurement to test design, instrument construction, scale analysis, and measurement theory. The Educational Psychology program emphasizes the use of rigorous quantitative methodology in the scientific study of learning, instruction, and measurement in applied settings. Typically this program prepares individuals for professions in universities, research institutions, government agencies, and industry. Individuals interested in more clinical applications of psychology, such as counseling psychology or school psychology should contact those specific graduate programs in the University.

Admission Requirements

Applicants are required to submit scores from the Graduate Record Examinations (GRE) verbal, quantitative, and analytic writing. Successful applicants typically score above 500 on both Verbal and Quantitative on the GRE, or above 153 on Verbal and above 144 on the Quantitative sections of the revised GRE. Typically applicants have at least a 3.0 junior/senior grade-point average (on a 4.0 point scale) and broad undergraduate background including college level mathematics. Exceptions may be made for students with special backgrounds, abilities, and interests. Applicants with a master's degree will be required to show strong performance in their graduate program. Applicants will also supply letters of reference and a written statement of their professional goals. The requirements specified here are in addition to the Graduate Council requirements stated in the Graduate Bulletin.

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.

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

Master's Degree Requirements

Students in the master's degree program are required to take 30 credits, including core courses EDPSY 421, 450, 475 and 505. The 30 credits must be at the 400 level or higher, and at least 18 of those credits must be at the 500 level or higher. Students will also take at least one foundational course in educational theory, philosophy, or individual differences. The remaining credits will be taken in a way to develop the student's area of specialization, in consultation with the student's adviser. The program offers two pathways, M.S. with a thesis, and an M.S. without a thesis. Students wishing to go on to the Ph.D. are required to complete the M.S. with thesis.

Doctoral Degree Requirements

Students in the doctoral degree program will select a major emphasis in either learning and instruction or measurement. Students in the doctoral program must complete the core courses as listed in the master's program. All students must also have at least one advanced-level course in learning and in measurement. Students will also have three courses spread across the foundational areas of educational theory and history, philosophy, and individual differences. Students must pass a candidacy examination to enter into the doctoral program, assessing their mastery of the content in the core courses. Students must also pass a comprehensive examination assessing their areas of specialization near the end of their doctoral studies. Students are also expected to develop and defend a theoretically based scholarly research proposal that will become their dissertation project. The doctoral program culminates in the production of and defense of the student's dissertation that is expected to be a publishable quality independent research study. All of these requirements are specified in more detail in the student handbook and/or the Graduate Council's doctoral degree requirements (http://bulletins.psu.edu/graduate/degreerequirements/degreeReq1).

Doctoral Minor

At the doctoral level, a minor is also possible in EDPSY. Like all doctoral minors, it requires at least 15 credits of work within the program; the specific requirements for the doctoral minor in Educational Psychology are EDPSY 421, EDPSY 450, and EDPSY 505, plus at least two other courses in EDPSY, in consultation with the minor adviser. The minor adviser should be a member of the Graduate Faculty and should be appointed to the student's doctoral committee as early as possible. Anyone interested in the minor should talk to a faculty member in EDPSY.

Student Aid

All applicants are considered for Graduate Assistantships that are available in the program. Typically these assistantships provide tuition waiver plus a stipend.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

EDUCATIONAL PSYCHOLOGY (EDPSY) course list

Last Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-05

Review Date: 02/25/2014

Faculty linked: 6/9/14

Engineering Design (EDSGN)

http://www.sedtapp.psu.edu/design

SVEN G. BILEN, *Head of the School of Engineering Design, Technology, and Professional Programs*
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814-865-7589

Degrees Conferred:

M.S., M.Eng.

The Graduate Faculty

Students may specialize in *Engineering Product Design, Systems Design* and *Data-Driven Design*. Engineering Product Design addresses the identification of consumer preferences and requirements, the evaluation of existing products and product families, and the development of innovative designs. Systems Design examines the role components play within systems and the optimization of systems as a whole. This includes defining and developing a variety of systems that satisfy user requirements. Data-Driven Design focuses on using data to motivate and inform design decisions and assess current product performance.

Admission Requirements

The requirements listed here are in addition to the general requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates a bachelor's degree from a U.S. regionally accredited institution or a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Applicants with at least a 3.00 junior/senior grade-point average (on a 4.00 scale) and appropriate course backgrounds may be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

All applicants must provide the department with official transcripts of all their previous course work (in duplicate); international applicants must submit official transcripts, degree, and diploma certificates in both English and their native language. Photocopies will not be accepted. Applicants must also submit scores from the GRE® revised General Test (verbal reasoning, quantitative reasoning, and analytical writing), a statement of objectives, resume, and three letters of recommendation.

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

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

Applicants for fall admission who wish to be considered for financial aid should complete the application process prior to DECEMBER 15 of the preceding year.

Degree Requirements

Master of Science (M.S.) Degree Requirements. The M.S. degree is an academic degree, which is strongly oriented toward research. To receive the Master of Science degree in Engineering Design, a student must complete at least 32 credits beyond the baccalaureate degree. At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in course work (400 and 500 series), as contrasted with research, must be completed in the major program. A thesis is required and at least 6 credits of thesis research (EDSGN 600/610) must be included in the program.

REQUIREMENTS FOR THE PROGRAM - 32 credits

A minimum of 32 graduate credits is required as follows: focus area elective courses (12 cr.), general electives (6 cr.), engineering design studio (6 cr.), engineering design portfolio (1 cr.), colloquium, (1 cr.), thesis research (6 cr.)

Students must take the following 8 credits: EDSGN 581 (3), EDSGN 582 (3), EDSGN 585 (1), EDSGN 590 (1)

Students must select a minimum of 12 credits of focus area electives from: EDSGN 401 (3), EDSGN 479 (3), EDSGN 547 (3), EDSGN 548 (3), EDSGN 549 (3), EDSGN 558 (3), EDSGN 559 (3)

Students must select 6 credits of general electives from: I E 418 (3), I E 460 (3), I E 470 (3), I E 520 (3), I E 557 (3), I E 563 (3); IST 413 (3); IST 520 (3); IST 521 (3); M E 561 (3), M E 565 (3); MANGT 510 (3); SYSEN 550 (3), SYSEN 555 (3) or from a list of approved courses maintained by the program

Students must take 6 credits of EDSGN 600/610

The M.S. in Engineering Design requires the completion of an M.S. thesis and the Engineering Design Portfolio.

Master of Engineering (M.Eng.) Degree Requirements

The M.Eng. degree is a non-thesis professional master's degree that provides training for advanced professional practice. To receive the Master of Engineering degree in Engineering Design, a student must complete at least 32 credits beyond the baccalaureate degree, and a scholarly report based on an independent studies course (EDSGN 596), or a domestic (ENGR 595A) or international (ENGR 595I) internship experience, and an engineering design portfolio (ENGR 585). A minimum of 18 credits must be in the 500 series.

REQUIREMENTS FOR THE PROGRAM - 32 credits

A minimum of 32 graduate credits is required as follows: focus area elective courses (12 cr), general electives (9 cr), engineering design studio (6 cr), engineering design portfolio (1 cr), colloquium, (1 cr), independent studies (3 cr) or domestic or international internship (3 cr)

Students must take the following 8 credits: EDSGN 581 (3), EDSGN 582 (3), EDSGN 585 (1), EDSGN 590 (1)

Students must select a minimum of 12 credits of focus area electives from: EDSGN 401 (3), EDSGN 479 (3), EDSGN 547 (3), EDSGN 548 (3), EDSGN 549 (3), EDSGN 558 (3), EDSGN 559 (3)

Students must select 9 credits of general electives from: I E 418 (3), I E 460 (3), I E 470 (3), I E 520 (3), I E 557 (3), I E 563 (3), IST 413 (3), IST 520 (3), IST 521 (3), M E 561 (3), M E 565 (3), MANGT 510 (3), SYSEN 550 (3), SYSEN 555 (3) or from a list of approved courses maintained by the program

Students must take EDSGN 596 (3), or ENGR 595A (3), or ENGR 595I (3)

The M.Eng. in Engineering Design requires the completion of a scholarly paper and the Engineering Design Portfolio.

Other Relevant Information

All graduate students must participate in **Scholarship and Research Integrity (SARI)** training by completing the online University module offered through the Office of Research Protections (ORP) during their first year of study and 5 hours of discussion-based training. To satisfy the 5-hour discipline-specific discussion-based training, SEDTAPP will provide 2 hours of training as part of their colloquium; the remaining 3 hours of training can be satisfied through College or ORP offerings. These requirements must be met before graduation.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* International students must take AEOCPT and score between 250 and 300 in order to begin a teaching assistantship; students who require remediation may be assigned a teaching assistantship only after addressing the deficiencies identified by the test.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ENGINEERING DESIGN (EDSGN) course list

Last Revised Spring Semester 2014

Blue Sheet Item #: 42-07

Review Date: 06/10/2014

Educational Theory and Policy (EDTHP)

Program Home Page

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Degrees Conferred:

Ph.D., M.A.

The Graduate Faculty

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE) are required for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Students with a 2.75 grade-point average will be considered for admission to the master's program, and with a 3.00 grade-point average at the master's level for the Ph.D. program. Exceptions to the minimum grade-point average may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Candidates who seek an M.A. in Educational Theory and Policy shall complete programs that will include studies in social theory, policy, and planning or in the social sciences or humanities.

A minimum of 36 credits is required, with at least 18 credits in the 500 and 600 series combined, and a minimum of 6 credits of thesis research (600 or 610).There are 12 credits required in the following core courses: EDTHP 500 (3 cr.), and 9 credits of Research Methods, consisting of EDTHP 585 (3 cr.), EDPSY 406 or another approved statistics course, and EDTHP 586. The remaining elective credits may be chosen from a list of approved electives maintained by the program office. Only 3 credits of EDTHP 596 (Independent Study) may be counted toward the M.A.

A thesis is required. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Candidates who seek a Ph.D. in Educational Theory and Policy shall complete programs that will include studies in social theory, policy, and planning, or in the social sciences or humanities.

A minimum of 57 credits is required:

- EDTHP 500 (3 cr.)
- Research Methods (12 cr.): EDTHP 585 (3 cr.), EDTHP 586 (3 cr.), and 6 additional credits approved by the program to fulfill this requirement.
- Theory Foundations (9 cr.): a minimum of 9 credits in 500-level EDTHP courses approved by the program to fulfill this requirement.
- Policy Foundations (9 cr.): EDTHP 587 (3 cr.), and 6 additional credits approved by the program to fulfill this requirement.
- Focused Program of Study (9 cr.): a minimum of 9 credits chosen in consultation with the adviser to prepare students for dissertation research. Students will need to explain how the three chosen courses will have prepared them for their dissertation research. This justification will become a part of the candidacy materials routed to all EDTHP faculty for approval. The course work must have a unifying theme. It does not have to be taken in the EDTHP program.

Electives (15 cr.): the remaining elective credits may be chosen from a list of approved electives maintained by the program office.

Doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. and M.A. in Comparative and International Education

Admission Requirements

Students must apply and be admitted to the graduate program in Educational Theory and Policy and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page. Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Educational Theory and Policy, listed above. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page. Some courses may satisfy both Educational Theory and Policy and Comparative and International Education degree requirements. Final course selection must be approved by the student's doctoral committee.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Educational Theory and Policy and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Educational Theory and Policy and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an Educational Theory and Policy and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and

International Education must be appointed as co-chair. The Comparative and International Education representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Educational Theory and Policy and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Joint Degree Program between Penn State Law (J.D.) and the Educational Theory and Policy Program (M.A., & Ph.D.)

Penn State Law (PSL) and the Educational Theory and Policy (EDTHP) Program offer a joint degree program leading to a Juris Doctor (J.D.); and either a Master of Arts (M.A.) or a Doctor of Philosophy (Ph.D.) in Educational Theory and Policy.

Admission Requirements

Applicants to the joint degree program must apply and be admitted first to Penn State Law, and subsequently to the Educational Theory and Policy graduate program. Admissions requirements and applications for admission for Penn State Law are listed in the J.D. Admissions section of the Penn State Law website. The admission requirements for the Educational Theory and Policy graduate program are listed above. When applying to the Educational Theory and Policy graduate program, applicants must include two letters of recommendation from Penn State Law faculty members and a career statement. Applicants to the joint degree program may submit LSAT scores instead of GRE scores. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

Residency

Students will normally spend four semesters in residence at PSL and as many additional semesters in residence as needed to complete the additional requirements for the pertinent EDTHP degree. Ph.D. candidates must arrange the sequence of semesters to ensure that they are in residence as full-time students in the EDTHP program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website. Degree requirements for the M.A. and Ph.D. degrees are listed in the Master's Degree and Doctoral Degree Requirements section above.

PSL: A maximum of twelve credits for EDTHP course work may be double-counted for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited toward the J.D. degree. The following EDTHP courses may qualify for credit in PSL: (1) EDTHP 518 (Analysis of U.S. Educational Policy); EDTHP 520 (Theoretical Perspectives on School Reform); (3) EDTHP 533 (Social History and Educational Policy); (4) EDTHP 541 (Contemporary Philosophies of Education); and (5) EDTHP 587 (Education Policy and Politics).

EDTHP: The courses that may be double-counted will be determined by the student's degree program. Normally a maximum of twelve credits of PSL course work will be double-counted for credit for the minimum requirements for a master's or doctoral degree, subject to approval by the student's advisory committee.

Sequence: The sequence of courses will be determined by the students and their advisers.

Recommended Program of Study and Advising: All students in the program will have two advisers, one from PSL and one from EDTHP. Periodic interaction between the two advisors is encouraged.

Tuition: Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the EDTHP degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships: Decisions on financial aid and assistantships will be made by each school according to that school's procedures.

Fulfillment of Degree Requirements and Graduation: All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the EDTHP degree if all EDTHP degree requirements have been satisfied.

Student Aid

Graduate assistantships available to doctoral students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

EDUCATIONAL LEADERSHIP PROGRAM (EDLDR) course list

EDUCATIONAL THEORY AND POLICY (EDTHP) course list

HIGHER EDUCATION (HI ED) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 04/12/04

Last Revised by the Department: Spring Semester 2017

Blue Sheet Item #: 45-06-000

Review Date: 4/4/17

Faculty linked: 6/9/14

Energy and Mineral Engineering (EME)

Program Home Page

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Degrees Conferred:

Ph.D., M.S. (with or without options in Petroleum and Natural Gas Engineering; Mining and Mineral Process Engineering; Environmental Health and Safety Engineering; Fuel Science; and Energy Management and Policy)

The Graduate Faculty

The Department

The John and Willie Leone Family Department of Energy and Mineral Engineering provides a vertically integrated approach to research and education in all aspects of the energy and mineral industries, including scientific and engineering issues, health and safety, and maintenance of high environmental standards. The department's mission is to forge an intellectual and scientific cohesiveness in energy and mineral resource technology. This objective is achieved by exploiting the natural synergy between the exploration, extraction, processing, and utilization of energy and mineral resources so as to cater to the emerging needs of society.

The department offers advanced degrees in Energy and Mineral Engineering (M.S. and Ph.D.). The department has overall requirements for the M.S., and Ph.D. degrees with specific requirements associated with each program. The department also offers integrated undergraduate-graduate (IUG) degree programs that combine the M.S. in Energy and Mineral Engineering with each of the five B.S. degree programs: Energy Business and Finance; Energy Engineering; Environmental Systems Engineering; Mining Engineering; and Petroleum and Natural Gas Engineering.

Energy and Mineral Engineering Program

The Energy and Mineral Engineering (EME) program is a single graduate program with a focus on the production of energy and minerals in an economic, safe and efficient manner. The program provides flexible education of students in energy and mineral sciences and engineering, with focus on both non-renewable and renewable resource and energy industries. The program is designed to resolve the sometimes competing goals of flexible education of requisite breadth while still providing in-depth study; students are required to follow a focused curriculum that combines the requisite rigor with flexibility in a rapidly changing field of endeavor. Participating students take core program and required option courses and additional courses from a broad array of courses to meet the total credit requirements. Students are not required to choose an option. However, a student who desires disciplinary identity may choose from among the five available options: petroleum and natural gas engineering, mining and mineral process engineering, environmental health and safety engineering, fuel science, and energy management and policy.

Admission Requirements

Scores for the Graduate Record Examinations (GRE) are required for admission, though this may be waived at the discretion of the Energy and Mineral Engineering graduate program. The best-qualified applicants will be accepted by the Energy and Mineral Engineering graduate program up to the number of spaces available for new students. At the discretion of the Energy and Mineral Engineering graduate program, a student may be granted provisional admission. Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Admission to the Energy and Mineral Engineering graduate program in the John and Willie Leone Family Department of Energy and Mineral Engineering is competitive. Entering students must hold a bachelor's degree in a science or engineering discipline unless they are on the Integrated Undergraduate-Graduate (IUG) program. Students with 3.00 or better (out of 4.00) junior/senior cumulative grade-point averages and appropriate course backgrounds will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Undergraduate students from the John and Willie Leone Family Department of Energy and Mineral Engineering with sixth semester standing, minimum grade-point average of 3.5, and excellent faculty recommendations may be admitted for a five-year B.S./M.S. integrated undergraduate-graduate (IUG) degrees.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. Specific graduate programs may have more stringent requirements. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British west Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, The United States, and Wales.

Letters of recommendation and an applicant's statement of purpose are also required.

Master's Degree Requirements

The M.S. degree program in Energy and Mineral Engineering is designed for students to gain advanced knowledge for research, analysis, and design in Energy and Mineral Engineering. Students pursuing an M.S. degree will be required to complete 24 course credits and submit a thesis (6 credits) to the Graduate Council. Prescribed courses are EME 500(3), EME 580(3), EME 590(1), and EME 600(6); an additional 17 credits of electives are required (for options, 12 of these elective credits are prescribed). Graduate committees in the Energy and Mineral Engineering graduate program play an important role in formulating individual course and research schedules. At least 18 of the total course credits must be at the 500 level or above.

Doctoral Degree Requirements

The Ph.D. program in Energy and Mineral Engineering emphasizes scholarly research and help students prepare for research and related careers in industry, government and academe. Acceptance into the Ph.D. degree program in Energy and Mineral Engineering is based on the student's performance on the Ph.D. candidacy examination administered by the faculty of the EME graduate program. A comprehensive examination is required of all Ph.D. candidates and should be taken after substantial completion of course work. The comprehensive examination is the responsibility of the candidate's doctoral committee and administered according to the rules specified by the Graduate Council. The Ph.D. program in Energy and Mineral Engineering is quite flexible, with minimum formal requirements. A minimum of 12 post M.S. course credits and 12 research credits are required. At least 18 course credits for the graduate program must be at the 500 level or above. For students entering the program with an M.S. degree, 500-level or above courses already taken either at Penn State or

other institutions may be accepted in partial fulfillment of the 18 credits of 500-level or above course requirements if they are found to be appropriate. Students meet the general communication requirement for all Ph.D. candidates through the candidacy examination where a candidate is required to submit a written research paper or proposal of less than 15 double-spaced pages and make a formal public presentation and defense of the research proposal. The candidate is assessed by the exam committee on both technical and communication proficiency. Although encouraged, competency in a foreign language is not required for the Ph.D. degree. However, each Ph.D. candidate is expected to demonstrate competency in communication and language by successfully completing EME 581(3) (Research and Geostatistics Methods) which teaches students methods for the conduct, analysis and effective communication of scientific research and spatial characterization.

The general requirements for graduation are outlined in the GENERAL INFORMATION section of the Graduate Bulletin.

Integrated Undergraduate-Graduate (IUG) Degree Requirements

Integrated B.S. in Energy Business and Finance and M.S. in Energy and Mineral Engineering
The integrated undergraduate-graduate (IUG) program between the Energy Business and Finance undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused EBF undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

Integrated B.S. in Energy Engineering and M.S. in Energy and Mineral Engineering
The integrated undergraduate-graduate (IUG) program between the Energy Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused ENENG undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

Integrated B.S. in Environmental Systems Engineering and M.S. in Energy and Mineral Engineering
The integrated undergraduate-graduate (IUG) program between the Environmental Systems Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused ENVSE undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

Integrated B.S. in Mining Engineering and M.S. in Energy and Mineral Engineering
The integrated undergraduate-graduate (IUG) program between the Mining Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused MNG E undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

Integrated B.S. in Petroleum and Natural Gas Engineering and M.S. in Energy and Mineral Engineering
The integrated undergraduate-graduate (IUG) program between the Petroleum and Natural Gas Engineering undergraduate program and the Energy and Mineral Engineering graduate program enables academically superior and research-focused PNG E undergraduate students to also obtain an M.S. degree in Energy and Mineral Engineering in five years of study. The IUG admission and degree requirements are shown below.

The John and Willie Leone Family Department of Energy and Mineral Engineering offers integrated B.S./M.S. programs that are designed to allow academically superior and research-focused undergraduate students in any of our five B.S. degree programs—Energy Business and Finance (EBF); Energy Engineering (ENENG); Environmental Systems Engineering (ENVSE); Mining Engineering (MNG E); and Petroleum and Natural Gas Engineering (PNG E)—also to obtain an M.S. degree in Energy and Mineral Engineering (EME) within five years of study. Students interested in the five-year Integrated Undergraduate-Graduate (IUG) program must apply for admission to The Graduate School and be admitted into the EME IUG program by the end of their junior year.

In the first three years IUG students will follow the course scheduling of the undergraduate major in the department (see Undergraduate Degree Program Bulletin). Students interested in the IUG program will, however, be encouraged to take upper-level classes, whenever appropriate. An admitted student will begin the senior year working towards the B.S./M.S. with an M.S. Advising Committee. The student will follow the course scheduling of the B.S. major while also taking 500-level courses, whenever appropriate, to satisfy the M.S. requirements. The student will also start work on a thesis designed to meet the requirements of the M.S. thesis. In the fifth year the student will continue to work towards satisfying all degree requirements for the B.S. and M.S. degrees including the M.S. thesis. Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, an assistantship requiring the payment of graduate tuition.

Admission Requirements

Undergraduate students from the John and Willie Leone Family Department of Energy and Mineral Engineering with sixth semester standing and minimum grade-point average of 3.5 who wish to complete the Integrated B.S./M.S. program may apply to the Graduate School and the EME IUG program before the end of their junior year. Three faculty letters of recommendation are required. A statement of purpose and a plan of study covering the five year period, prepared in consultation with an adviser, and approved by the program officers of the B.S. major and the EME graduate program must accompany the application. The plan should be presented in person to the undergraduate and graduate program officers prior to being admitted into the program. Graduate Record Examination (GRE) scores may be submitted by IUG applicants but are not required. The application will be reviewed by the Admissions Committee of the EME Graduate program and acted upon by the EME Graduate Program Officer.

Degree Requirements

The degree requirements will be in accordance with the approved requirements of the respective undergraduate degree program (i.e. energy business and finance, energy engineering, environmental systems engineering, mining engineering or petroleum and natural gas engineering) and the energy and mineral engineering graduate program. However, 12 of the 500-level credits required for the master's degree may be applied to both undergraduate and graduate degree programs. The undergraduate degree program officer will determine the specific undergraduate required courses for which the 500-level courses may be used to substitute to meet institutional and accreditation requirements.

Requirements

Once admitted into the IUG program, students are bound by the same guidelines, credit requirements, and program procedures as all other students in the Energy and Mineral Engineering graduate program.

As many as 12 of the credits required for the master's degree may be applied to both the B.S. and the M.S. degrees. A minimum of 6 credits counted for both the B.S. and M.S. degrees must be at the 500 level. The table below shows which course credits will be double-counted as substitutes for both the B.S. and M.S. as applicable. To meet the number of 500 or above credit requirements, students will be advised to take the graduate courses and use them to substitute for the undergraduate courses.

Other Relevant Information

All graduate students are expected to attend general Department seminars. Graduate students may be asked to contribute to the instructional programs of the Department by assisting with undergraduate laboratory and lecture courses.

Students in Energy and Mineral Engineering may elect to apply for the dual-title degree program in Operations Research for the Ph.D. and M.S. degrees. (See also Operations Research)**Student Aid**

Graduate students are supported by a variety of government and industry fellowships, and research and teaching assistantships. Stipends vary depending on the source. Please see the STUDENT AID section of the *Graduate Bulletin* to learn other forms of the student aid.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ENERGY AND MINERAL ENGINEERING (EME) course list

Last Revised by the Department: Spring Semester 2012
Blue Sheet Item #: 40-06-251
Review Date: 04/10/2012
Faculty linked: 6/9/14

English (ENGL)

Program Home Page

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Degrees Conferred:

Ph.D., M.A., M.F.A.
Dual-Title Ph.D. in English and African American and Diaspora Studies
Dual-Title Ph.D. in English and Visual Studies
Dual-Title M.A., Ph.D. in English and Women's Studies
Integrated Undergraduate-Graduate (B.A./M.A.) Degree in English

The Graduate Faculty

The Programs

Candidates for the M.A., M.F.A., and Ph.D. in English may choose from a variety of courses in English literature and language, rhetoric and composition, and theory/cultural studies. The M.F.A. in English helps prepare candidates for professional careers as writers of fiction, poetry, or nonfiction, or for careers in academia.

The department offers a strong college-level teacher-training program, and most graduate students in English have the opportunity to serve as teaching assistants. Students usually begin by teaching basic composition courses, but there are opportunities for advanced students to teach courses in business writing, technical writing, fiction writing, poetry writing, literature, and humanities, and to serve as tutors in the Writing Center.

Admission Requirements

Requirements listed in this section are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants should have a junior/senior grade-point average of 3.50 (on a 4.00 scale), although exceptions may be made for students with special backgrounds, abilities, and interests. Scores from the Graduate Record Examinations (GRE) Aptitude Tests (verbal and quantitative) are required for admission. Applicants must also submit three letters of recommendation, a writing sample indicating their ability to do analytical or original work, and a statement of their professional goals.

For admission, M.A. students should have strong backgrounds in English courses: 18 credits beyond freshman composition are a minimum, but the department prefers at least 24 credits.

For admission into the M.F.A. program, students must have a baccalaureate degree (with substantial work in English), a portfolio of publishable student writing, and the intention to pursue a career as a professional writer.

To be considered for the doctoral program, students must have completed an M.A. in English, M.F.A. or its equivalent. The records of potential students should indicate promise of superior work in doctoral study.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Candidates for the M.A. take at least 30 credits of course work, with a minimum of 18 credits of 500-level courses, including:

- ENGL 501 Materials and Methods of Research (3 cr.)
- 1 course in literary theory or rhetoric (3 cr.)
- 2 courses in literature in English prior to 1800 (6 cr.)
- 2 courses in literature in English after 1800 (6 cr.)
- 6 credits of ENGL 596 Individual Studies, in which students complete their culminating master's paper.

In addition, M.A. candidates must demonstrate reading knowledge of one of the following languages: French, German, Italian, Russian, Spanish, Latin, or Classical Greek. Other languages may be substituted with the approval of the Graduate Studies Committee.

M.F.A. candidates are required to take 48 credits, distributed as follows:

- 3 credits ENGL 501
- 12 credits in ENGL 512, ENGL 513, or ENGL 515, at least 9 of which must be in the student's area of specialization (ENGL 512, 513, and 515 can be repeated for credit)
- 12 credits in ENGL 596 for the final project, or at least 6 credits of ENGL 596 and 6 credits of English Department graduate seminars. Candidates will complete a book-length manuscript of publishable quality in their area of specialization.
- 9 credits in electives (400 or 500-level courses)
- 12 credits in literature at the 500-level

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The Ph.D. degree does not require a specific number of credits although all candidates are required to have completed English 501 (or the equivalent), one course in rhetoric or theory, two courses in periods before 1800, and two in periods after 1800. With the help of departmental graduate advisers, students select a program of seminars or reading courses. To complete their programs, students must pass a Ph.D. candidacy examination and pass a comprehensive examination (consisting of both written and oral components); and write a doctoral dissertation. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination.

Dual-Title Ph.D. Degree in English and African American and Diaspora Studies

Admission Requirements

Students must apply and be admitted to the graduate program in English and the Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the African American and Diaspora Studies dual-title program. Refer to the Admission Requirements section of theAfrican American and Diaspora Studies Bulletin page. Doctoral students must be admitted into the dual-title degree program in African American and Diaspora Studies prior to obtaining candidacy in their primary graduate program.

In addition to the admission requirements set forth by the Graduate Council and the Department of English, students will be admitted to the dual-title

degree program in African American and Diaspora Studies by an admissions committee of African American and Diaspora Studies faculty. Students enrolled in the English Department can apply for admission to the dual-title degree prior to taking the candidacy exam.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in English, listed above. In addition, students must complete the degree requirements for the dual-title in African American and Diaspora Studies, listed on the African American and Diaspora Studies Bulletin page.

Foreign Language Requirements

As required by the Department of English, students must demonstrate reading proficiency in at least one foreign language no later than the third semester of residency (not including summer semester).

Candidacy

The dual-title field must be fully integrated into the candidacy exam for the doctoral program. The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from English and must include at least one Graduate Faculty member from the African American and Diaspora Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. In addition, candidates for the dual-title Ph.D. in African American and Diaspora Studies will be required to present to their committee a portfolio of work in African American and Diaspora Studies which includes a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's interest in questions taken up by scholars of African American and Diaspora Studies.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an English and African American and Diaspora Studies dual-title Ph.D. student must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the committee representing English is not also a member of the Graduate Faculty in African American and Diaspora Studies, then the committee member representing African American and Diaspora Studies must be appointed as co-chair.

Comprehensive Exam

The African American and Diaspora Studies Graduate Faculty member on the student's doctoral committee is responsible for developing and administering the African American and Diaspora Studies portion of the student's comprehensive exam. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student's thematic or regional area of interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam will include the following components: broad history of the field, contemporary theory and debates, and either sexual and gender politics or a topic related to the student's specific area of interest.

Dissertation and Final Oral Examination

The candidate must complete a dissertation on a topic that reflects their original research and education in both English and African American and Diaspora Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination.

Dual-Title Ph.D. in English and Visual Studies

Admission Requirements

Students must apply and be admitted to the graduate program in English and the Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program. Refer to the Admission Requirements section of the Visual Studies Bulletin page. Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in English, listed above. In addition, students must complete the degree requirements for the dual-title in Visual Studies, listed on the Visual Studies Bulletin page.

Foreign Language Requirements

As required by the Department of English, students must demonstrate reading proficiency in at least one foreign language no later than the third semester of residency (not including summer semester).

Candidacy

The dual-title field will be fully integrated into the candidacy exam for the doctoral program. The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from English and must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. In addition, candidates for the dual-title Ph.D. in Visual Studies will be required to present to their committee a portfolio of work in Visual Studies, including a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's interest in questions related to the Visual Studies.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an English and Visual Studies dual-title Ph.D. student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the committee chair does not represent Visual Studies, the committee member representing Visual Studies must be appointed as co-chair.

Comprehensive Exam

The Visual Studies Graduate Faculty member on the student's committee is responsible for developing and administering the Visual Studies portion of the student's comprehensive exam. The exam must incorporate components addressing Visual Studies based on the student's areas of interest and specialization in the Visual Studies.

Dissertation

The candidate must complete a dissertation on a topic that reflects his or her original research and education in both English and in Visual Studies in order to earn the dual-title Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination.

Dual-Title M.A. and Ph.D. in Women's Studies

Admissions Requirements

Students must apply and be admitted to the graduate program in English and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women's Studies dual-title program. Refer to the Admission Requirements section of theWomen's Studies Bulletin page. Doctoral students must be admitted into the dual-title degree program in Women's Studies prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in English, listed above. In addition, students must complete the degree requirements for the dual-title in Women's Studies, listed on theWomen's Studies Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from English and must include at least one Graduate Faculty member from the Women's Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both English and Women's Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyondthe normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of and English and Women's Studies dual-title Ph.D. student must include at least two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Women's Studies, a member of the committee representing Women's Studies must be appointed as co-chair. The Women's Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in English and Women's Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Integrated Undergraduate-Graduate (B.A. /M.A.) Program

The English B.A./M.A. Integrated Undergraduate Degree Program (ENGL IUG) is a five-year program designed for highly-qualified and motivated students seeking to improve their writing skills significantly. The integrated B.A./M.A. degree offers talented undergraduates a chance to acquire both a B.A. in English and an M.A. in English in five years of study. The first two years of undergraduate course work include the University General Education and Liberal Arts requirements in addition to introductory course work in the English major. Students typically will apply to the B.A./M.A. during their 5th or 6th semester and begin graduate studies in their fourth year. In the third year students are expected to take upper-level course work in English in literature, rhetoric, or creative writing. In the fourth year, students will complete the capstone course for the English major, English 487W, and enroll exclusively in 400-level and graduate-level courses in creative writing. The fifth and final year of the integrated program consists entirely of graduate-level seminars. The program culminates with the submission of a master's paper that consists of the best creative work that the student has produced in his or her primary creative genre—either poetry or prose, and includes a scholarly research component.

Time of Admission to the Program

Students shall be admitted to the English IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study.

Application to the English IUG would typically occur in the junior year after a student has completed 60 credits, enrolled in the English major, and completed two English courses in creative writing.

Admission Requirements

Students must apply to and meet admission requirements of the Graduate School, as well as the admission requirements for the M.A. in English, listed above. Admission requirements listed here are in addition to requirements stated in theGENERAL INFORMATION section of the *Graduate Bulletin*.

Admission to the integrated B.A./M.A. program will be based on the submission of a portfolio of creative work and a plan of study to the department's Director of Graduate Studies (DGS) and the Director of the B.A./M.A. program. Applications typically will be filed during the 5th or 6th semesters of study, and applicants must have achieved a minimum of 60 credits and a 3.3 overall GPA and 3.6 GPA in English to begin the program. The English DGS will ensure that the applicant meets the minimum credit and GPA requirements for the program. The Director of the B.A./M.A. program will evaluate the quality of the student's creative work and the applicant's plan for fulfilling the requirements of the M.A. in English. The Director of the B.A./M.A. program, in consultation with the Creative Writing faculty, will have final approval for what constitutes an acceptable level of creative work and an acceptable plan for the completion of the M.A.

The application procedure requires submission of the following:

A. Support letters from faculty and administrators (addressed to the department's Director of Graduate Studies and the Director of the B.A./M.A. program)
B. A personal statement
C. Portfolio of creative work
D. A Plan of Study
E. A transcript and degree audit printed from the student information system
F. A current resume or curriculum vita
G. A copy of the completed on-line Graduate School Application (GRE scores are not required).

Plan of Study and Advising

Prior to the application process, students should communicate their intent to enroll in the IUG to the English B.A. adviser and the Director of the B.A./M.A. program. The Director of the B.A./M.A. will help each student identify an appropriate series of English courses to properly prepare each student for the 500-level M.A. workshops and 500-level literature courses.

Students will be expected to maintain a minimum overall GPA of 3.3 for all undergraduate course work and a GPA of 3.6 in English (ENGL) courses throughout the IUG program of study. Failure to do so will result in the student being advised that he/she must regain a GPA of 3.3 within one semester. If the GPA is not 3.3 or higher in general undergraduate course work and 3.6 or higher in English course work after that term, the student will be dropped from the IUG.

Each student enrolled in the B.A./M.A. will meet at the beginning of each term with the Director of the B.A./M.A. to discuss his or her progress through the M.A. degree and to make sure that he or she is following the plan established upon his or her admission to the B.A./M.A. program.

If the student decides not to continue on in the IUG, the student may, contingent on fulfilling all other requirements for the BA in English, graduate with a B.A. in English.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in English are listed in theUndergraduate Bulletin. Degree requirements for the M.A. degree are listed in the Master's Degree Requirements section above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree

cannot be double-counted. The courses that are eligible to double count for both degrees are: ENGL 412 (3 cr.), ENGL 413 (3 cr.), ENGL 415 (3 cr.), ENGL 512 (3 cr.), ENGL 513 (3 cr.), and ENGL 515 (3 cr.).

Student Aid for English Graduate Students

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin. Student on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin. In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in English graduate programs:

EDWIN ERLE SPARKS FELLOWSHIPS IN THE HUMANITIES (8)

Available to beginning and continuing graduate students in one of the following graduate programs: Comparative Literature, English, French, German, History, Linguistics, Philosophy, Spanish, and Speech Communication; stipend $12,560 plus waiver of tuition. Apply to department before February 1.

KATEY LEHMAN FELLOWSHIP

Provides approximately $13,000 plus tuition for a year's study in poetry or fiction writing leading toward the B.A./M.A. in English or the M.F.A. in English. The Lehman Fellow will teach one course during the fellowship year. Fellowship holders are eligible for graduate assistantships with a similar stipend and tuition grant during the second year of study.

WILMA EBBITT AWARD

Funding to support research in rhetoric. Number and amount of awards to be determined.

BEN EUWEMA MEMORIAL SCHOLARSHIP

Travel funding for graduate degree candidates; consideration will be given to all currently enrolled graduate students in English. Preference will be given to students at the Ph.D. thesis stage, particularly those who need to travel to complete their research; number of awards and amount of each will be determined each year.

FOLGER INSTITUTE FELLOWSHIPS

Penn State is a member of the Folger Institute of Renaissance and Eighteenth-Century Studies. Graduate students in English are eligible for Folger Institute Fellowship to study in seminars and workshops at the Folger Library, Washington, D.C.

PHILIP YOUNG MEMORIAL AWARD

Funding to support research in American Literature. Number and amount of awards will be determined.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ENGLISH (ENGL) course list

Last Revised by the Department: Summer 2017

Blue Sheet Item #: 46-01

Review Date: 8/22/2017

Faculty linked: 6/9/14

Engineering Management (ENGMT)

JAMES A. NEMES, *Interim Chancellor*
School of Graduate Professional Studies
Penn State Great Valley
30 E. Swedesford Road
Malvern, PA 19355-1443
610-725-3335

COLIN J. NEILL, *Associate Professor and Director of Engineering Programs*
School of Graduate Professional Studies
Penn State Great Valley, Engineering Division
610-648-3277
www.sgps.psu.edu

Degree Conferred:

M.E.M.

The Graduate Faculty

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. The Master of Engineering Management is developed for students with a background in engineering or science. Applicants with a four year undergraduate degree in engineering, mathematics, physics, computer science, or a related discipline will be considered. Test scores from the GMAT or GRE exams are not required, but will be considered by the admissions committee if submitted. Jr/Sr GPA of 3.0 or better on a 4.0 scale is required. Students must have three years or more work experience in an engineering or engineering-related position. Applicants must submit a letter of reference, and a one page personal statement of relevant experience and goals.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 20 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 19 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5.

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

Degree Requirements

All students in the Master of Engineering Management program must complete a minimum of 33 credits.
The courses must include the required core courses of 18 credits:

ENGMT 501: Engineering Management Science (3)
ENGMT 510: Economics and Financial Studies for Engineers (3)
SYSEN 505: Technical Project Management (3)
SYSEN 536: Decision and Risk Analysis in Engineering (3)
SYSEN 550: Creativity and Problem Solving I (3)
SYSEN 552: Creativity and Problem Solving II (3)

as well as the capstone course:

ENGMT 539: Engineering Management Strategy (3)

Student Aid

Graduate Assistantships available to students in the program and other forms of student aid are described in the STUDENT AID section of the *Gradate Bulletin.*

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item #: 38-02-029

Review Date: 10/06/09

Faculty linked: 1/13/16

Entomology (ENT)

Program Home Page

GARY W. FELTON, *Head of the Department*
501 Agricultural Sciences and Industries Building
814-863-7789

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

Students in Entomology represent a range of experiences and interests, with varied backgrounds from biology, chemistry, zoology, entomology, meteorology, ecology and botany programs to name a few. You will find an exceptional faculty that offer an unequaled range of research expertise and breadth within our focus areas. The strength of our research resides in four main program themes: Chemical Ecology, Ecological Applications, Disease Biology and Ecology and Pollinator Biology and Ecology. Many opportunities are available for study abroad experiences from which students return with a new perspective that enhances their studies and research. The Entomology Department participates in a number of dual-degree programs including Comparative and International Education (CI ED), Human Dimensions of Natural Resources and the Environment (HDNRE), International Agriculture and Development (INTAD) and Operations Research (OR). Additional specialization is available to students conducting research with insects in intercollege degree programs in ecology, genetics and plant biology.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

For admission a student should have a strong background in biological sciences. Courses in chemistry through organic, physics, mathematics through calculus, statistics, and computer application are recommended.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5.

Master's Degree Requirements

The Master of Science degree in Entomology is an intermediate degree leading toward the development of special knowledge in entomology. It provides training for prospective doctoral candidates. A minimum of 30 credits (400 and 500 level) is required, with at least 20 credits earned in residence. At least 18 credits in the 500 and 600 series must be included in the program. A minimum of 12 credits in coursework (400 and 500) must be completed in the major program.

The program requires all students to take ENT 432, ENT 518, ENT 522, ENT 530 (2 credits), 3 credits of 400-to 500-level ENT course, and 3 credits of statistics (i.e., STAT 501, 502, 541, AG 400, or equivalent). Additional courses may be selected by the student in consultation with his/her graduate committee. Each Master's student is expected to serve as a teaching assistant for 3 credits. Each student must present the results of thesis research at a departmental seminar, and the student may register for 1 credit of ENT 590 that semester. A thesis equivalent to 6 credits (ENT 600) is required. A final oral examination covering the general field of entomology, with emphasis in the student's area of specialization, is required by the department. This is to be administered by the student's committee. A favorable vote of a two-thirds majority is necessary for passing.

Committees for master's degree candidates should be formed during the first semester, and are suggested jointly by the student and advisor, with approval by the Department Head. Masters committees have a minimum of three members. One of these should be from another degree program, particularly if the student plans to minor in that area. Adjunct faculty members cannot constitute a majority of the committee. The student and committee shall meet early in the process to plan the student's program and approve a thesis project.

The Thesis Guide is available electronically, visit www.etd.psu.edu.

Doctoral Degree Requirements

The degree of doctor of philosophy signifies high scholastic achievement and demonstrated capability in independent research. Although there is no formal credit requirement at the Ph.D. level, five academic years of full time graduate work beyond the bachelor's degree are normally required. Some of the work may be completed off campus or on a part-time basis, but between the time of acceptance as a candidate and completing the degree requirements the student must spend two academic sessions in residence within a twelve-month period. The program requires all students to take ENT 432, ENT 518, ENT 522, ENT 530 (4 credits) and 3 credits of 400- or 500-level ENT course. Other course requirements are dependent on the student's program of study. Each Ph.D. student is expected to serve as a teaching assistant for 6 credits. The results of the dissertation research must be presented at a departmental seminar. In addition, students must take and pass a comprehensive and final oral examination. Students commencing a doctoral program may have a provisional committee appointed as soon as the advisor is selected. Students are not formally admitted to the doctoral candidacy until they have passed a candidacy examination. A favorable vote by two-thirds of the Candidacy Committee members is necessary for acceptance of a candidate.

The official doctoral committee is approved by the Department Head and is appointed by the Graduate Dean through the office of Graduate Enrollment Services after the student has passed the candidacy exam. Doctoral committees for students in the entomology program include at least three members from the department, at least one member from a related field outside Entomology, and a total of no fewer than four members; five members are recommended. Typically, committee members are chosen in consultation with the advisor. If the student has a formal minor, a representative of the minor field must be on the committee.

The student and committee should meet early in the degree process to plan the student's Ph.D. program and approve a thesis project. A student may change advisor or committee members without prejudice. The doctoral committee guides and monitors the student's progress, administers the comprehensive and final oral examinations, and evaluates the dissertation.

A candidate for the degree of Doctor of Philosophy is required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the Ph.D. Entomology assesses and works to improve competence of both domestic and international students. Assessments to evaluate competency prior to the candidacy exam include pieces of original writing required as part of ENT 522 (Professional Development). Oral communication competency is evaluated during the candidacy examination. Students needing assistance are directed to appropriate remedial activities. (International students should note that passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a Ph.D. from Penn State.)

There is no foreign language requirement for the Ph.D. degree. However, depending on the nature of the thesis research and with the advice and consent of the Doctoral Committee, competency in a foreign language may be required as a part of the doctoral studies of certain students.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Dual-Title Graduate Degree in Entomology (ENT) and International Agriculture and Development (INTAD)

Graduate students with research and educational interests in international education may apply to the Entomology/INTAD Dual-Title Degree Program. The goal of the dual-title degree Entomology and INTAD graduate program is to enable graduate students from Entomology to acquire the knowledge and skills of their primary area of specialization in Entomology, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of chemical ecology, disease ecology and biology, pollinator ecology and biology, ecology, genomics and pest management. Additional specialization is available to students performing research with insects in the inter-college degree programs in genetics, ecology, and plant biology. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions. This dual-title graduate degree program does not duplicate any other degree program at the University.

Admission Requirements

For admission to the dual-title doctoral degree under this program, a student must first apply and be admitted to the Entomology graduate program. Once accepted into the Entomology program, the student can then submit an application to the INTAD Academic Program Committee for the dual-title degree program. The application consists of a written personal statement indicating the career goals that a student hopes to accomplish by earning a dual-title ENT/INTAD degree. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

For admission a student should have a strong background in biological sciences. Courses in chemistry through organic, physics, mathematics through calculus, statistics, and computer application are recommended. The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Entomology program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, determined by the student, their INTAD advisor, and their Entomology program advisor.

Degree Requirements for ENT/INTAD Dual-Title M.S.

The master's in Entomology and INTAD is a dual-title degree awarded only to students who are admitted to the Entomology master's program and admitted to the dual-title degree in INTAD. In addition to the requirements of the Entomology degree, dual-title degree students must:

Course Requirements

Complete a minimum of 12 INTAD course credits (400, 500 or 800 level) as follows:

9 credits from the core curriculum:

Program Design and Delivery (AEE 450, 3 credits)
Leadership Development (CEDEV/R SOC/AEE 505, 3 credits, on-line)
International Agricultural Development Seminar (INTAD 820, 3 credits)

3 credits of internship or applied courses/ independent studies with international development content

Thesis

Write a master's thesis on a topic that reflects both the graduate program in entomology and the dual-title offering in INTAD. Thesis research credits (SUBJ 600) must be taken in the major program.

All members of the student's committee for the dual-title master's degree will be members of the graduate faculty. The committee must include at least one graduate faculty member from INTAD. A Degree Committee form should be filed upon selection of the committee members and should be approved by the INTAD Academic Program Committee Co-chair.

Candidates for the dual-title master's degree in Entomology and INTAD will also be required to pass a final oral examination covering the general field of entomology and INTAD, with emphasis on the student's area of specialization. The oral exam is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate primary program requirements and those of the INTAD program. Final course selection is determined by the students in consultation with their INTAD advisors and their Entomology program advisors. Permission from a student's academic advisor, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course; however, the requirement for 18 credits at the 500-level or above must still be met, in total, across both the major and the dual-title courses of study. Students and advisors should maintain the INTAD Master's Degree Plan of Study, which must be submitted to the INTAD program office two months before the student files the "Intent to Graduate" via eLion.

Degree Requirements for ENT/INTAD Dual-Title Ph.D.

The doctoral degree in Entomology and INTAD is a dual-title degree awarded only to students who are admitted to the Entomology doctoral program and admitted to the dual-title degree in INTAD. The minimum course requirements for the dual-title Ph.D. degree in ENT/INTAD, in addition to the Entomology requirements, are as follows.

Course Requirements

Students must complete a minimum of 18 INTAD course credits with study in the following categories:

9 credits from the core curriculum

International Agricultural Development Seminar (INTAD 820, 3 credits)
International Rural Social Change (R SOC 517, 3 credits)
Sociology of Agriculture (R SOC 508, 3 credits) or Human Dimensions of Natural Resources (R SOC 555, 3 credits)

9 credits from INTAD elective curriculum/courses with international development content/internships/independent study

Permission from a student's academic advisor, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course; however, the requirement for 18 credits at the 500-level or above must still be met, in total, across both the major and the dual-title courses of study. Particular courses may satisfy both the Entomology Department requirements and those in the INTAD program. Final course selection is determined by the student in consultation with their INTAD advisors and their Entomology program advisors. Students who already hold a master's degree from another

institution may petition to have equivalent course credits accepted.

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

Candidacy

Candidacy procedures will be based on the procedures of the major department and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the candidacy exam may be delayed at the discretion of the student's advisor in consultation with the INTAD program coordinators.

Committee Composition

The doctoral committee of a Ph.D. dual-title degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty; and the committee must include at least one representative from the INTAD Program faculty. The chair of the committee can be a member of both the Major Program and the INTAD Program faculty. If the chair is not an INTAD Program faculty member, the INTAD representative must be the co-chair of the committee. An official "outside member" also must be appointed to the committee.

Comprehensive Exam

At the end of the coursework, candidates for the dual-title doctoral degree in Entomology and INTAD will be required to pass an oral comprehensive examination based on their thesis proposal and area of specialization in entomology, while reflecting their dual-title curriculum. A separate comprehensive examination is not required by the INTAD program, but international agriculture must be one of the key areas of the exam and the INTAD representative on the student's doctoral committee must have input into the development of and participation in the evaluation of the comprehensive examination.

Dissertation and Dissertation Defense

Ph.D. students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both Entomology and International Agriculture and Development. The dissertation should contribute to the body of knowledge in international agriculture. A public oral presentation of the dissertation is required.

Dual-Title Graduate Degree in Entomology (ENT) and Comparative and International Education (CI ED)

Graduate student with research and educational interests in international education may apply to the Entomology/CI ED Dual-Title Degree Program. The goal of the dual-title degree Entomology and CI ED graduate program is to enable graduate students from Entomology to acquire the knowledge and skill of their primary area of specialization in Entomology, while at the same time gaining the perspective and methods of comparative and international education. Graduate Dual-Title degree program in Entomology and CI ED study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development, presentations, publication of research articles, and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of chemical ecology, disease ecology and biology, pollinator ecology and biology, ecology, genomics and pest management. Additional specialization is available to students performing research with insects in the inter-college degree programs in genetics, ecology, and plant biology. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions.

This dual-title graduate degree program does not duplicate any other degree program at the University.

Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to the Entomology graduate program. Once accepted into the Entomology program, the student can apply to the Admissions Committee on the Comparative and International Education program. The CI ED admissions committee reviews applications and recommends students for admission to the dual-title degree program to the Graduate School. Scores from the Graduate Records Examinations (GRE) are required for admission. In addition, students are to provide a written personal statement indicating the career goals they hope to accomplish by earning a dual-title Entomology/CI ED degree. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Entomology program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the CI ED program committee. Within this framework, final course selection is determined by the student, their CI ED adviser, and their Entomology program adviser.

Upon a student's acceptance by the CI ED admissions committee, the student will be assigned a CI ED academic adviser in consultation with the CI ED program chair. As students develop specific scholarly interests, they may request that a different CI ED faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of The Graduate School, the Entomology program and the CI ED program.

Requirements for Entomology/CI ED Dual-Title M.S.

The master's in Entomology and CI ED is a dual-title degree awarded only to students who are admitted to the Entomology master's program and admitted to the dual-title degree in CI ED. In addition to the requirements for the Entomology degree, dual-title students must:

Complete a minimum of 12 CI ED credits with study in the following curriculum categories:
3 credits, CI ED Proseminar (CI ED 500)
6 credits, advanced comparative and international education content courses
3 credits, advanced or focused comparative and international education content courses
Write a master's thesis on a topic that reflects both the graduate program in Entomology and the dual-title offering in Comparative and International Education.

The thesis committee for the dual-title M.S. degree will consist of two graduate faculty members from Entomology and one graduate faculty member from CI ED.

Candidates for the dual-title master's degree in Entomology and CI ED will also be required to pass a final oral examination covering the general field of Entomology and CI ED , with emphasis on the student's area of specialization. The oral exam (thesis defense) is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate primary program requirements and those of the CI ED program. Final course selection is determined by the students in consultation with their CI ED advisers and their major program advisers. Students and advisers should maintain the CI ED Master's Degree Plan of Study, which must be submitted to the CI ED program office two months before the student files the "Intent to Graduate" via eLion.

Requirements for the Entomology/CI ED Dual-Title Ph.D.

The doctoral degree in Entomology and CI ED is a dual-title degree awarded only to students who are admitted to the Entomology doctoral program and admitted to the dual-title degree in CI ED. The minimum course requirements for the dual-title Ph.D. degree in Entomology and CI ED, in addition to the Entomology Department requirements, are as follows:

Complete a minimum of 27 graduate credits
3 credits of Proseminar in Comparative and International Education (CI ED 500);

6 credits in advanced-Comparative and International Education courses;
12 credits in Comparative and International Education content courses or courses with comparative or international content;
6 credits in research methods.

A minimum of 18 of the 27 credits must be taken at the 500-level, and particular courses may satisfy both the Entomology Department requirements and those in the Comparative and International Education program. Final course selection is determined by the student in consultation with their CI ED advisers and their major program advisers. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

Ph.D. Minor in CI ED

A Ph.D. (or D.Ed.) minor program in Comparative and International Education is available to doctoral students who find it desirable to include the perspectives and methodologies of Comparative and International Education in the Entomology program and have been approved to do so by their doctoral committees. To qualify for a minor in Comparative and International Education, students must satisfy the requirements of the Entomology Department, and meet the following minimum requirements:

3 credits in the Proseminar in Comparative and International Educations (CI ED 500);
3 credits in a Comparative and International Education course;
9 credits in Comparative and International Education content courses (or advanced courses) or in courses with comparative or international content outside the College of Education.

Dual-Title Graduate Degree in Entomology (ENT) and Operations Research (O R)

Graduate students with research and educational interests in operations research may apply to the Entomology/O R Dual-Title Degree Program. The goal of the dual-title degree Entomology and O R graduate program is to enable graduate students from Entomology to acquire the knowledge and skill of their primary area of specialization in Entomology, while at the same time attain and be identified with the tools, techniques, and methodology of operations research. Operations research is the analysis--usually involving mathematical treatment--of a process, problem, or operation to determine its purpose and effectiveness and to gain maximum efficiency. Graduate Dual-Title degree program in Entomology and O R study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development, presentations, publication of research articles, and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of chemical ecology, disease ecology and biology, pollinator ecology and biology, ecology, genomics and pest management. Additional specialization is available to students performing research with insects in the inter-college degree programs in genetics, ecology, and plant biology. At the same time they will acquire a broad perspective about how to apply their research findings in the context of operations research. Thus, the dual-title will allow students to master their field of specialization from an operations research perspective.

This dual-title graduate degree program does not duplicate any other degree program at the University.

Admission Requirements

For admission to the dual-title degree under this program, a student must first apply and be admitted to the Entomology graduate program. Once accepted into the Entomology program, the student can apply to the Admissions Committee of the Operations Research program. The O R admissions committee reviews applications and recommends students for admission to the dual-title degree program to the Graduate School. Scores from the Graduate Records Examinations (GRE) are required for admission. For the M.S. dual-title degree in Entomology-Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 140, MATH 141, MATH 220; CMPSC 101; and 3 credits of probability and statistics. For the Ph.D. dual-title degree in Entomology-Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 401, MATH 436; CMPSC 101; and 3 credits of probability and statistics. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Entomology program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the O R program. Within this framework, final course selection is determined by the student, their O R adviser, and their Entomology program adviser.

Requirements for Entomology/O R Dual-Title M.S.

For the M.S. dual-title degree in Operations Research, the minimum requirements are:

6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes;
6 credits in optimization, including a minimum of 3 credits in linear programming;
3 credits in computational methods;
3 credits in applications/specialization

Students must enroll in O R 590 Colloquium for at least 1 credit in each year enrolled in the program and in residence. A minimum of 9 credits must be in the 500 series.

Particular courses may satisfy both the graduate major program requirements and those in the Operations Research program.

A thesis may be required, the supervisor of which must be a member of the graduate faculty recommended by the chair of the program granting the degree and approved by the Operations Research committee as qualified to supervise thesis work in operations research. A paper or report may be written in lieu of the M.S. or M.A. thesis upon approval of the student's graduate major program. It is the prerogative of the graduate major program to assign these credits to one or more of the following categories: stochastic/statistical methods, optimization, computational methods, or applications.

Requirements for the Entomology/O R Dual-Title Ph.D.

For the Ph.D. dual-title degree in Operations Research, the minimum requirements are:

9 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes;
9 credits in optimization, including a minimum of 3 credits in linear programming;
6 credits in computational methods, including a minimum of 3 credits in simulation;
12 credits in applications/specialization

Students must enroll in O R 590 Colloquium for at least 1 credit in each year enrolled in the program and in residence. A minimum of 18 credits must be in the 500 series.

The doctoral committee for an Entomology-Operations Research Ph.D. dual-title degree student is recommended by the Entomology program. The chair and at least two members of a doctoral committee must be members of the graduate faculty and approved by the Operations Research committee as qualified to supervise doctoral theses in operations research. The Operations Research committee is responsible for administering an examination in operations research that constitutes a portion of the comprehensive examination administered to the doctoral students in the program option, as well as to the candidate who chooses operations research as a minor field.

Ph.D. Minor in O R

A Ph.D. minor program in Operations Research is available for doctoral students who find it advantageous to include advanced quantitative methods of systems analysis in their programs of study and have been approved to do so by their doctoral committees. To qualify for a minor in Operations Research, students must satisfy the requirements of their graduate major programs, meet the same prerequisites as the M.S. dual-title degree, and meet the following minimum requirements:

6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes;
6 credits in optimization
3 credits in computational methods

A minimum of 6 credits must be taken at the 500 level.

The doctoral committee for an Entomology-Operations Research Ph.D. dual-title degree student is recommended by the Entomology program. The chair and at least two members of a doctoral committee must be members of the graduate faculty and approved by the Operations Research committee as qualified to supervise doctoral theses in operations research. The Operations Research committee is responsible for administering an examination in operations research that constitutes a portion of the comprehensive examination administered to the doctoral students in the program option, as well as to the candidate who chooses operations research as a minor field.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ENTOMOLOGY (ENT) course list

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06

Review Date: 04/14/2015

Last updated by Publications: 10/27/06

Environmental Engineering (ENV E)

Program Home Page

PATRICK FOX, *Department Head and Shaw Professor*
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Degrees Conferred:

Ph.D., M.S., M.Eng.

The Graduate Faculty

This specialty prepares students for careers in the design of treatment facilities, environmental monitoring, process development for water quality control, industrial waste treatment, management of hazardous and toxic substances, monitoring and management of environmental quality, air pollution control, and water resource systems.

Admission Requirements

The requirements listed here are in addition to the general requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Candidates should possess a baccalaureate degree from a regionally accredited institution. Students in engineering, physical sciences, or mathematics with a 3.00 grade-point average (on a 4.00 scale) may be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students without a baccalaureate degree in engineering would be admitted on a provisional basis pending successful completion of entrance requirements (completed concurrently with degree requirements).

U.S. applicants will upload official copies of their transcripts, a statement of objectives, and three references for letters of recommendation when applying to the program. If admitted, applicants will be required to provide the Graduate School with OFFICIAL COPIES of transcripts of all their previous course work. In addition, all applicants must submit scores from the General Graduate Record Examinations Aptitude Test (verbal, quantitative, and analytical). For the M.Eng. degree, the GRE requirement will be waived for students who have graduated with a degree from the College of Engineering at The Pennsylvania State University with a cumulative grade-point average of greater than 3.30.

International applicants will upload official copies of their transcripts, a statement of objectives, and three references for letters of recommendation when applying to the program. If admitted, applicants will be required to provide the Graduate School with OFFICIAL transcripts (or attested copies), degree, and diploma certificates in **both English and native language**. Photocopies will NOT be accepted. All international applicants whose native language is not English must submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System). The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum composite score for the IELTS is 6.5. International applicants who have received a baccalaureate or master's degree from a college, university, or institution in any of the following countries are exempt from the TOEFL requirement: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, or Wales.

Application Deadlines

M.Eng.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by March 15th of the calendar year for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

M.S. and Ph.D.: Complete applications including required supplementary materials (e.g., official transcripts, reference letters) should be submitted by September 15th for admission in Spring semester and by December 15th for admission in Fall semester. International students are strongly encouraged to submit complete applications early to allow sufficient time for visa processing.

Degree Requirements

Three degrees are offered: Master of Engineering (M.Eng.), Master of Science (M.S.), and the Doctor of Philosophy (Ph.D.).

The M.Eng. degree is a non-thesis professional master's degree. The program provides training for advanced professional practice. A minimum of 31 graduate credits (400 level and above) of course work are required. At least 18 credits must be earned in graduate courses (500 level). At least 12 credits must be earned in courses with the CE prefix. At least 20 credits must be earned at an established graduate campus of the University. All students are required to take CE 535 Integrated Project Management for Civil Engineering to fulfill the requirement for a culminating experience. Specific core courses are also required. All students are required to take the 1-credit CE 590 Colloquium and complete all requirements for Scholarship and Research Integrity (SARI) training. The M.Eng. degree is designed as a two-semester master's degree program and students are required to start their degree in the Fall semester. The preferred plan of study is as follows:

- Fall semester: Fifteen credits of course work plus one credit of CE 590
- Spring semester: Fifteen credits of course work, including CE 535

The M.S. degree program is strongly oriented toward research. A thesis is required, and at least 6 credits of thesis research (C E 600 or 610) must be included in the candidate's academic course plan. A minimum of 31 graduate credits (400-level and above) are required, of which 20 must be earned at an established graduate campus of the University. A minimum of 24 credits of course work are required. A minimum of 12 credits of course work (400 and 500 level) must be completed in the major (courses prefixed C E). At least 18 credits in the 500 and 600 levels, combined, must be included in the program. Specific core courses are also required. All students are required to take the 1-credit CE 590 Colloquium and complete all requirements for Scholarship and Research Integrity (SARI) training. Students are not permitted to count audited credits toward the minimum credits required for the degree.

For the Ph.D. degree, a minimum of 21 credits of graduate course work (400 level and above) is required beyond the M.S. degree, or 15 credits beyond the M.S. in Environmental Engineering from Penn State. Specific core courses are also required. All students are required to take the 1-credit CE 590 Colloquium and complete all requirements for Scholarship and Research Integrity (SARI) training. Students are not permitted to count audited credits toward the minimum credits required for the degree. A candidate for the Ph.D. degree must pass the English proficiency and candidacy examinations, prepare and defend the thesis proposal as part of the oral comprehensive examination, and pass the final oral examination (thesis defense). Prior to completion of the Ph.D. program, the candidate must spend at least two consecutive semesters as a registered full-time student.

Continuous registration is required for all M.S. and Ph.D. graduate students until the thesis (M.S.) or dissertation (Ph.D.) has been approved or course requirements have been satisfied (M.Eng.). See also Civil Engineering.

Biogeochemistry Dual-Title Degree Program

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the

field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of biogeochemistry is required.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. International applicants who wish to be considered for a teaching assistantship must present an acceptable score (250-300 or 55-60) on the Test of Spoken English (TSE). The TSE can be taken in many countries, or at Penn State after arrival. The Department offers a number of graduate fellowships.

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/3/04

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-07-000

Review Date: 6/30/2015

UCA Revision #1: 8/4/06

Faculty updated: 6/9/14; Dept head updated: 9/24/15

Environmental Engineering (ENVE)

Program Home Page

SHIRLEY E. CLARK, *Program Chair, Environmental Programs*
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Middletown, PA 17057-4898

Degree Conferred:

M.Eng.

The Graduate Faculty

The Program

This program, offered at the Harrisburg campus, is intended for the engineer who wishes to pursue, either full-time or part-time, further training in the environmental field with a focus toward understanding the theory behind the design of environmental systems. Prospective students who do not have an undergraduate engineering degree, but rather hold a baccalaureate degree in a related scientific field (such as chemistry, microbiology, environmental science) may be admitted to the program but may need to take several prerequisite undergraduate engineering courses. This degree program builds on the Civil Engineering undergraduate program and complements the Environmental Pollution Control graduate programs (M.E.P.C. and M.S. in EPC) offered by the same faculty.

A variety of civil and environmental engineering courses are regularly offered, as well as specialty courses in environmental policy, other engineering areas, computer science, and other policy-related areas.

Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

Applicants are strongly encouraged to present an undergraduate degree in engineering from an ABET-accredited program. ABET (www.abet.org) is the accrediting body for engineering programs. However, those who possess an undergraduate degree in a related scientific field or unaccredited engineering program may be considered for admission; those students will need to take additional engineering courses at the undergraduate level in order to be adequately prepared. Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

All students are expected to have an undergraduate junior/senior grade-point average of 3.0 on a 4.0-point system. Exceptions to this minimum may be made for students with special backgrounds or abilities, or other qualifications.

All applicants must provide two copies of all official transcripts of all their previous course work. In addition, applicants must supply a statement of objectives and three letters of recommendation.

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

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

International applicants should be aware that processing of transcripts and other application-related information may take considerable time. While this program has a rolling admissions procedure, applicants must ensure that materials arrive at least three months prior to the start of the semester they first intend to begin studies. In addition, students who wish to be considered for a fellowship must submit their materials no later than January 30th.

Integrated B.S. in Civil Engineering/M.Eng. in Environmental Engineering Program

The Civil Engineering undergraduate and Environmental Engineering graduate programs offers a limited number of academically superior Bachelor of Science candidates the opportunity to enroll in an integrated, continous program of study leading to both the Bachelor of Science in Civil Engineering and the Master of Engineering in Environmental Engineering. The ability to coordinate as well as concurrently pursue the two degree programs enables the student to earn the two degrees in five years.

Students in the IUG program must satisfy the degree requirements for both Bachelor of Science and Master of Engineering degress. However, the total course load is reduced due to the maximum of 10 credits that can count towards both degress. A minimum of 7 credits proposed to count for both degrees must be at the 500 level. Master's paper credits may not be double-counted. The first three years of the IUG program are identical to the first three years of the Bachelor of Science program. The fourth year of the IUG program differs from that of the Bachelor of Science program due to the courses that count toward the Master of Engineering degree requirements.

Students will be admitted on a provisional basis late in their 6th semester so that they may be advised appropriately for the IUG 7th semester courses. Formal acceptance is contingent upon maintaining the 3.0 cumulative GPA through the 6th semester, and a collective GPA of 3.3 or better in courses designated MATH, CHEM, C E, or ENVE.

Student performance will be monitored on an on-going basis. In addition, a formal evaluation of student academic performance will be performed when the student has completed 114 to 115 credits, the end of the first semester of the senior year for a typical student in the program. Students who have not maintained a collective 3.3 GPA in courses designated MATH, CHEM, C E, or ENVE will be transferred to a probationary status. Students who have not maintained a collective GPA of 3.3 or better in courses designated MATH, CHEM, C E, or ENVE by the end of their eighth semester will be dropped from the graduate program but will continue in the Bachelor of Science C E degree program.

If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Engineering degree, the student will be permitted to receive the Bachelor of Science degree, assuming all the undergraduate degree requirements have been completed satisfactorily.

Students have the choice of receiving the B.S. degree at the end of the fourth year or waiting until the end of the fifth year to receive both degrees. Students who elect to receive the B.S. degree at the end of the fourth year will pay graduate tuition for courses taken in the fifth year; students opting to receive both degrees at the end of the fifth year will pay undergraduate tuition for all five years. Note that students who are awarded a graduate assistantship must elect to receive the B.S. degree at the end of the fourth year. If for any reason a student admitted to the IUG program is unable to complete the requirements for the Master of Engineering degree, the student will be permitted to receive the Bachelor of Science degree assuming all the undergraduate degree requirements have been satisfactorily completed. Students who successfully complete the courses listed in the recommended schedule will satisfy the requirements for the

Bachelor of Science degree by the end of their fourth year.

Degree Requirements

A minimum of 30 credits is required for the degree. Courses in the degree program may be taken at the 400 or 500 level, but a minimum of 18 credits must be at the 500 level.

ENVIRONMENTAL ENGINEERING FOUNDATION (3 credits)
All candidates are required to take core courses that provide a foundation and context for pursuing and successfully completing a master's program in environmental engineering. The following are the required core courses.

EPC 590. Colloquium (1 cr)
ENVE 591. Research Methods in Environmental Engineering (1 cr)
C E 592. Environmental Engineering and Science Topics (1 cr)

CULMINATING EXPERIENCE (3 credits)
ENVE 594. Master's Paper Research (3 cr)

This program does require that all students complete a scholarly master's paper. The seminar and the paper count toward the 500-level requirement. It is expected that students will upload their master's papers to be available publically via ScholarSphere: https://scholarsphere.psu.edu/.

ELECTIVE COURSES (24 credits)
In addition to the requirements listed above, students must take one course (3 or 4 credits per course) in each of the following five core areas of environmental engineering theory and design, and environmental policy: Chemistry; Process Engineering; Biology; Water Resources; and Environmental Policy. Students must take at least one course from each core area (as shown in the table below) for a total of 15-16 credits. All courses are 3 credits except for C E 475.

The remaining 8 or 9 credits may be used by the student to specialize in an area of environmental engineering by taking classes offered not only by the Environmental Engineering Program but also from Mechanical Engineering and Civil Engineering. (E.g., C E 578 - "Groundwater Remediation"; see links to lists under "Courses," below.) In addition, certain courses from the Schools of Business and Public Administration may be approved on a course-by-course basis.

Core 1 (Chemistry)	C E 475 - Environmental Water Chemistry (4 cr) or C E 570 - Aquatic Chemistry
Core 2 (Process Engineering)	ENVE 411 - Water Supply and Pollution Control or ENVE 550 - Chemical Fate & Transport or C E 571 - Physical-Chemical Treatment or C E 572 - Biological Treatment Processes or C E 577 - Treatment Plant Design
Core 3 (Biology)	ENVE 540 - Environmental Biodegradation and Bioremediation or C E 572 - Biological Treatment Process or C E 579 - Envir. Pollution Microbiology
Core 4 (Water Resources)	ENVE 415 - Hydrology or C E 561 - Surface Water Hydrology or C E 462 - Open-Channel Hydraulics or C E 555 - Groundwater Hydrology or C E 580 - Hydrodynamic Mixing Processes
Core 5 (Policy)	ENVE 460 - Environmental Law or ENVE 569 - Risk Assessment or P ADM 531 - Environmental Policy

Because of similarity of the content (both are introductory hydrology courses), students will not be allowed to take both ENVE 415 and C E 561 for credit in the master's program.

NOTE: C E 572 is listed as approved for both Cores 2 and 3. Once the course is successfully completed, the course may count for one of the two core areas. An additional course is required in either Core 2 or 3, depending on the student's interest.

Course that meet the core area requirements include, but are not limited to, the courses in the table above. Courses that deviate from this tabulated list will require pre-approval from the student's adviser. If these courses were taken to meet degree requirements for a baccalaureate degree, they cannot be counted toward the graduate degree.

Courses

Graduate courses carry numbers from 500 to 5699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

CIVIL ENGINEERING (C E) course list

CIVIL ENGINEERING (C ENG) course list

ENVIRONMENTAL ENGINEERING (ENVE) course list

MECHANICAL ENGINEERING (M E) course list

Last Revised by the Department: Fall Semester 2015

Blue Sheet Item #: 44-01-116

Review Date: 8/25/2015

UCA Revision #2: 7/30/07

Coordinator updated: 9/26/14

Faculty linked: 8/14/14

Epidemiology (EPID)

Program Home Page

VERNON M. CHINCHILLI, *Chair of the Department of Public Health Sciences*
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Degree Conferred:
Ph.D. in Epidemiology

The Graduate Faculty

The Program

Epidemiology is the discipline for the study of the distribution and determinants of health-related states or events (including diseases) in specified human populations, and the application of this study to the prevention and control of health problems. Epidemiology is the primary source of the knowledge that underlies public health policy and practice. As such, well-trained epidemiologists develop and evaluate hypotheses about the effects of various factors (risk factors) on human health and develop the knowledge basis for disease prevention and control programs.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants must complete prior to admission:

1. An M.S. or M.P.H. degree with a focus on epidemiology or biostatistics.
2. A two-semester graduate level course in Epidemiology, comparable to PHS 550 (3) and PHS 551 (3).
3. A two-semester graduate level course in Biostatistics, comparable to PHS 520 (3) and PHS 521 (3).

Prospective applicants must demonstrate:

1. Completion of an undergraduate bachelor degree program at an accredited U.S. college or university, or its equivalent in another country, with a GPA of 3.0 or higher. Official transcripts from all post-secondary institutions attended are required.
2. The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.
3. Completion of the Graduate School application, which includes three (3) letters of recommendation and a Curriculum Vita or resume.
4. Payment of the nonrefundable application fee.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Students enrolled in the Epidemiology Ph.D. program must successfully complete a minimum of 28 credits, including 10 core required credits in:

Required Course Methodology:
PHS 554: Statistical Methods in Public Health I (3)
PHS 555: Statistical Methods in Public Health II (3)
PHS 510: Grant Writing Methods (3)

Required Course: PHS 500: Research Ethics for Clinical Investigators (1)

Students are also required to complete a minimum of 12 credits in Substantive Epidemiology courses and a minimum of 6 credits in either Substantive Epidemiology courses or Other Biostatics courses. The list of courses that will fulfill these requirements is maintained by the graduate program office.

Additionally, Epidemiology Ph.D. students are required to fulfill the following requirements:

- Epidemiology and biostatistics seminar series: Students are required to attend. Each student is required to present at least one seminar each year.
- Pass a candidacy examination which may be given after at least 18 credits have been earned in graduate courses beyond the baccalaureate, and must be taken within three semesters (excluding summer sessions) of entry into the doctoral program.
- Pass a comprehensive examination which will be a defense of the dissertation research proposal, administered by the entire doctoral committee after the candidate has substantially completed all course work.
- To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.
- Pass a final oral examination (the dissertation defense).

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07-000

Review Date: 6/26/2018

Food Science (FD SC)

Program Home Page

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Degrees Conferred:

Ph.D., M.S.
Dual-Title Ph.D. in Food Science and Clinical Translational Research
Dual-Title M.S. in Food Science and International Agriculture and Development
Dual-Title Ph.D. in Food Science and International Agriculture and Development

The Graduate Faculty

The Programs

Graduate work leading to the M.S. and Ph.D. degrees in Food Science is directed toward a multidisciplinary and integrated approach to teaching and research relevant to processing and manufacture of value-added foods from agricultural commodities. Through integration of the disciplines of chemistry, microbiology, engineering, and nutrition, students learn to ensure that consumers can make healthful choices from an abundant supply of affordable, safe, nutritious, and appealing foods.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE) are required for admission.

Students with a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission to the program. Exceptions may be made at the discretion of the program for students.

Best preparation for graduate work would be the completion of an undergraduate degree in food science, biochemistry, microbiology, or other related areas. The undergraduate program must include calculus, organic chemistry, microbiology, and general physics. Students may be provisionally admitted with deficiencies but are required to make them up without degree credit.

Students are generally admitted directly to a master's program unless they have previously earned an M.S. degree in food science or an appropriate related area; in such cases, admission can be made directly to the doctoral program by approval of the graduate program committee.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

A minimum of 30 credits at the 400, 500, 600 or 800 level is required, with at least 18 credits in the 500 and 600 series, combined. There are 24 credits required in the following core courses:

- Fundamentals of Food Science (FDSC 500A, FDSC 500B, FDSC 500C, and FDSC 500D), 4 credits;
- Research Methods in Food Science (FDSC 501), 2 credits;
- Other 500-level FDSC courses, 6 credits (3 credits of the requirement can be satisfied by 400 level Food Science courses with permission of the adviser.)
- Additional 400 or 500-level courses, 6 credits
    - Must include-Statistics (STAT 500 Applied Statistics or equivalent)
- Thesis Research (FDSC 600), 6 credits.

In addition, M.S. students are required to complete 1 credit of Supervised Experience in College Teaching (FDSC 602); however, this 1 credit cannot be counted towards the minimum 30 credits required. The remaining 6 elective credits may be chosen from a list of approved electives maintained by the program office.

The M.S. degree also requires the formation of a master's committee, the writing of a satisfactory thesis accepted by the master's committee, the head of the graduate program, and the Graduate School, and the passing of a final oral examination.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

A minimum of 18 credits is required for the Ph.D. degree; Ph.D. students who did not complete the M.S. in Food Science at Penn State must complete 6 additional credits, for a minimum of 24 credits:

- Fundamentals of Food Science (FDSC 500A, FDSC 500B, FDSC 500C, and FDSC 500D), 4 credits (Not needed if student received credit for these courses during master's degree program at Penn State.
- Research Methods in Food Science (FDSC 501), 2 credits (Not needed if student received credit for this course during master's degree program at Penn State.)
- Other 500-level FD SC courses, 6 credits (3 credits of this requirement can be satisfied by 400-level Food Science courses with permission of the adviser.)
- Additional 400 or 500-level courses, 12 credits
- Additionally, students must have satisfactorily completed at least one 400 or 500-level course in statistics (i.e., STAT 500 Applied Statistics or equivalent), during their undergraduate or graduate program

In addition, Ph.D. students are required to complete 2 credits of Supervised Experience in College Teaching (FDSC 602); however, these 2 credits cannot be counted towards the minimum credits required for the degree.

Except in special cases, an M.S. in Food Science is earned before pursuing a Ph.D. degree. Although most applicants to the Ph.D. program have already obtained a master's degree in Food Science or a related program, the M.S. degree is not a prerequisite for entrance into the doctoral program. For students entering the Ph.D. program without having earned an M.S. degree in Food Science, there are two additional course requirements:

- Dissertation Research (FDSC 600), 6 credits
- Additional 400 or 500-level FDSC courses, 6 credits

All doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation

defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School. In addition, all Food Science Ph.D. candidates are assessed for English competency. International students who plan to be teaching assistants must also take the American English Oral Communicative Proficiency Test (AEOCPT).

Dual-Title Ph.D. in Clinical and Translational Sciences

Students must apply and be admitted to the graduate program in Food Science and the Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CTS dual-title program. Refer to the Admission Requirements section of theCTS Bulletin page. Doctoral students must be admitted into the dual-title degree program in CTS prior to obtaining candidacy in their primary graduate program. An admissions committee comprised of faculty affiliated with the dual-title program will evaluate applicants. Applicants must have a graduate GPA of at least 3.5. Prospective dual-title program students must include in their application a statement of purpose that addresses the ways in which their research and professional goals will be enhanced by an interdisciplinary course of study in clinical and translational sciences.

The Dual-Title Ph.D. Degree in Food Science and Clinical and Translational Sciences emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences, and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary mentor from the Graduate Program in Food Science and another individual serving as the secondary mentor from an area covered by the dual-title program who is a member of the Clinical and Translational Sciences faculty.

Degree Requirements

To qualify for the dual-title degree in Food Science and Clinical and Translational Sciences, students must satisfy the Food Science Ph.D. degree requirements listed in the “Doctoral Degree Requirements” section above. In addition, students must complete the degree requirements for the dual-title CTS, listed on the CTS Bulletin page Approximately 6 credits of course work may overlap with elective courses required by the Ph.D. Program in Food Science.

For students in the dual-title program, the candidacy examination consists of the standard Food Science candidacy exam with one modification. A member of the CTS Graduate Faculty will join the standing FD SC candidacy committee during the normal FD SC exam and assess the student’s CTS knowledge. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. This occurs by assigning the student a paper that has clinical relevance, or by asking the student questions that require him or her to extend the assigned paper into a clinical/translational context. This examination must be completed before the end of the second year, within four semesters (summer sessions do not count) of entry into the doctoral program.

The student’s doctoral committee will include Graduate Faculty from Food Science and Graduate Faculty from Clinical and Translational Science. In accordance with Graduate Council policy, the doctoral committee of a Food Science and CTS dual-title doctoral degree student must include at least one member of the CTS Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the doctoral committee representing Food Science is not also a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair.

The fields of food science and clinical and translational sciences will be integrated in the student’s comprehensive examination. The CTS representative on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. All dual-title students are required to conduct dissertation research that contributes fundamentally to the fields of food science and clinical and translational sciences. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in Food Science and International Agriculture and Development (INTAD)

Graduate students with research and educational interests in international education may apply to the dual-title degree program in Food Science and INTAD. The goal of the dual-title degree program in Food Science and INTAD is to enable graduate students from Food Science to acquire the knowledge and skills of their primary area of specialization in Food Science, while at the same time gaining the perspective and methods needed for work in international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of food chemistry, food microbiology, food engineering, effects of processes on nutrition, sensory science, bioactive components, human gut microbiome, food processing, and Extension education. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions.

Admission Requirements

For admission to the dual-title graduate degree under this program, a student must first apply and be admitted to the Food Science graduate program and the Graduate School. Once accepted into the Food Science program, the student can then submit an application to the INTAD Academic Program Committee for admission to the dual-title degree program. The student must obtain consent from their Food Science adviser prior to applying to the INTAD program. Refer to the Admission Requirements section of the INTAD Bulletin page. Ph.D. students must apply and be admitted to the dual-title degree program in International Agriculture and Development prior to taking the candidacy exam.

Degree Requirements for the Dual-Title M.S. in Food Science and INTAD

To qualify for this dual-title degree, students must satisfy the requirements of the Food Science Master of Science degree program, described above under “Master’s Degree Requirements.” In addition, they must satisfy INTAD program requirements for the dual-title master’s degree. Some courses may satisfy both Food Science program requirements and those of the INTAD program. Final course selection must be approved by the student’s advisory committee.

Degree Requirements for the Dual-Title Ph.D. in Food Science and INTAD

To qualify for this dual-title degree, students must satisfy the requirements of the Food Science Ph.D. program, described above under “Doctoral Degree Requirements.” In addition, they must satisfy INTAD program requirements for the dual-title Ph.D. degree. Some courses may satisfy both Food Science program requirements and those of the INTAD program. Final course selection must be approved by the student’s doctoral committee.

The Candidacy Examination committee for the dual-title degree will be composed of Graduate Faculty from Food Science and must include at least one Graduate Faculty member from the INTAD Program. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Food Science and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a dual-title doctoral degree student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the committee representing Food Science is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student’s doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Food Science and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

FOOD SCIENCE (FD SC) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: Spring 2017

Faculty linked: 6/3/14

Finance (FINAN)

JAMES A. NEMES, *Interim Chancellor*
School of Graduate Professional Studies
Penn State Great Valley
30 East Swedesford Road
Malvern, PA 19355-1443
610-648-3335

KAREN DUHALA, *Director of Management Programs*
School of Graduate Professional Studies
Penn State Great Valley, Management Division
610-648-3229
Online: www.sgps.psu.edu

Degree Conferred:

Master of Finance (M.Fin.)

The Graduate Faculty

The Program

The Master of Finance (M.Fin.) program offered by the School of Graduate Professionals at Penn State Great Valley is a graduate degree program designed for intensive and focused study in finance. As part of the School's Managment Division, the program is included under the specialized professional accreditation received from the Association to Advance Collegiate Schools of Business International (AACSB). Students enroll in the program as a cohort and proceed through courses together in a prescirbed sequence. Classes are taught in a schedule convenient for working professionals who have demanding time commitments. The time required to complete the program is fifteen months.

The program provides an advanced and specialized graduate education in finance for individuals with career interests as finance professionals in financial management, or investment management. The curriculum reflects a balanced combination of advanced financial theory and practical business applications. Major emerging concepts and practices in the finance field are introduced and discussed throughout the program. The program is designed to help graduates to become proficient in technical and analytical skills in finance and to develop expertise in financial problem solving and financial decision-making preparing them to advance their finance careers in organizations such as investment and commercial banking firms, mutual funds, other financial firms, non-financial businesses, consulting firms, government agencies and non-profit organizations. In addition, students will find a substantial number of courses in the M.Fin. program to be helpful in preparing for tests required for various professional certifications in finance, such as the Chartered Financial Analyst (CFA).

Admission Requirements

Requirements listed here are in addition to the Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5.

International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university./institution in any of the following:Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales. For admission to the Graduate School, U.S. applicants must have received, from a regionally accredited institution, a bachelor's degree with requirements substantially equivalent to those at Penn State. (Penn State is accredited by the Middle States Association of Colleges and Schools.) International applicants must have a tertiary (postsecondary) degree that is deemed comparable to a four-year U.S. bachelor's degree to apply for admission. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

Applicants should:

1. Have a 3.0 or better (on a 4.0 scale) junior/senior grade-poiont average.
2. Submit a completed online application.
3. Submit a GMAT or GRE score. Applicants holding an MBA, JD, Ph.D., CPA, or CFA or doctoral degree are not required to submit standardized test scores.
4. Submit a statement of intent or career path objective (one page).
5. Submit two confidential evaluation form letters.
6. Submit two official transcripts from all post-secondary institutions attended.
   International applicants must submit official university records (transcripts/marksheets and diploma if date conferred does not appear on transcripts/marksheets), with attested English translations if the record is not in English.Notarized copies are not sufficient.
7. Submit a current resume.
8. Submit a visa application document if they are in the U.S. on a student or work visa.
9. Complete an admissions interview (by telephone or in person).

Admission decisions are based on the quality of the applicant's credentials and an interview in relation to those of other applicants who meet the requirements for admission outlined above.

Application Filing Dates: Applications to the Penn State Great Valley's Master of Finance program are reviewed on a rolling basis. New students are admitted to a cohort and begin their studies in early January.

Pre-Program Requirements:

Applicants are expected to have a working knowledge of a spreadsheet program, financial management, statistics and microeconomics. These pre-program requirements may be satisfied with academic work prior to matriculation in the M.Fin. program through college-level course credits in the following areas:

1. Financial Management/Corporate Finance: Topics include time value of money, basic theories of bond and stock valuation, capital budgeting, capital asset pricing model, market efficiency, and capital structure
2. Introductory Business Statistics: Topics include probability theory, sampling, inference, quality assurance, regression, forecasting, and simulation
3. Microeconomics: Topics include allocation of resources and distribution of income with in various market structures

The professor-in-charge of the Master of Finance program will examine academic transcripts of each applicant to determine if and how pre-program requirements are met. If a requirement is not met, the deficiency must be corrected through earned credit.

Degree Requirements:

Thirty (30) credits are required to complete the M.Fin. degree. The course work includes six required core courses (18 credit hours) which provide a body of knowledge in finance; three elective courses (9 credit hours) designed to help students develop additional expertise in corporate finance or investments; and a capstone course (3 credit hours) which provides a culminating experience for students.

The required courses provide a quantitative and analytical foundation in finance. They include:

CORE COURSES:

- ACCTG 512 Financial Accounting Theory and Reporting Problems
- BUSAD 525 Quantitative Methods in Finance
- BUSAD 526 Current Issues in Corporate Finance
- FIN 505 Multinational Managerial Finance
- FIN 508 Analysis of Financial Markets
- FIN 513 Speculative Markets

The required capstone course, BUSAD 585 Research in Security Valuation, provides a culminating experience for students to develop their analytical ability, their synthesis of material, and their ability to identify strategies that enhance value creation, building upon their knowledge acquired from the core courses.

The electives allow students to focus in a selected field of finance such as corporate financial management or investment management. The exact elective courses to be offered for a cohort will be determined by the professor-in-charge based on polls taken from each cohort class and on consultation with the faculty who are teaching elective courses.

Students may enroll in the Master of Finance program at the Great Valley Campus, taking courses in a face-to-face and blended format. Or students may enroll in the online Master of Finance program. A one-week residency at Great Valley is required as part of the online progam.

Student Aid

There are a limited number of scholarships, fellowships, and graduate assistantships available. For more information on these, contact the Financial Aid Office at Penn State Great Valley via email at studentaid@gv.psu.edu or visit the website at http://www.sgps.psu.edu/Admissions/FinancialAid/default.htm.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

ACCOUNTING (ACCTG) course list

BUSINESS ADMINISTRATION (BUSAD) course list

FINANCE (FIN) course list

Last Revised by the Department: Summer Session 2006

Blue Sheet Item #: 34-06-360

Review Date: 12/15/06

Faculty linked: 8/14/14

Science/Business, Integrated Five-Year Program

Degree Conferred:

B.S./M.B.A. Degrees

This special program is a cooperative effort between the Eberly College of Science and the Smeal College of Business. The program will provide an opportunity for students to combine and accelerate an undergraduate program in the basic sciences with a graduate program in business administration. Students admitted to this program will have the opportunity to earn a B.S. degree in General Science from the Eberly College of Science and an M.B.A. in Business Administration from the Smeal College in a total of five years. The first three years of study will include courses that satisfy the undergraduate science and General Education components of the program, and the last two years will satisfy the graduate business components of the program.

Initial program admission decisions are made jointly by the Eberly College of Science and the Smeal College of Business. The decision to extend an invitation to join the program as an undergraduate is reached through a multi-step process. First, applicants meeting all program criteria will be initially reviewed. Then a limited number of top candidates will be selected for on campus interviews by representatives of the Eberly College of Science and the Smeal College of Business. Successful interviewees will be offered admission to the accelerated program.

During the third year of the program, students formally apply to the MBA program in the Smeal College of Business. Applications are reviewed against the same criteria used for all MBA applicants, including undergraduate record, GMAT scores and related work experience. Successful candidates will gain admission into the MBA program for their fourth year of study. Students will then earn their B.S. degree during the first year of M.B.A. course work, and earn their M.B.A. degree at the end of their second year of graduate study. In addition to the regular fall and spring semester course work, program students are expected to earn credit during summer session through Cooperative Education experiences and participate in the MBA internship program.

This program seeks to combine an undergraduate program with graduate study in a professional school, and it proposes to attract and select excellent students with defined career goals. It is important to note that students in this program will have completed at least 112 undergraduate credits before entering the MBA component of the program. They will satisfy all of Penn State's undergraduate General Education requirements and will complete the science course requirements that a General Science student with the General option does. The main elements that are different for students in the accelerated program as compared with regular four-year General Science major (General option) are that in the accelerated program students use elective credits for summer Co-op experiences and for 12 transfer credits from their first year of MBA studies. These 12 credits will be "double counted" on both the undergraduate and graduate transcripts. Accelerated students also will have an opportunity to take special "bridge" courses including 1- and 2-credit seminar classes that will focus on traversing the boundaries among science, technology, and business.

DATE LAST REVIEWED: 3/18/03

Forest Resources (FORR)

Program Home Page

MICHAEL G. MESSINA, *Director of the School of Forest Resources and Professor of Forest Resources*
121 Forest Resources Building
814-863-7093

Degrees Conferred:

Ph.D., M.S.
Dual-title M.S. (Forest Resources and Human Dimensions of Natural Resources and the Environment)
Dual-title Ph.D. (Forest Resources and Human Dimensions of Natural Resources and the Environment)
Dual-title M.S. (Forest Resources and International Agriculture and Development)
Dual-title Ph.D. (Forest Resources and International Agriculture and Development)
Dual-title M.S. (Forest Resources and Operations Research)
Dual-title Ph.D. (Forest Resources and Operations Research)

The Graduate Faculty

The Programs

The Doctor of Philosophy and the Master of Science degree programs are oriented toward research, education, and scientific technology in the professions of forest products and forestry. Faculty expertise, laboratories, and outdoor facilities are available to support specialization in a variety of fields. Possibilities for specialization are indicated in part by the courses listed under wood products, forestry, and wildlife and fisheries, and by related courses in agricultural economics, agronomy, animal nutrition, biology, business administration, chemical engineering, computer science, ecology, economics, entomology, environmental pollution control, environmental resource management, genetics, horticulture, industrial engineering, landscape architecture, meteorology, physiology, plant pathology, polymer sciences, recreation and parks, regional planning, or statistics.

Students in this program may elect a dual-title program option in Operations Research, Human Dimensions of Natural Resources and the Environment, or International Agriculture and Development for the Ph.D. and M.S. degrees.

Admission Requirements

Requirements listed here are in addition to requirements stated in the General Information section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE) are required for admission. A student may be admitted at the discretion of the program without GRE scores.

For admission, an applicant should have at least a 2.75 grade-point average, a 3.00 junior/senior average (on a 4.00 scale), and courses that are basic to the individual's field of specialization. Ordinarily, these include 12 credits in communication; 12 credits in social sciences and humanities; 10 credits in quantification, including calculus and statistics; 8 credits in chemistry and/or physics; 8 credits in biological sciences; and 18 credits in forest products, forestry, fish, wildlife, or related courses. Three reference letters and a brief statement describing the applicant's academic goals, career interests, and special qualifications are required. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to admission requirements may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

Admission to the Ph.D. program in Forest Resources requires a master's degree in Forest Resources or a closely related field, or a bachelor's degree with a minimum grade-point average of 3.30 and demonstrated research ability.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with least 18 credits at the 500 and 600 level, combined. The department requires 12 credits of 400- or 500-level formal courses in Forestry (FOR) of which 6 must be 500-level. At least 6 credits of 400- or 500-level courses (usually STAT) are required in courses that cover topics such as analysis-of-variance, correlation, regression, and design of experiments; the courses that will satisfy this requirement must be approved by the student's committee. Participation in at least one colloquium course each semester is expected and students must complete at least 1 credit of colloquium (FOR 590). In addition, specific courses and requirements will be determined by the faculty adviser and advisory committee.

A thesis based on field or laboratory research is required for the M.S. degree and at least 6 credits in thesis research (600 or 610) must be taken in conjunction with completing the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

While a minimum number of courses for the degree is not specified, the doctoral committee has the responsibility of specifying courses and credits essential for the education and development of the candidate. Students are expected to be educated in depth in a specific subfield of Forestry (FOR) and to have a perspective of the general field. Normally, students will have 50 to 60 credits in formal course work beyond the B.S. degree.

Doctoral candidates are required to participate regularly in a departmental colloquium and to register for at least 1 credit of Colloquium (FOR 590) during the Ph.D. program. Ph.D. students are required to complete two separate semesters of Supervised Experience in College Teaching (FOR 602) for 2 credits total; however, these 2 credits cannot be counted towards the degree requirements. Doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in Forest Resources (FORR) and Human Dimensions of Natural Resources and the Environment (HDNRE)

Admissions Requirements

Students must apply and be admitted to the graduate program in HDNRE and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the HDNRE dual-title program. Refer to the Admission Requirements section of the HDNRE Bulletin page. Doctoral students must be admitted into the dual-title degree program in HDNRE prior to obtaining candidacy in their primary graduate program.

Degree Requirements for FORR/HDNRE Dual-Title M.S.

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree in Forest Resources, listed above. In addition, students must complete the degree requirements for the dual-title in HDNRE, listed on the HDNRE Bulletin page.

Degree Requirements for FORR/HDNRE Dual-Title Ph.D.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in Forest Resources, listed above. In addition, students must complete the degree requirements for the dual-title in HDNRE, listed on the HDNRE Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Forest Resources and must include at least one Graduate Faculty member from the HDNRE program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Forest Resources and HDNRE. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Forest Resources and HDNRE dual-title Ph.D. student must include at least one member of the HDNRE Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in HDNRE, the member of the committee representing HDNRE must be appointed as co-chair. The HDNRE representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Forest Resources and HDNRE. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in Forest Resources (FORR) and International Agriculture and Development (INTAD)

Graduate students with research and educational interests in international education may apply to the dual-title degree program in Forest Resources and International Agriculture and Development. The goal of the dual-title degree FORR and INTAD graduate program is to enable graduate students from FORR to acquire the knowledge and skills of their primary area of specialization in FORR, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, engineering, outreach, and project management anywhere in the world. Students acquire a broad perspective on how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can effectively engage in agricultural development activities within various countries and regions.

Admission Requirements

Students must apply and be admitted to the graduate program in FORR and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of the INTAD Bulletin page. Doctoral students must be admitted into the dual-title degree program in INTAD prior to obtaining candidacy in their primary graduate program.

Degree Requirements for FORR/INTAD Dual-Title M.S.

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree, listed above. In addition, students must complete the degree requirements for the dual-title M.S. in INTAD, listed on the INTAD Bulletin page. Up to 6 credits of INTAD approved courses can be applied to fulfilling FORR program requirements. Final course selection must be approved by the student's advisory committee.

Degree Requirements for FORR/INTAD Dual-Title Ph.D.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree, listed above. In addition, students must complete the degree requirements for the dual-title Ph.D. in INTAD, listed on the INTAD Bulletin page. Some courses may satisfy both FORR program requirements and those of the INTAD program. Up to 6 credits of INTAD approved courses can be applied to fulfilling FORR program requirements. Final course selection must be approved by the student's doctoral committee.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from FORR and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. There will be a single candidacy examination, containing elements of both FORR and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed on semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an FORR and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may service in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in FORR and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in Forest Resources (FORR) and Operations Research (OR)

Admissions Requirements

Students must apply and be admitted to the graduate program in Operations Research and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Operations Research dual-title program. Refer to the Admission Requirements section of the Operations Research Bulletin page. Doctoral students must be admitted into the dual-title degree program in Operations Research prior to obtaining candidacy in their primary graduate program.

Degree Requirements for FORR/Operations Research Dual-Title M.S.

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.S. degree in Forest Resources, listed above. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page.

Degree Requirements for FORR/Operations Research Dual-Title Ph.D.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in Forest Resources, listed above. In addition, students must complete the degree requirements for the dual-title in Operations Research, listed on the Operations Research Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Forest Resources and must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Forest Resources and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Forest Resources and Operations Research dual-title Ph.D. student must include at least one member of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair. The Operations Research representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Forest Resources and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

FORESTRY (FOR) course list

See also Wildlife and Fisheries Science.

WOOD PRODUCTS (W P) course list

Last Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07-000

Review Date: 6/26/2018

Faculty linked: 6/9/14

French and Francophone Studies (FR)

Program Home Page

BENEDICTE MONICAT, *Department Head*
437 Burrowes Building
814-865-3532
bxm6@psu.edu

Degrees Conferred:

Ph.D., M.A.
Dual-title Ph.D. in French and Francophone Studies and African Studies
Dual-title Ph.D. in French and Francophone Studies and Visual Studies
Dual-title Ph.D. in French and Francophone Studies and Women's Studies
Dual-title M.A. in French and Francophone Studies and Women's Studies

The Graduate Faculty

The Program

Graduate programs in French and Francophone Studies generate and analyze culture and society and literature. For example, programs of study can concentrate on such topics as genres, themes, periods, cultural anthropology, philosophy, socio-cultural and literary history, stylistics, urbanism, visual studies, and women's and gender studies. Through varied sites of analysis (city, library, archive, classroom, stage, environment, among others), the program explores past and current issues and theoretical debates. Our interdisciplinary approach to French and Francophone Studies currently gravitates around three major poles: race and gender; cultures and literatures in contact; and aesthetics/poetics.

The M.A. is a general humanistic degree that helps prepare students for a variety of situations, including teaching in private high schools or community colleges, or further graduate work. The Ph.D. is a more specialized degree. The Ph.D. in French and Francophone Studies can be combined with a minor in a field such as social thought. Other potential combinations include our dual-title Ph.D. programs in French and Francophone Studies and Women's, Gender and Sexuality Studies, French and Francophone Studies and African Studies, or French and Francophone Studies and Visual Studies.

Only the faculty members and courses officially associated with the Department of French and Francophone Studies are listed here. Faculty members and courses in other departments are also available to French and Francophone students to help them progress in their training.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE) are generally required of all students educated (high school and college) in the continental United States. The language of instruction at Penn State is English (however, courses in French and Francophone Studies are typically taught in French). English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Minimum qualifications for admission to the program typically include a B.A. in French or the equivalent, a minimum of 3.20 grade-point average (on a 4.0 scale), and the ability to speak and write in both French and English . A speech sample demonstrating the applicant's ability to speak extemporaneously and coherently about his/her study and career goals in French for Anglophones, in English for Francophones, and in French and English for speakers of other foreign languages is required. A written text on a literary or cultural topic also must be submitted in French for Anglophones and speakers of other foreign langauges, and in English for Francophones. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.20 GPA may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The Ph.D. degree prepares candidates for careers in teaching and research at the college or university level. Between 33 and 36 credits beyond the M.A. in French (or equivalent) is required in course work at the 400, 500, 600, or 800 level. Candidates who have not taken these courses while completing their M.A. at Penn State must take FR 571 French Literacy Theory and Criticism (3), FR 580 Approaches to French Civilization (3), FR 581 Theory and Techniques of Teaching French (1-6), FR 501A Pro-Seminar in French Studies I (1.5), and FR 501B Pro-Seminar in French Studies II (1.5). Credits must be distributed in one of two areas of specialization: culture and society or literature.

Doctoral candidates must demonstrate either an advanced knowledge of one foreign language other than French or a reading ability of two foreign languages other than French (equivalent to the 12-credit level). The foreign language requirement must be completed prior to scheduling the candidacy exam. All doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Candidates for the master's degree in French and Francphone Studies must complete a minimum of 33 credits at the 400, 500, 600, or 800 level, either 33 credits plus a master's paper or 27 credits plus 6 credits for a thesis. A reading knowledge of a second foreign language plus oral and written examinations are also required. All candidates take FR 571 French Literacy Theory and Criticism (3), FR 502 Introduction to French Linguistics (3), FR 580 Approaches to French Civilization (3), FR 581 Theory and Techniques of Teaching French (1-6), FR 501A Pro-Seminar in French Studies I (1.5), and FR 501B Pro-Seminar in French Studies II (1.5). In addition to the six required courses designated here, all candidates take 6 3-credit courses in French and Francophone Studies. The M.A. degree (or equivalent) is normally a prerequisite to doctoral candidacy. Students who complete a thesis must take at least 6 credits in thesis research (600 or 610). The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. Students who complete a master's paper do so by building on ideas or concepts from one of their graduate courses, including a faculty member's feedback and suggestions for further developing a final paper.

Dual-Title Graduate Degree in French and Francophone Studies and African Studies

French and Francophone Studies doctoral students who have research and educational interests in African studies may apply to the Dual-Title Doctoral Degree Program in African Studies. The goal of the program is to enable doctoral students from French and Francophone Studies to complement their knowledge and skills in their primary discipline with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The Dual-Title Doctoral Degree Program will provide interested French and Francophone Studies doctoral students with a multidisciplinary approach that will enhance their analytical capabilities for addressing key issues in African Studies.

Admissions Requirements
Students must apply and be admitted to the graduate program in French and Francophone Studies and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the African Studies dual-title program. Refer to the Admission Requirements of theAfrican Studies Bulletin page. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to French and Francophone Studies and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in African Studies-related research.

To be enrolled in the Dual-Title Doctoral Degree Program in African Studies, a student must have the approval of the French and Francophone Studies Department and then submit a letter of application and transcript, which will be reviewed by and African Studies Admissions committee. An applicant must have a minimum grade-point average of 3.0 (on a 4.0 scale) to be considered for enrollment in the dual-title degree program. Students must be admitted into the dual-title degree program in African Studies prior to obtaining candidacy in French and Francophone Studies.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirement of the French and Francophone Studies doctoral program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Within this framework, course selection is determined by the student with the approval in advance of the African Studies Director of Graduate Studies.

Upon acceptance by the African Studies admissions committee, the African Studies director will assign the student an African Studies academic adviser in consultation with the African Studies admissions committee. As a student develops specific scholarly interests, s/he may request a different African Studies from the one assigned by the African Studies admissions committee. The student and the French and Francophone Studies and African Studies academic advisers will establish a program of study that is appropriate for the student's professional objectives and that is in accordance with the policies of the Graduate Council, the French and Francophone Studies graduate program, and the African Studies Program.

The Ph.D. in French and Francophone Studies and African Studies is awarded to students who are admitted to the French and Francophone Studies doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in French and Francophone Studies and African Studies are as follows.
- A minimum of 66 post-baccalaureate credits. Course work accepted for the M.A. in French and Francophone Studies will count toward the credit requirement. At least 48 credits, exclusive of dissertation research credits, must be in French and Francophone Studies.
- 18 credits of Africa-related course work at the 400- or 500-level of which the following 9 credits are required: AFR 501 (3) and a minimum of 6 credits from a list of courses maintained by the African Studies program chair.
- Up to 6 of the 18 credits may come from French and Francophone Studies, as approved by the student's French and Francophone Studies and African Studies Program academic advisers.
- The remaining credits can be taken in African Studies or in any department other than French and Francophone Studies.
- Of the 18 credits, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.

The choice of courses in African Studies is to be proposed by the student, subject to approval in advance by the French and Francophone Studies and African Studies academic advisers. The suite of selected courses should have an integrated, intellectual thrust that probes thematic, national, or regional issues and be complementary to the student's specialty in French and Francophone Studies.

Language Requirement
Fulfillment of the foreign language requirement will meet the existing French and Francophone Studies requirements.

The foreign language requirement at the doctoral level is designed to provide students with a skill that will aid them in research and in securing employment. The French and Francophone Studies department feels that the majority of students would profit most from four-skill proficiency in another language. However, some students would benefit most from a reading knowledge of two languages.

Candidacy Examination
The dual-title degree will be guided by the Candidacy examination procedure of the French and Francophone Studies graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable. There will be a single candidacy examination, containing elements of both French and Francophone Studies and African Studies.

The Candidacy Examination committee for the dual-title degree will be composed of graduate faculty from French and Francophone Studies and must include at least one graduate faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from French and Francophone Studies if that person holds a formal affiliation with the African Studies program.

Doctoral Committee Composition
In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a French and Francophone Studies and African Studies dual-title Ph.D. student must include at least one member of the African Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

If the chair of the committee representing French and Francophone Studies is not also a member of the Graduate Faculty in African Studies, the member of the committee representing African Studies must be appointed as co-chair.

Comprehensive Examination
The Comprehensive Examination consists of a series of content-intensive examinations and the Doctoral Dissertation Proposal. The African Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Dissertation and Final Oral Examination
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and expertise in French and Francophone Studies and African Studies. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in French and Francophone Studies, and Visual Studies

French and Francophone Studies graduate students who have research and educational interests in global visual culture may apply to the Dual-Title Doctoral Program in Visual Studies. The program aims to (a) provide students with the conceptual and methodological tools they will use to interpret literature, culture and society in French, Francophone and global contexts; (b) generate and analyze ground-breaking research at the intersection of such disciplines as cultural anthropology, philosophy, socio-cultural and literary history, stylistics, urbanism, visual studies, and women's and gender studies; and (c) guide students in using their specialized knowledge and skills to produce research of publishable quality on varied sites of analysis (city, library, archive, classroom, stage, environment, among others). The program prepares graduates for college and university teaching, and careers in other related fields.

The dual-title Ph.D. in Visual Studies comprises two core components: 1) historical and theoretical analysis of various forms of visual culture, their diverse sources, and their current manifestations; 2) historical and theoretical analysis of visual media in the information age, including the visual aspects of the digital humanities and the presentation of scholarship and teaching in visual media. A program-specific required course in each of these areas will ensure breadth of training for participating students. Together these components will offer students a sophisticated understanding of and ability to intervene in debates about visual culture and visuality in the world today.

Admission Requirements

Students must apply and be admitted to the doctoral program in French and Francophone Studies and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly in their applications to French and Francophone Studies and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in Visual Studies-related research. After admission to the doctoral program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program, as described in the Admission Requirements section of the Visual Studies Bulletin. Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to obtaining candidacy in the French and Francophone Studies program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in French and Francophone Studies, listed above. In addition, students must complete the degree requirements for the dual-title in Visual Studies, listed on the Visual Studies Bulletin page.

The Visual Studies segment of the program will consist of a total of fifteen credits, including two required courses – "Visual Culture Theory and History" and "Visual Studies in Digitality" -- and three elective courses dealing with questions of visuality, chosen in consultation with the Director of Graduate Studies for French and Francophone Studies. Up to six credits may be double-counted by both the primary graduate program (FFS) and the dual-title. All in all, students must complete a minimum of 66 post-baccalaureate credits for the Ph.D. in French and Francophone Studies and Visual Studies. Course work accepted for the M.A. in French and Francophone Studies will count towards the credit requirement.

The choice of courses in Visual Studies is to be proposed by the student, subject to approval in advance by the French and Francophone Studies and Visual Studies academic advisers. The suite of selected courses should have an integrated, intellectual thrust that probes thematic, national, or regional issues and be complementary to the student's specialty in French and Francophone Studies.

Language Requirements

Fulfillment of the foreign language requirement will meet the existing French and Francophone Studies requirements.

The foreign language requirement at the doctoral level is designed to provide students with a skill that will aid them in research and in securing employment. The French and Francophone Studies department feels that the majority of students would profit most from four-skill proficiency in another language. However, some students would benefit most from a reading knowledge of two languages.

Candidacy Examination

The dual-title degree will be guided by the Candidacy examination procedure of the French and Francophone Studies graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable. There will be a single candidacy examination, containing elements of both French and Francophone Studies and African Studies.

The Candidacy Examination committee for the dual-title degree will be composed of graduate faculty from French and Francophone Studies and must include at least one graduate faculty member from the Visual Studies Program. The designated dual-title faculty member may be appointed from French and Francophone Studies if that person holds a formal affiliation with the Visual Studies program.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a French and Francophone Studies and a Visual Studies dual-title Ph.D. student must include at least one member of the Visual Studies graduate faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

If the chair of the committee representing French and Francophone Studies is not also a member of the Graduate Faculty in Visual Studies, the member of the committee representing Visual Studies must be appointed as co-chair.

Comprehensive Examination

The Comprehensive Examination consists of a series of content-intensive examinations and the Doctoral Dissertation Proposal. The Visual Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Dissertation and Final Oral Examination

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and expertise in French and Francophone Studies and Visual Studies. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-title Ph.D. in French and Francophone Studies and Women's Studies

Admission Requirements

Students must apply and be admitted to the graduate program in French and Francophone Studies and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admission requirements of the Women's Studies dual-title program. Refer to the Admission Requirements section of theWomen's Studies Bulletin page. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to French and Francophone Studies and include remarks in their statement of purpose that address the ways in which their research and professional goals in the primary department reflect an interest in Women's Studies-related research.

To be enrolled in the Dual-Title Doctoral Degree Program in Women's Studies, a student must have the approval of the French and Francophone Studies Department and then submit a letter of application and transcript, which will be reviewed by the Women's Studies Admissions committee. An applicant must have a minimum grade-point average of 3.2 (on a 4.0 scale) to be considered for enrollment in the dual-title degree program. Students must be admitted into the dual-title degree program in Women's Studies prior to obtaining candidacy in French and Francophone Studies.

Degree Requirements

The dual-title Ph.D. in French and Francophone Studies and Women's Studies requires between 30 and 42 credits beyond the master's degree.

Course Requirements:
- FR 571: French Literary Theory and Criticism (3)
- FR 580: Approaches to French Civilization (3)
- WMNST 501: Feminist Perspectives on Research and Teaching Across the Disciplines (3)
- WMNST 502: Global Perspectives on Feminism (3) or a 597 Special Topics course taught by a core Women's Studies faculty member (3)
- WMNST 507: Feminist Theory (3)
- A further twenty-one credits selected in consultation with the adviser, of which nine credits must beWomen's Studies approved
- Six credits of elective study

Language Requirement
Second Foreign Language: Reading proficiency in two foreign languages, or advanced level in one foreign language.

Candidacy Examination
The dual-title degree will be guided by the Candidacy examination procedure of the French and Francophone Studies graduate program. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable. There will be a single candidacy examination, containing elements of both French and Francophone Studies and Women's Studies.

The Candidacy Examination committee for the dual-title degree will be composed of graduate faculty from French and Francophone Studies and must include at least one graduate faculty member from the Women's Studies Program. The designated dual-title faculty member may be appointed from French and

Francophone Studies if that person holds a formal affiliation with the Women's Studies program.

Doctoral Committee Composition
In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a French and Francophone Studies and Women's Studies dual-title Ph.D. student must include at least one member of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

If the chair of the committee representing French and Francophone Studies is not also a member of the Graduate Faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair.

Comprehensive Examination
The Comprehensive Examination consists of a series of content-intensive examinations and the Doctoral Dissertation Proposal. The Women's Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Dissertation and Final Oral Examination
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and expertise in French and Francophone Studies and Women's Studies. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-title Master's Degree in French and Francophone Studies and Women's Studies

Admissions Requirements
Students must apply and be admitted to the graduate program in French and Francophone Studies and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Women's Studies dual-title program. Refer to the Admission Requirements of theWomen's Studies Bulletin page.

To be enrolled in the Dual-Title Master's Degree Program in Women's Studies, a student must have the approval of the French and Francophone Studies Department and then submit a letter of application and transcript, which will be reviewed by the Women's Studies Admissions committee. An applicant must have a minimum grade-point average of 3.2 (on a 4.0 scale) to be considered for enrollment in the dual-title degree program.

Degree Requirements
To qualify for this dual-title degree, students must satisfy the requirements of the French and Francophone Studies Master of Arts degree program, listed above under Master's Degree Requirements. In addition, they must satisfy the Women's Studies program requirements for the dual-title master's degree. Refer to the Master's Degree Requirements section of the Women's Studies Bulletin page. Some courses may satisfy both the graduate primary program requirements and those of the Women's Studies program. Final course selection is determined by the student after consulting, in advance, with their French and Francophone Studies and Women's Studies advisers.

For students who elect to write the thesis for the dual-title M.A. degree in French and Francophone Studies and Women's Studies, the thesis must reflect the student's education and interest in both French and Francophone Studies and Women's Studies. All members of the student's thesis committee must be members of the Graduate Faculty. The master's thesis committee must include at least one Graduate Faculty member from Women's Studies. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

FRENCH (FR) course list

Last Revised by the Department: Fall 2018

Blue Sheet Item #: 47-01-000

Review Date: 8/28/2018

Faculty linked: 6/9/14

Forensic Science (FRNSC)

Program Home Page

Dr. Reena Roy, *Chair*
Program Office:
107 Whitmore Laboratory
814-863-6758

Degree Conferred:

Master of Professional Studies in Forensic Science

The Graduate Faculty

The Program

The Master of Professional Studies (MPS) in Forensic Science is an inter-college degree program housed in the Eberly College of Science and includes ties with Departments of Anthropology, Biochemistry and Molecular Biology, Chemistry, Entomology, Psychology, and Sociology. The program is offered by Penn State graduate faculty members, with enrichment by mentors from the academic faculty, public crime laboratories, and private forensic laboratories. The curriculum is designed to provide students with innovative, hands-on, and multidisciplinary learning approaches to educate and train them in crime scene investigation, the science behind forensics, courtroom proceedings, and the ethical and social issues that they will be exposed to when they join the forensic community. In addition, the program will develop teamwork and communication skills, which will be important when working actual cases in a crime laboratory

Admission Requirements and the Application Process

Applications will be considered in accordance with the requirements of the Graduate School as described in the GENERAL INFORMATION section of the *Graduate Bulletin.* The Masters degree in Forensic Science is appropriate for students with a baccalaureate degree in the biological sciences, chemistry, or a related field of study. Applicants are required to have a minimum cumulative GPA of 3.00 (on a 4.00 scale) in their undergraduate degree. The GRE's are required, with a score of 1100 (old system) or 306 (new system) to be competitive. In addition, each applicant is asked to provide a personal statement of interests and objectives, a statement of their definition of the word "ethics" and two letters of reference. Letters of reference can be submitted by the student's undergraduate advisor, research advisor, and/or an instructor for an upper level course taken as part of their major. An applicant may be asked to go through an interview process conducted by members of the forensic science faculty. Admission to the program is based upon a thorough review of all applicant qualifications, and the best-qualified applicants will be accepted up to the number of spaces available for new students.

Applicants are referred to the program web site for guidance on how to submit their applications, the deadline for submitting applications, and when decisions on acceptance into the program will be announced: www.forensics.psu.edu.

Degree Requirements

Chemistry Emphasis

A minimum of 41 credits are required for completion of the program, with at least 19 credits from courses at the 500 and 800-level, and at least 6 credits at the 500 level. Students are required to take 27 credits from the core courses listed below and 11 additional credits of Chemistry coursework. Elective credits are from courses which are determined based on interest and career track. FRNSC 801 will serve as the capstone experience for completion of the MPS in Forensic Science.

Biology Emphasis

A minimum of 42 credits are required for completion of the program, with at least 20 credits from courses at the 500 and 800-level, and at least 6 credits at the 500 level. Students are required to take 27 credits from the core courses listed below and 12 additional credits of Biology coursework. Elective credits are from courses which are determined based on interest and career track. FRNSC 801 will serve as the capstone experience for completion of the MPS in Forensic Science.

Core Courses (27 credits)

FORENSIC SCIENCE (FRNSC)

- 400. Courtroom Proceedings and Testimony (1)
- 410. A Scientific Approach to Crime Scene Investigation (2)
- 411. Criminalistics: Trace and Impression Evidence (3)
- 413. Criminalistics: Biology (3)
- 415W. Laboratory in Crime Scene Investigation (2)
- 475. Forensic Science Seminar (1)
- 532. Drug Chemistry and Toxicology (3)
- 541. Forensic Seminar Series (1)
- 561. Ethics in Forensic Science (1)
- 801. Criminalistics III (4)
- 894. Research Projects in Forensic Science (6)

ADDITIONAL COURSES (11-12 credits)

Forensic Chemistry Emphasis (11):

CHEM 425 – Chromatography and Electrochemistry (3)
CHEM 500 – Seminar in Chemistry (1)
FRNSC 427W – Forensic Chemistry (4)
FRNSC 831 – Forensic Chemistry II (3)

Forensic Biology Emphasis (12):

B M B 400 – Molecular Biology of the Gene (3)
BMMB 590 – Colloquium (1)
FRNSC 421W – Forensic Molecular Biology (4)
FRNSC 821 – Forensic Molecular Biology II (4)

Electives (Select at least 3 credits)

- CRIM 406 – Sociology of Deviance (3)
- CRIM 423 – Sexual Violence (3)
- CRIM 425 – Organized Crime (3)
- CRIM 432 – The Courts (3)
- CRIM 453 – Women & Justice (3)
- PSYCH 471 – Adjustment & Social Relationships (3)

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-020

Review Date: 06/12/2012

Link check: 1/30/15

Geodesign (GEODZ)

Program Home Page

RON HENDERSON, FASLA, *Head*
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Degree Conferred:

M.P.S. in Geodesign

The Graduate Faculty

The Program

Geodesign is a rapidly emerging and powerful approach to spatial problem-solving that requires the synthesis of geographic knowledge and scientific data with the best practices of environmental design. Graduates from the Master in Professional Studies (M.P.S.) in Geodesign program will be prepared to take leadership roles in addressing complex environmental design problems in settings ranging from urban design to conservation planning.

The M.P.S. in Geodesign program's goal is to provide practicing professionals with an advanced skill set in geodesign. They will learn to capitalize on the power of spatial knowledge and evolving technologies, identify opportunities that emerge to better inform the design, understand their relevance to particular situations and assist communities in designing alternative futures based on a unique process that brings all this information into focus.

The M.P.S in Geodesign program is intended specifically for professionals who are able to participate principally on a part-time basis and at a distance. It is offered exclusively through the World Campus.

Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. To be admitted to the program, applicants must be able to meet the following requirements:

1. A completed online Graduate School application and payment of the application fee.
2. Personal statement of background and interest in the program, including an outline of possible topic for the individual capstone project (maximum 3-pages).
3. Official undergraduate transcript
4. TOEFL scores (see below)
5. Three (3) letters of recommendation

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, will be considered, but are not required for admission.

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

Students with a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test or a total score of 80 with a 19 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5.

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

Student Aid

Graduate assistantships are not available. Financial aid opportunities for part-time students who participate through the World Campus are discussed at: http://www.worldcampus.psu.edu/tuition-and-financial-aid/financial-aid.

Degree Requirements

Students earn the M.P.S. in Geodesign degree by successfully completing a minimum 35 credits of course work, including a supervised individual study project. Course requirements include a minimum of 18 credits at the 500 level or above, with a minimum of 6 credits at the 500 level. Note that because most of the available elective courses are worth 3 credits, many students are likely to take at least 36 credits (9 elective credits) to complete their degree program. The individual study capstone project is the culminating experience for the graduate degree and requires the student to apply the geodesign framework to a real-world challenge, of his/ her choosing, in order to demonstrate aptitude in analytic, design and collaborative skills. For most students the project will culminate in a formal public presentation, attended by the student's adviser, who is member of the graduate faculty at Penn State. If the adviser is unable to attend, the department will send a representative from the graduate faculty. The presentation will take place at an appropriate professional conference, approved in consultation with the project adviser. Typically the presentation will be at an annual conference (at the national, regional or state level) of professional organizations, such as the American Planning Association, American Society of Landscape Architects, the Urban and Regional Information Systems Association, ESRI User Conferences, or other suitable professional organization- affiliated venues. The final venue selection will be one that is mutually agreeable between the student and adviser as to location and appropriate level of professional rigor. Alternatively, students who will be unable to attend a conference, or have other professional objectives, may work with their adviser to get approval to write and submit a project report as an article for an appropriate peer-reviewed journal. The student will provide the adviser with the article, who will in turn recommend final submission to the journal. This will provide an alternative path to successfully complete the culminating experience. Presentations and papers are preceded by dress rehearsals that are open to all students in the program through Web and audio conferencing. As part of his or her individual studies, every student is expected to contribute a formal peer review of one other student's rehearsal.

An Advisory Board consisting of accomplished design, geography and planning professionals in government and industry, as well as Penn State faculty members in a variety of disciplines, guides the ongoing development of the curriculum. Based on taking courses on a part-time basis and at a distance, the curriculum will take at a minimum two-and-a-half years to complete.

Prescribed Courses:

GEODESIGN (GEODZ)

511. Geodesign History, Theory, Principles (3)

822. GeoDesign Models I: Evaluation and Decision (3)
One of these two additional models courses:
824. GeoDesign Models II: Process and Impact (3)
or
826. GeoDesign Models III: Representation and Change (3)
842: Geodesign Studio I: Rural/Regional Challenges (6)
852: Geodesign Studio II: Urban/District-scale Challenges (6)
596A: Individual Studies-Geodesign Capstone Project Proposal and Peer Review (3)
596B: Individual Studies-Geodesign Capstone Project Dissemination (3)

Electives:

In addition to the 27 required credits specified above, students must select three courses (at least 8 credits) of GEOG courses at the 400 level or higher; courses must be approved in advance by the student's adviser. A list of acceptable electives is maintained by the program office.

Lasted Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-06

Review Date: 04/08/2014

Faculty linked: 8/14/14

Geography (GEOG)

Program Home Page

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Degrees Conferred:

Ph.D., M.S.
Dual-Title Graduate Degree (Ph.D.) in Geography and African Studies.

The Graduate Faculty

The Programs

The faculty encourages graduate students to arrange courses of study appropriate to their individual needs and aspirations. Programs in Geography may be directed toward a career in public service, teaching and research, private industry, or one of the many other vocational opportunities open to geographers.

Students typically concentrate their study on topics that fall within the special skills and interests of the faculty. Current specialties include behavioral geography; biogeography; cartography; climatology; cultural geography; feminist geography; geo-computation; geographic education; geographic information science; geography of the developing world; geographic theory; geographic visualization; historical geography; human dimensions of global change; nature and society; political geography; population geography; regional economic development and industrial location; remote sensing; and urban geography.

The M.S. program is broadly based. It is designed to provide beginning graduate students with basic training in systematic fields, geographical theory, and research techniques. Study at the Ph.D. level is also broad in the first year, then becomes more specialized.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission, as well as a personal statement. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course work in geography or a related discipline will be considered for admission to the M.S. program or to the five-year PhD program. Applicants with master's degrees from high-quality graduate programs in geography will be considered for admission to the four-year doctoral program. The best-qualified applicants will be admitted up to the number of places that are available for new students. All students must have or must acquire a broad competence in physical geography, human geography, environment and society, GIScience, and analysis methods (qualitative or quantitative).

Baccalaureate students must earn a master's degree before they will be considered for admission to the doctoral program.

Master's Degree Requirements

The M.S. degree may be earned by completing a thesis or two papers. The thesis option requires completion of at least 30 graduate credits. If the two-paper option is elected, the candidate must earn 35 credits of graduate-level work. The master's papers are usually expanded versions of course or semester papers that are of sufficiently high quality that they can be submitted to scholarly journals. At least one of the papers offered to fulfill the M.S. papers requirement must have been written in connection with a departmental course or seminar.

All M.S. students are required to enroll in GEOG 500 Introduction to Geographic Research (3 credits), GEOG 502 Research Scholarship in Geography (3 credits), and at least 3 credits of GEOG 501A, B, C, or D Research Perspectives (1 credit each) during their first year of residence. All M.S. students are required to complete at least one seminar at the 500 level. Supporting courses are chosen in consultation with an entrance committee (in year one) or the adviser (in subsequent years).

Doctoral Degree Requirements

There are three paths to a Ph.D. One is a five-year Ph.D with M.S. degree, which is available to students who enter Penn State Geography's graduate program without a master's degree. These students are on an accelerated schedule and earn an M.S. along the way to the Ph.D. The second is a four-year Ph.D., which is available to those students who have already received a master's degree in another program either at Penn State or at another university. The third is an M.S.-to-Ph.D. path, which is available to Penn State Geography M.S. students who decide either to continue into the Ph.D. program after they have started their master's program, or to return for the Ph.D. after having graduated with the M.S. Students on this path are not accelerated and therefore will usually require two years to earn the master's and four years to earn the doctorate.

There is no fixed number of credits; courses are prescribed according to the student's prior experience and academic goals. The Graduate School's communication and foreign language requirement for the Ph.D. degree shall be satisfied in a manner approved by the candidate's doctoral committee.

All doctoral students are required to enroll in GEOG 500 Introduction to Geographic Research (3 credits) and GEOG 502 Research Scholarship in Geography (3 credits) during their first year of residence.

Dual-Title Graduate Degree in African Studies

Geography doctoral students – who are already in the program and who have research and scholarly interests in comparative, sub-regional, national and thematic analyses, environmental change, livelihood systems, socio-economic and political change, and other aspects of African development – may apply to the Dual-Title Doctoral Degree Program in African Studies. The goal of the dual-title program is to enable graduate students from Geography to complement their knowledge and skills in a major area of geographic specialization with in-depth knowledge of prevailing theories and problem-solving approaches to thematic, regional, or national issues pertaining to African Studies.
The dual-title degree program will provide interested Geography doctoral students with a multidisciplinary approach that will enhance their analytical capabilities for addressing key issues in African development and broad aspects of livelihood change. It thereby will add value to their Geography degree and increase their competitiveness in the job market. The well-rounded, regional specialist who graduates from the program is likely to be employed in an international setting. The program has the potential, therefore, to enhance the reputation of the Geography Department, the College of Earth and Mineral Sciences, the College of the Liberal Arts, and Penn State.

Admission Requirements

Students must apply and be admitted to the graduate program in Geography and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Geography and include remarks in their statement of purpose that address the ways in which their research and professional goals in Geography reflect an interest in African Studies-related research.

To be enrolled in the Dual-Title Doctoral Degree Program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by the African Studies Admissions Committee. Students must apply for enrollment into the dual-title degree program in African Studies prior to taking their candidacy examination.

General Graduate School admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Academic Advisors and Course Selection

To qualify for the dual-title degree, students must satisfy the requirements of the Geography graduate program. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Within this framework, final course selection is determined by the student in consultation with the Geography and African Studies academic advisors.
Upon acceptance into the dual-title degree program by the African Studies admissions committee, the student will be assigned an African Studies academic advisor in consultation with the African Studies director and the African Studies admissions committee.
As a student develops specific scholarly interests, s/he may request a different African Studies advisor from the one assigned by the African Studies admissions committee. The student and the Geography and African Studies academic advisors will establish a program of study that is appropriate for the student's professional objectives and that is in accordance with the policies of the Graduate Council, the Geography graduate program, and the African Studies dual-title graduate degree program.

Requirements for the Geography-African Studies Ph.D.

The Dual-Title Doctoral Degree in Geography and African Studies is awarded only to students who are admitted to the Geography doctoral program and admitted to the dual-title degree program in African Studies. The minimum course requirements for the Dual-Title Ph.D. degree in Geography and African Studies are as follows:

- Completion of all course work and other requirements for the Geography Ph.D.
- 18 credits of Africa-related coursework at the 400-, 500-, or 800-level, of which the following are required: AFR 501 (3) and a minimum of 6 credits from AAAS 530 (3), AFR 532 (3), AFR 534 (3), AFR 536 (3), AFR 537 (3), and SOC/AFR 527 (3)
- As many as 6 of the 18 credits may come from 400-, 500-, or 800-level Geography courses, as approved by the student's Geography and African Studies Program advisors
- The remaining credits can be taken in AFR or in any department other than Geography; of these, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from AFR and GEOG 596 and 599
- Communication and foreign language requirements will be determined by the student and the Geography and African Studies advisors in accordance with the existing Geography language requirements

The choice of electives in African Studies is to be proposed by the student and is subject to approval by the Geography and African Studies academic advisors. The suite of selected courses should have an integrated, intellectual thrust that probes a thematic, national, or regional issue and that complements the student's specialty in Geography.

Language Requirement

The language requirement for a student in the dual-title doctoral degree program will be determined by the student and the Geography and African Studies Program advisors in accordance with the existing Geography language requirements.

Candidacy Exam

The Candidacy Exam in Geography is an oral exam designed to help students to "..think analytically and critically in their field of expertise and to understand and apply ideas from other fields of geography to their research domain" (Geography Graduate Student Handbook 2011-2012, p. 30). The format of the candidacy exam for the dual-title degree student will be unchanged from the existing Geography candidacy exam and will be guided directly by the requirements outlined in the Geography Graduate Student Handbook. The only difference from the Geography candidacy exam will be an explicit African studies component.

Doctoral Committee Composition

The doctoral committee of a Ph.D. dual-title doctoral degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty. The committee must include at least one member of the African Studies graduate faculty. If the chair of the committee representing Geography is not also a member of the graduate faculty in African Studies, then the member of the committee representing African Studies must be appointed as Co-Chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Geography and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate's major Geography subfields and on African Studies. The African Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the oral component of the comprehensive examination. The African Studies component of the exam will be based on the student's thematic, national, or regional area of interest and specialization in African Studies.

Dissertation and Dissertation Defense

Ph.D. students enrolled in the dual-title degree program are required to write a dissertation on a topic that reflects their education and research interest in Geography and African Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the degree.

Other Relevant Information

Penn State's graduate program in Geography works with incoming students to design programs tailored to their specific interests and needs. Thus there are few formal requirements and a maximum of opportunities for students to pursue their own interests under the guidance of the faculty. Each student's work is supervised by his or her academic adviser and by a committee consisting of two additional members of the graduate faculty for M.S. students and three or four additional members for doctoral students.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

GEOGRAPHY (GEOG) course list

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/14/04

Faculty linked: 6/9/14; department head updated: 9/30/14

Geosciences (GEOSC)

Program Home Page

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Degrees Conferred:

- Ph.D., M.S.
- Integrated B.S/M.S. Program in Geosciences

The Graduate Faculty

M.S. and Ph.D. Degrees

The Department of Geosciences offers M.S. and Ph.D. degree programs that provide students with a broad background in any of the major areas of geological sciences and intensive research experiences culminating in the preparation of a formal thesis. The goal of the programs is to prepare students for scientific careers in academia, government, or industry. A wide range of faculty interests and exceptional laboratory and other support facilities provide an extensive variety of areas of specialization in which students may choose their course work and research topics, which include: aqueous geochemistry, chemistry and physics of rocks and mineral, geodynamics, global change and earth history, sedimentary geology and paleobiology, solid earth and applied geophysics, surficial processes. A complete listing can be found atwww.geosc.psu.edu.

The research of faculty and students is facilitated through: the Biogeochemical Research Initiative for Education (BRIE, an NSF-sponsored graduate program in microbial biogeochemistry), the Petroleum Geosystems Initiative (an industry-sponsored, team-based M.S. program) linking the Department of Geosciences and the Department of Energy and Geo-Environmental Engineering and the Penn State Astrobiology Research Center (PSARC, an NSF-sponsored interdisciplinary program in the origin and evolution of life in the universe, aimed at understanding the connections between the environment and the biota on Earth, especially during the stages of its evolution) as well as the Environment Institute of the College of Earth and Mineral Sciences, including the Earth System Science Center, and the Center for Environmental Chemistry and Geochemistry.

In addition to extensive computing and supercomputing facilities developed in association with the Earth System Science Center, students have access to a wealth of analytical, experimental, and field equipment. State-of-the-art analytical equipment is maintained by the department and the Material Characterization Laboratory. The Department of Geography and the Office for Remote Sensing of Environmental Resources have remote sensing facilities.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are normally required for admission. Exceptions must be approved by the department.

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

For admission, applicants generally are expected to have a bachelor's degree in some branch of the natural or physical sciences, engineering, or mathematics. An applicant also is expected to have completed standard introductory courses in geosciences, chemistry, physics, and mathematics through integral calculus, plus 15 credits of intermediate-level work in one or a combination of these subjects. Greater than minimal preparation in chemistry, geology, biology, mathematics, or physics may be required for particular subdisciplines. Applicants who have taken somewhat less than the indicated minimum in these subjects may be admitted but must make up their deficiencies concurrently with their graduate studies.

Students with special backgrounds, abilities, and interests whose undergraduate grade-point average in courses pertinent to geosciences is below a 3.00 (on a 4.00 scale) will be considered for admission only when there are strong indications that a 3.00 average can be maintained at the graduate level.

Students are admitted both to the M.S. and Ph.D. degree programs. A student may work toward a Ph.D. degree without first earning a master's degree. If this option is desired, the student must arrange the scheduling of a candidacy evaluation no later than the end of the third semester of residence at Penn State.

Faculty Advisers

Upon arrival, students will be advised initially by a committee appointed by the associate head for Graduate program and Research. The committee in turn will designate an interim adviser. Before the end of the first academic year of residence, the student is expected to develop specific academic and research interests so that an appropriate permanent academic adviser and research supervisor may be chosen. The academic adviser and research supervisor are usually the same person, except when the research supervisor is not a member of the geosciences graduate faculty. In such a case, a geosciences program family member serves as the academic adviser.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin. In addition, several graduate fellowships are available for students within the Department of Geosciences.

Programs of study are planned to require no more than two years for the M.S. degree and three additional years, or five years total, for the Ph.D. degree. A student transferring to the department with the M.S. degree should plan on four additional years. Financial support from teaching or research assistantships or from fellowships is available to students in good standing, but not awarded beyond these limits except in unusual cases.

Common Degree Requirements

All graduate students in geosciences, including both M.S. and Ph.D. students, are expected to acquire breadth of knowledge in the geosciences, a fundamental and advanced knowledge of their subdiscipline, and skills in the areas of data collection and quantitative analysis. Toward that end, all graduate students must select one of the approved courses in each of the following areas: (1) Geosciences Breadth -- 3-4 credits; (2) Disciplinary Fundamentals -- 3--4 credits; (3) Data Gathering -- 3--4 credits; and (4) Quantitative Analysis -- 3--4 credits.

Prescribed courses (3 credits): GEOSC 500 (3)

Additional Courses
Disciplinary Fundamentals: Select 3 credits from GEOSC 488(4), GEOSC 489(4), GEOSC 502(4), GEOSC 507(3), GEOSC 518(3), GEOSC 519(3), GEOSC 533(3), GEOSC 542(1-4), GEOSC 548(3), GEOSC 585(3)

Data Gathering and Interpretation: Select 3 credits from GEOSC 410(3), GEOSC 413W(3), GEOSC 483(3), GEOSC 508(3), GEOSC 558(4), GEOSC 565(3), GEOSC 572(1-2)

Quantitative Analysis: Select 3 credits from E MCH 524A(3), GEOSC 514(3), GEOSC 560(3), GEOSC 561(4), MNG 557(3-6), P N G 425(3); GEOSC 597(3) (either Multivariate Analyses in Geosciences OR Data Analysis in the Earth Sciences)

A current list of approved courses is maintained by the Department's Graduate Program Office in room 507 Deike Building. The list of approved courses may be modified by approval of the Department's Graduate Program Committee.

Additional Master's Degree Requirements

Master's degree students are required to take 30 graduate credits, which include at least 18 credits at the 500 to 600 level. The 12 to 16 common degree credits described above satisfy the Graduate School minimum of at least 12 credits in course work in the major program.

As part of the M.S. program, each student is required to complete a thesis. The thesis must be defended in an oral examination administered by an M.S. committee.

Additional Doctoral Degree Requirements

Admission to Ph.D. candidacy is determined by an oral examination before a candidacy committee. Preparation and defense of two research proposals will serve as one means of assessing the student's ability. At least one of these proposals should represent original work by the student, but the other may be an actual thesis proposal and involve limited initial input from the adviser or others.

Course work in addition to the common degree requirements described above will be selected by the student in consultation with his/her committee.

The comprehensive examination is both oral and written. It is administered by the doctoral committee after the student has essentially completed course work and after a foreign language requirement (if required by the committee) is fulfilled. A final oral defense of the thesis is required.

Biogeochemistry Dual-Title Degree Program

Graduate students with research and educational interests in biogeochemistry may apply to the Biogeochemistry Dual-Title Degree Program. Students in the Biogeochemistry Dual Title program are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program and a member of the Biogeochemistry faculty. Additional coursework from an approved list of courses is required. All students must pass a candidacy examination that includes an assessment of their potential in the field of biogeochemistry. A single candidacy examination that includes biogeochemistry will be administered for admission into the student's Ph.D. program, as well as the biogeochemistry dual-title. The structure and timing of this exam will be determined jointly by the dual-title and major program. The student's doctoral committee should include faculty from the major program of study and also faculty with expertise in biogeochemistry. The field of biogeochemistry should be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of biogeochemistry is required.

Integrated B.S/M.S. Program in Geosciences

The Department of Geosciences offers an integrated B.S./MS. Program that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Geosciences within 5 years of study. Students who wish to complete the Integrated B.S./M.S. Program in Geosciences must apply for admission to the Graduate School and the Integrated B.S/M.S program by the end of their junior year

During the first three years, the student follows the course scheduling of one of the options in Geosciences (see *Undergraduate Degree Program Bulletin*); however, if a student intends to enter the Integrated B.S./M.S. program, he/she would be encouraged to take, wherever appropriate, upper level classes. By the end of the junior year, the student normally would apply for admission to the program. A decision of acceptance would be made prior to the beginning of the senior year and a M.S. Advising Committee would be appointed. During the senior year, the student would follow the scheduling of the B.S. Geosciences option he/she has selected, with an emphasis on completing 500-level coursework wherever appropriate. During the senior year, the student will start work on a thesis designed to meet the departmental requirements of a M.S. Thesis. During the fifth year, the student will take courses fulfilling the departmental M.S. degree requirements and complete the M.S. Thesis. Undergraduate tuition rates will apply as long as the student is an undergraduate, unless the student receives financial support, for example, an assistantship requiring the payment of graduate tuition.

Admission Requirements

Students who wish to complete the Integrated B.S/M.S. Program in Geosciences must apply for admission to the Graduate School and the Integrated B.S/M.S program at the by the end of their junior year. Typical test scores of students admitted to the Geosciences Graduate Program are: GPA 3.5, and GRE's Verbal 570, and Quantitative 700. Three letters of recommendation by faculty members for admission to graduate studies are required. The applications are reviewed by the Admissions Committee of the Geosciences Graduate Program and acted upon by the Associate Head for Graduate Programs.

Requirements

B.S. Degree Portion: Total B.S. Requirements - 121 Credits
(For details on courses see the *Undergraduate Degree Programs Bulletin*.)

General Education: 45 Credits
18 of these are included in the REQUIREMENTS FOR THE MAJOR

Requirements for the Major - 94 Credits

Common Requirements for all options - 61 Credits

Prescribed Courses - 61 credits

Additional Courses - 3 Credits

Additional Geosciences Courses - 15 Credits

Supporting Courses and Related Areas - 15 Credits

M.S. Portion: Total M.S. Requirements - 30 Credits

Prescribed Courses: GEOSC 501(1), GEOSC 600(1-15)

Additional Courses - 9 credits

Disciplinary Fundamentals: Select 3 credits from GEOSC 479, GEOSC 481, GEOSC 489, GEOSC 519, GEOSC 533, GEOSC 548, GEOSC 585

Data Gathering: Select 3 credits from GEOSC 413W, GEOSC 483, GEOSC 558, GEOSC 565, GEOSC 572

Quantitative Analysis: Select 3 credits from E MCH 524A, GEOSC 560, GEOSC 561, GEOSC 514, MNG 557, P N G 425, P N G 430, P N G 511, STAT 500

Additional Geosciences Courses at the 400 and 500 level - 6 Credits

Supporting Areas: 6 Credits of Graduate course work.
These courses should be related to the thesis work of the student.

If a student has accumulated more than 121 Credits as an undergraduate student, 9 credits of 400- or 500-level class credits can be transferred to the MS program, provided these courses were not used to fulfill BS requirements.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

GEOSCIENCES (GEOSC) course list

NOTE: GEOSC 439, GEOSC 470W, GEOSC 472A, GEOSC 472B includes from one to several field trips for which an additional charge will be made.

Unit A.
(MATSC) POWDER X-RAY DIFFRACTION (1) Compound identification, lattice parameter measurement, and other applications of the powder diffraction method.

Unit B.
(MATSC) TRANSMISSION ELECTRON MICROSCOPY (1) Principles and practice of transmission electron microscope operation. Students undertake individual projects.

Unit C.
(MATSC) SPECTROSCOPY (1) Emission spectrographic analysis of powders and atomic absorption analysis of solutions.

Unit D.
(MATSC) ELECTRON MICROPROBE ANALYSIS (1) Qualitative and quantitative elemental analysis of microvolumes within solids. Emphasis on individual student projects.

Unit E.
(MATSC) SCANNING ELECTRON MICROSCOPY (1) Principles and practice of scanning electron microscope operation. Students undertake individual projects.

Unit G.
(MATSC) ANALYTICAL ELECTRON MICROSCOPY (1) Modern analytical electron microscope techniques: scanning transmission electron microscopy; electron energy loss spectroscopy; energy dispersive analysis of X-rays. Prerequisite: MATSC (GEOSC) 511B.

Last Revised by the Department: Fall Semester 2008

Blue Sheet Item #: 36-06-185D

Review Date: 4/15/08

Faculty linked: 6/9/14

German (GER)

Program Home Page

THOMAS BEEBEE, *Head of Department*
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Degrees Conferred:

Ph.D., M.A.
Dual-Title Ph.D. Degree in German and Language Science
Dual-Title Ph.D. Degree in German and Visual Studies

The Graduate Faculty

Programs of study with major emphasis upon literature, culture, linguistics, or applied linguistics lead to advanced degrees.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE) are required. An exception may be allowed for foreign applicants who have never attended university in the United States. To request an exception, applicants must contact the program head.

Minimum qualifications for admission include 30 undergraduate credits in German beyond the intermediate level. Provision is made, however, for provisional admission with limited deficiencies. Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the Degree Requirements section of the *Graduate Bulletin*.

The M.A. in German is designed to offer students a general foundation in German culture, language, linguistics, and literature. After completing a small set of core requirements, students may pursue their individual interests from among the courses offered by faculty who specialize in German Applied Linguistics, Culture, Linguistics, and Literature. The M.A. degree requires a minimum of 36 credits, with at least 18 at the 500 level, and is designed as a terminal degree.

The following courses are required for the M.A. degree:

- German 510: Introduction to Literary Criticism and Its Application (3 cr.)
- German 511: The Teaching of College German (3 cr.)
- German 513, 514 or 515: German Phonetics and Phonology, German Syntax, or Introduction to German Applied Linguistics (3 cr.)

Practical experience in supervised teaching is required for all graduate degrees. Students who wish to earn a Master's Degree must enroll in GER 596 and write a scholarly research paper of between thirty and fifty pages on a topic defined in conjunction with a faculty adviser. The research paper should demonstrate mastery of primary and secondary literature, interpretative skills, and academic prose in both German and English. A one-hour oral defense of the paper shall be scheduled two weeks after its formal submission to the adviser. A committee consisting of faculty adviser and two other members of the German program selected by the M.A. candidate shall evaluate the student's knowledge of the subject matter.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the Degree Requirements section of the *Graduate Bulletin*.

For the Ph.D., a student must complete at least 54 credits (these can include M.A. credits) of graduate-level work. GER 510 (3 cr.), 511 (3 cr.), and either 513, 514 or 515 (3 cr.) are required of all students. Other requirements include: (1) demonstrated reading knowledge of one foreign language in addition to German and English, (2) successful passing of the comprehensive examination with written and oral components, and (3) completed doctoral dissertation and passing a final oral examination (the dissertation defense). The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. Degree in German and Language Science

Graduate students with research and educational interests in German and Language Science may apply to the dual-title Ph.D. in German and Language Science. The goal of the dual-title degree in German and Language Science is to enable graduate students from German to acquire the knowledge and skills of their major area of specialization in German, while at the same time gaining the perspective and methods of the Language Sciences.

Admission Requirements

Students must apply and be admitted to the graduate program in German and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission and meet the admissions requirements of the Language Science dual-title program. Refer to the Admission Requirements of the Language Science Bulletin page. Doctoral Students must be admitted into the dual-title degree program in Language Science prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the Ph.D. degree requirements in German, listed above. In addition, students must complete the degree requirements for the dual-title in Language Science, listed on the Language Science Bulletin page.

Some courses may satisfy both German and Language Science degree requirements. Final course selection must be approved by the student's doctoral committee. Students who hold a master's degree from another institution may petition to have equivalent course credits accepted.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from German and must include at least one Graduate Faculty member from the Language Science program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both German and Language Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a German and Language Science dual-title Ph.D. student must include at least one member of the Language Science Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Language Science, the member of the committee representing Language Science must be appointed as co-chair. The Language Science representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in German and Language Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School

Dual-Title Ph.D. in German and Visual Studies

Graduate students with interests in German culture and the history of visual media may apply to the dual-title Ph. D. in German and Visual Studies. The goal of the dual-title Ph.D. in German and Visual Studies is to enable graduate students from German to acquire the knowledge and skills of their major area of specialization in German, while at the same time gaining the theories and methods of Visual Studies.

Admission Requirements

Students must apply and be admitted to the graduate program in German and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program. Refer to the Admission Requirements section of the Visual Studies Bulletin page. Students must receive approval from the Director of Graduate Studies in German, and must submit a recommendation from a member of the German Graduate Faculty who is also a member of the Visual Studies Graduate Faculty. Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to obtaining candidacy in German

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. degree in German, listed above. In addition, students must complete the degree requirements for the dual-title in Visual Studies, listed on the Visual Studies Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from German and must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both German and Visual Studies. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a German and Visual Studies dual-title Ph.D. student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Visual Studies, the member of the committee representing Visual Studies must be appointed as co-chair. The Visual Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in German and Visual Studies. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*. In addition, the following awards typically have been available to graduate students in this program.

EXCHANGE FELLOWSHIPS AT CHRISTIAN ALBRECHTS UNIVERSITÄT, KIEL, AND THE PHILLIPS UNIVERSITÄT, MARBURG--Available to graduate students in German and other fields for a full academic year. Students must have a good command of German.

WALTER EDWIN THOMPSON AND DR. REGINA BLOCK THOMPSON SCHOLARSHIP FUND--Thompson Fellowships are available each year for graduate students in the Department of Germanic and Slavic Literatures and Languages. These fellowships can be awarded in addition to other grants or stipends.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

GERMAN (GER) course list

Last Revised by the Department: Summer Session 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Faculty linked: 6/9/14; Dept head updated: 4/13/16

Geographic Information Systems (GIS)

Program Home Page

Department of Geography, via World Campus

Anthony C. Robinson, Ph.D. Assistant Professor, Department of Geography Director, Online Geospatial Education Programs
John A. Dutton e-Education Institute
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Degrees Conferred:

M.G.I.S.

The Graduate Faculty

The Program

The Master of Geographic Information Systems (M.G.I.S.) degree is awarded to students who demonstrate mastery of the technical competencies and leadership skills required to design, manage, and use geographic information technologies successfully in a wide range of professional fields. The M.G.I.S. program is intended specifically for working professionals who are able to participate only on a part-time basis and at a distance. It is offered exclusively through World Campus. The M.G.I.S. complements, but does not replace, the Department of Geography's research-focused Master of Science program, which is offered at the University Park campus. Students who expect to pursue the Ph.D. in Geography should apply for admission to the residential M.S. program.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Additional requirements imposed by the Department of Geography include:

- Statement of professional experience and goals including documentation of a minimum two years of professional experience, preferably (but not necessarily) related to geographic information technologies. A résumé may be attached as a supplement, but the statement itself should be an essay (two to three pages) that demonstrates the applicant's verbal communication skills;
- Three letters of recommendation that attest to the applicant's readiness for graduate study and that he or she has the requisite minimum of two years of professional experience;
- Official transcripts from all post-secondary institution attended, including the institution that conferred the applicant's baccalaureate degree (and any graduate degrees, if applicable).Official Graduate Records Examinations (GRE) score reported directly from the testing center to Penn State. GRE scores are required: however, this requirement may be waived at the discretion of the program. Please contact the graduate program directly for information on obtaining a waiver of the GRE requirement.

Credits earned at other institutions but not used to earn a degree may be applied toward the requirements for a graduate degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin*.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students earn the M.G.I.S. degree by successfully completing 36 credits of course work, including a supervised independent project. Course requirements include a minimum of 18 credits at the 500 or 800 level, with at least 6 credits at the 500 level. The culminating experience for the degree is an independent project completed while enrolled in GEOG 596. A minimum of 6 credits and a maximum of 9 credits of GEOG 596 will count towards the degree. The independent project demonstrates the student's ability to apply advanced knowledge and skills related to geographic information systems in a way that makes a substantial contribution to his or her professional work. For most students, the project culminates in a formal public presentation, attended by a member of the graduate faculty associated with the M.G.I.S. program, which takes place at an appropriate professional conference. Alternative arrangements are made for students with special needs or constraints. For example, students who submit written reports of project aims and outcomes for publication in adviser-approved peer-reviewed journals are exempt from the public presentation requirement. Presentations and papers are preceded by dress rehearsals that are open to all students in the program through Web and audio conferencing. As part of his or her individual studies, every student is expected to contribute a formal peer review of one other student's rehearsal.

PRESCRIBED COURSES

MASTER OF GEOGRAPHIC INFORMATION SYSTEMS

GEOGRAPHY (GEOG)

- 482. Making Maps that Matter with GIS (3)
  OR
  864. Professionalism in GIS&T (2)
  483. Problem-Solving with GIS (3)
  484. GIS Database Development (3)
  583. Geospatial System Analysis and Design (3)
  871. Geospatial Technology Project Management (3)
  586. Geographical Information Analysis (3)
  596. Individual Studies (6-9)

In lieu of specified prescribed and elective courses, MGIS students may elect to substitute those for courses that comprise an option. There are two option choices: Geospatial Intelligence Option (15 credits) and Geodesign Option (12 credits).

GEOSPATIAL INTELLIGENCE OPTION

M.G.I.S. students who choose to complete the Geospatial Intelligence Option may substitute the 15 credits that comprise the option for 15 credits of prescribed and elective courses (including GEOG 482 or 864+483+484). This option is designed for current or aspiring practitioners in government agencies, businesses, and non-governmental organizations that rely on insights produced through skillful, knowledgeable, and conscientious analysis of diverse geo-referenced data to plan for emergencies, to coordinate responses to natural and human induced disasters, to enforce the law, and to plan and conduct military operations.

Core required courses: GEOG 583 (3), GEOG 586 (3), GEOG 871 (3), and GEOG 596 (6-9).

Courses required for the option (15 cr.):

GEOGRAPHY (GEOG)

- 571. Intelligence Analysis, Cultural Geography, and Homeland Security (3)
- 882. Geographic Foundations of Geospatial Intelligence (3)
- 883. Remote Sensing for the Geospatial Intelligence Professional (3)
- 884. Geographic Information Systems for the Geospatial Intelligence Professional (3)
- 885. Advanced Analytic Methods in Geospatial Intelligence (3)

GEODESIGN OPTION

In lieu of 3 credits of a prescribed introductory course (GEOG 484) plus 9 additional elective credits, M.G.I.S. students may substitute 12 credits associated with courses that comprise the Geodesign Option. This option is designed for current or aspiring professionals in government agencies, businesses, and non-profit organizations who see limitations in current regional and urban planning and design approaches, and who seek a foundation in geospatially-based design through investigating the methods and collaborative nature of the Geodesign process.

Core required courses: GEOG 482 (3) or GEOG 864 (2), GEOG 483 (3), GEOG 583 (3), GEOG 586 (3), GEOG 871 (3), and GEOG 596 (6-9).

Courses required for the option (12 cr.):

GEODESIGN (GEODZ)
511. Geodesign History, Theory, Principles (3)
822. Geodesign Models I: Evaluation and Decision (3)

GEOGRAPHY (GEOG)
487. Environmental Applications of GIS (3)
865. Cloud and Server GIS (3)

Student Aid

Graduate assistantships are not available. World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

GEODESIGN (GEODZ) courses

GEOGRAPHY (GEOG) courses

Last Revised by the Department: Spring Semester 2018

Blue Sheet Item #: 46-04

Review Date: 1/9/2018

Faculty linked: 8/14/14

Health Administration (H ADM)

Program Home Page

HENGAMEH HOSSEINI, Ph.D., Professor in Charge
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Degree Conferred:

M.H.A.

Graduate Faculty

The Program

Recognizing that the national health care system is in a period of reform and redesign, the program emphasis involves design/redesign in a 36-credit curriculum. Based on eight core courses defined as the foundation of administration in health care, the degree is designed for part-time professional students already engaged in health administration careers. The mission of the program is to further student knowledge and skills in a continuous learning cycle. Students are expected not only to know the existing health system, but are to develop a capability for design consistent with demands of access to care, management, and control of costs and quality of care delivery.

Part-time students may start the program at the beginning of any semester. They usually take one or two 3-credit courses each semester. Students may also take one or two courses during the summer session to maintain steady progress toward the degree. All Health Administration courses are available during the evening for the convenience of part-time students. A student may complete the M.H.A. on a part-time basis in about two to four years.

Admission Requirements

Undergraduate degrees in any major are acceptable for admission. Applicants must have either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.. Applicants who are still completing their baccalaureate requirements at the time of the application may be admitted to the Graduate School conditional on the awarding of the baccalaureate degree.

Admission to the MHA program is based on clear suitability for the MHA program as demonstrated by the application as a whole, to include:

- a completed online Graduate School application and payment of the application fee,
- evidence of a bachelor's degree from an **regionally** accredited college as outlined above;
- a statement of career and educational goals;
- a successful undergraduate record with a minimum grade-point average of 3.00 (with particular attention given to the last two years of undergraduate work);
    - satisfactory scores on the Graduate Record Examination (GRE) or Graduate Management Admission Test (GMAT) are required if the GPA is less than 3.00 (typically, applicants who have scores of 1,000 or higher on the GRE and are admitted to the program tend to be successful in the program);
- three years of work experience; and
- names of three references willing to provide recommendations.

The GPA requirement may be relaxed if the student has professional experience or other strong evidence suggesting likely success in the MHA program. Some applicants may be admitted on a provisional basis; the condition for removal of provisional status is obtaining a grade-point average of 3.00 in 15 credits of approved courses within two semesters.

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

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

Program Requirements

The degree requires a total of 36 credits, with a minimum of 33 credits at the 500-level, including a 3-credit capstone course (faculty-supervised paper); up to 3 credits of 400-level work may be included in the electives. An overall 3.00 (B) grade-point average must be earned in all coursework.

REQUIRED COURSES: 24 credits
H ADM 539, H ADM 540, H ADM 541, H ADM 542, H ADM 545, P ADM 503, P ADM 506, P ADM 510

ELECTIVES: 9 credits
H ADM 543, H ADM 546, H ADM 548, H ADM 551, H ADM 552, H ADM 597, P ADM 505, P ADM 511, P ADM 512, P ADM 514, P ADM 515, P ADM 516

CAPSTONE COURSE (FACULTY-SUPERVISED PAPER: 3 credits
H ADM 594

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HEALTH ADMINISTRATION (H ADM) course list

Last Revised by the Department: Fall Semester 2013

Review Date: 11/19/2013

Faculty linked: 8/14/14

Health Policy and Administration (H P A)

Program Home Page

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Degrees Conferred:

- M.S., Ph.D., M.H.A., M.B.A./M.H.A.(concurrent)
- Integrated B.S. in Health Policy and Administration/Master of Health Administration (MHA) Admission and Degree Requirements

The Graduate Faculty

The graduate degrees in the Department of Health Policy and Administration focus on management, policy, and research in health services, with particular attention to the recurrent problems of cost, quality, and access to health services.

The doctoral program (Ph.D.) is designed to provide advanced knowledge and skills in health services research, with an emphasis track in health policy and economics, health care organizations or population health and demography. The doctorate in H P A prepares students to become independent health services researchers in academic and nonacademic settings.

The Master of Science (M.S.) degree in Health Policy and Administration provides a solid foundation of knowledge and skills in health services research. The M.S. in H P A prepares students for further graduate study toward a doctorate in health services research or related fields or for research and analytic work in academic and nonacademic health services research settings.

The professional Master of Health Administration (M.H.A.) program prepares students for the complexities they will face in managing organizations that plan, finance and deliver health care. The curriculum emphasizes strategic decision-making, financial management, communication and detailed aspects of the U.S. health care system. These include health law, epidemiology, health insurance, government health-financing programs, ethics, managed care, long-term care, health care technology, marketing, and strategic planning for health services.

The integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) program allows qualified undergraduate students to earn both degrees in five calendar years of full time academic study. Students completing an integrated B.S./M.H.A. are prepared to advance quickly to positions of leadership in health care organizations.

The M.B.A. program of the Smeal College of Business and the Department of Health Policy and Administration of the College of Health and Human Development offer a concurrent degree program. The M.B.A./M.H.A. graduate will be well-grounded in both business and health management and prepared for positions in hospitals, nursing homes, managed care and health insurance organizations, health care consulting, and pharmaceutical companies,as well as for helping businesses in all sectors understand the unique features of the health care system.

Doctoral Admission and Degree Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission. Degree requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Satisfactory scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission; the GRE is preferred. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale) and a well-considered statement of experience and career goals are major criteria for admission. Some work experience in health services is preferred, but not required.

The H P A doctoral curriculum includes study in three substantive areas: (1) core courses in health services organization, delivery, finance and policy; (2) core courses in health services research methods and statistics, and (3) courses and a doctoral thesis in an emphasis track approved by the doctoral committee.

M.S. Admission and Degree Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission. Degree requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Satisfactory scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission; the GRE is preferred. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale) and a well-considered statement of experience and career goals are major criteria for admission. Some work experience in health services is preferred, but not required.

The M.S. curriculum in H P A includes study in three substantive areas: (1) a core set of courses in health services organization, delivery, finance, and policy; (2) courses in health services research methods and statistics, and (3) courses and a master's thesis approved by the thesis advisor. At least 15 credits of the program must be completed in H P A departmental course offerings at the 400-and 500-level. At least 18 credits of the degree must be in 500-and 600-level courses. A 6-credits master's thesis must be completed as part of the degree requirement.

M.H.A. Admission and Degree Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission. Degree requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*."

Satisfactory scores from either the Graduate Management Admission Test (GMAT) or the Graduate Record Examination (GRE) are required for admission; the GRE is preferred. This requirement will be waived for applicants with five or more years of relevant work experience. A junior/senior grade-point average of 3.00 or better (on a 4.00 scale), a relevant personal statement and three letters of recommendation are necessary. Some work experience in health care is preferred, but not required.

The program can be completed on a full-time basis in 21 months or on a part-time basis or with the aid of technology through the World Campus in 28 months. Requirements for the completion of the M.H.A., include 49 credits with at least 39 credits at the 500-or 800-level. Included in the 49 credits is a residency in a health care setting and a capstone course to demonstrate evidence of analytical ability and synthesis of material.

Integrated B.S. in Health Policy and Administration/Master of Health Administration (M.H.A.) Admission and Degree Requirements

The following credentials will be considered for admission:

- A demonstrated ability to communicate effectively, an advanced level of maturity, and high motivation to pursue a career in the health care field
- Academic references
- Successful completion of 60 undergraduate credits having maintained a cumulative GPA of 3.4 or better

Students admitted to the B.S. in Health Policy and Administration/M.H.A. are able to earn both the B.S. and M.H.A. in five calendar years of full-time academic study.

M.B.A./M.H.A. Concurrent Degree Program Admission and Degree Requirements

Students may apply to be admitted to either the M.H.A. or the M.B.A. program initially. During the initial year in either graduate program, students may apply to complete the concurrent degree program and must meet admission requirements for the other program. See the M.H.A. and M.B.A. degree program descriptions for further admission requirements of each program.

Students complete 88 credits associated with both the M.H.A. and M.B.A. degrees. Included within the required credits is a 10-week integrated residency during a summer. The time required to complete the M.B.A./M.H.A. can be as much as 34 months.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HEALTH POLICY AND ADMINISTRATION (H P A) course list

Joint Degree Offering with Penn State Law

Degrees Conferred:
J.D. (Penn State Law)
M.H.A. (Health Policy and Administration)

Joint Degree Programs

Penn State Law (University Park) and Health Policy and Administration (HPA) will offer coordinated programs of studies leading to the degrees of Juris Doctor (J.D.) and Master of Health Administration (M.H.A).

Admission Requirements

Students applying to the joint degree program must be admitted separately into both Penn State Law and HPA. Students must first be admitted to the law school and must complete the required first-year curriculum in the J.D. program before commencing the M.H.A. component. Application to the MHA program must take place through the Graduate School Application. Formal admission to the M.H.A. program would normally take place during the student's first year of law, but HHD may extend provisional admission to the M.H.A. program at the time an applicant applies to Penn State Law particularly where an applicant's law school choice depends upon admission to the J.D./M.H.A. joint degree program.

College Specific Admission Requirements

Penn State Law: The Penn State Law admissions process considers academic transcripts, leadership activities, community activities, work experience, personal background, letters of recommendation, the personal statement, LSAT scores and the LSAT writing sample. An admissions committee identifies candidates who are academically prepared for law study and who will contribute to the promotion of diversity and excellence in the student body and the legal profession. There is no standard prescribed undergraduate curriculum. The following are required of J.D. degree applicants: a completed application form, an LSAT score, an LSDAS report, a one-page personal statement and two letters of recommendation.

Health Policy and Administration: The HPA M.H.A. admissions process is guided by a selection committee, which seeks students with the greatest potential for success, based on academic performance (a bachelor's degree is required), GRE or GMAT scores, motivation and leadership potential. All applicants must submit a completed graduate school application, including three letters of reference, a statement of purpose, current resume, standardized test scores (GRE or GMAT), and a transcript from each institution attended. Official transcripts showing degree conferral will be required when the applicant is recommended for admission and accepts the program offer. At the student's request, the LSAT may replace the GRE for joint degree admissions purposes.

International applicants for the joint degree who do not qualify for the English exemption will also need to provide a satisfactory TOEFL or IELTS score. All joint degree applicants will be required to achieve a minimum TOEFL score of 575 on the paper test, 230 on the computer-based test or 88 on the internet-based test (with a minimum speaking score of 20); a minimum of 6.5 on the IELTS will also be acceptable.

Residency: Students in the program will spend six semesters in Penn State Law and two to three semesters in HPA.

Liaisons: The director of the HPA M.H.A. program and the Penn State Law Associate Dean for Academic Affairs are designated program advisors and liaisons between the programs. Students will need to work with these designated program advisors and their individual faculty advisors from both programs to build an individual program.

Inter Program Transfer of Credits

Courses cannot be transferred or shared until the applicant is officially admitted to the joint program. Retroactive transfers of courses taken prior to admission to the joint program are not permitted.

Penn State Law: Penn State Law will accept the transfer of twelve (12) credits from the M.H.A. program's required core curriculum as elective credit towards the J.D. Students must obtain a grade satisfactory to the program in order for the credits to be transferable.

Health Policy and Administration: HPA will accept the transfer of twelve (12) credits from the Penn State Law curriculum towards the M.H.A. in lieu of (i) two M.H.A. electives, (ii) a required M.H.A. course in health law, and (iii) one other required M.H.A. course as determined by the student and their advisors. Specific law course selection for transfer to the M.H.A. will be dependent on course offerings available at Penn State Law. Students must obtain a grade satisfactory to the program in order for the credits to be transferable.

Course Sequencing: Studentsenrolling in the joint degree may choose to conduct their study in either of two sequence options below. Each "Year" refers to the traditional academic year beginning in late August and concluding in May. In compliance with ABA Standards and Rules law students may not enroll for more than 17 credits per semester at Penn State.

Joint J.D./ M.H.A. Degree Program OPTION 1

Year 1

J.D. Required First-Year Curriculum (32 crs)
Summer Semester: H P A 595-M.H.A. Residency Requirement. This requirement may be satisfied with a J.D. externship, as coordinated between Penn State Law and the M.H.A. program. (1-3 crs)*

Year 1 total credits is 32-35*

Year 2

Fall Semester: H P A 503 (3), H P A 447 (3), H P A 520 (3), H P A 523 (3) (12 crs)
Spring Semester: H P A 524 (3), H P A 835 (3), H P A 551 (3), H P A 855 (3) (12 crs)
Summer Semester: H P A 595 -M.H.A. Residency Requirement, if not fulfilled between year one and two of program. This requirement may be satisfied with a J.D. externship, as coordinated between Penn State Law and the M.H.A. program. (1-3 crs)*

Year 2 total credits is 24-27*

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

Year 3

Fall Semester: H P A 850 (3), H P A 805 (3), H P A 556 (3), elective credits from J.D. Program (minimum 3), substitution credits for H P A 836 or H P A 556 (12 crs)
Spring Semester**:** Capstone (3),
H P A 545 (3), elective credits from J.D. Program (minimum 3), substitution credits for H P A 836 or H P A 556 (12 crs)

Year 3 total credits is 24.

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

Year 4

J.D. Upper Level Coursework: If not already satisfied, student must successfully complete Professional Responsibility (CORE 934) and the seminar requirement, both J.D. degree requirements at Penn State Law.

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

Total credits required for the J.D. degree is 88.

Total credits required for the M.H.A. degree is 49-51.*

*Variable credit totals depend on which year M.H.A. Summer Residency requirement is met and whether it is met with H P A 595 (1 cr) or J.D. externship (3 crs).

Joint J.D./ M.H.A. Degree Program OPTION 2

Year 1

J.D. Required First-Year Curriculum (32 crs)

Year 2

J.D. Upper Level Coursework: Student should consider taking Professional Responsibility (CORE 934) and a seminar course, both J.D. degree requirements at Penn State Law.

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

Year 3

Fall Semester: H P A 503 (3), H P A 447 (3), H P A 520 (3), H P A 523 (3) (12 crs)
Spring Semester: H P A 524 (3), H P A 835 (3), H P A 551 (3), H P A 855 (3) (12 crs)
Summer Semester: H P A 595-M.H.A. Residency Requirement. This requirement may be satisfied with a J.D. externship, as coordinated between Penn State Law and the M.H.A. program. (1-3 crs)

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

Year 3 total credits is 25-27*

Penn State Law does not have a required number of credits for the second and third year of the J.D. degree program. Students are required to complete 88 credits to earn the J.D. Twelve (12) credits is full-time. J.D. students may enroll in a maximum of 17 credits per semester. J.D. students will complete a minimum of 56 credits their second and third year.

Year 4

Fall Semester: H P A 850 (3), H P A 805 (3), elective credits from J.D. Program (minimum 3), substitution credits for H P A 836 or H P A 556 (12 crs)
Spring Semester: Capstone(3),
H P A 545 (3), elective credits from J.D. Program (minimum 3), substitution credits for H P A 836 or H P A 556 (12 crs)

J.D. Upper Level Coursework: If not already satisfied, student must successfully complete Professional Responsibility (CORE 934) and the seminar requirement, both J.D. degree requirements at Penn State Law. Total credits required for the J.D. degree is 88

Total credits required for the M.H.A. degree is 49-51.*

*Variable credit totals depend on which year M.H.A. Summer Residency requirement is met and whether it is met with H P A 595 (1 cr) or J.D. externship (3 crs)

Recommended Program of Study and Advising

The director of the HPA M.H.A. program and the Penn State Law Associate Dean for Academic Affairs are designated program advisors. In addition, students will have individual faculty advisors in both programs. Periodic interaction between the two advisors will be encouraged. A program of study will be developed for each student.

Tuition

Students will be charged the applicable Penn State Law tuition to cover the J.D. program and the applicable graduate tuition to cover the M.H.A. degree program. Penn State Law tuition will be paid for the semesters in which the student is registered for Penn State Law courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses in the M.H.A. program. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships

Decisions on financial aid and assistantships will be made by each school according to that school's procedures. Students on graduate assistantships must adhere to the course load policy listed in theBulletin.

Information on Graduate Assistantships

Fulfillment of Degree Requirements and Graduation

A student in the program may complete the requirements for one of the degrees and be awarded that degree prior to completing all the requirements for the other degree; provided, however, that the student shall have successfully completed at least two semesters of work towards the other degree. All courses in

one program that will count towards meeting the requirements of the other must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the inter-program transfer of credits.

Last Revised by the Department: Fall Semester 2015

Blue Sheet Item #: 44-01-000

Review Date: 8/25/2015

Faculty linked: 6/20/14

Human Development and Family Studies (HD FS)

Program Home Page

DOUGLAS M. TETI, *Department Head, Human Development and Family Studies*

LISA GATZKE-KOPP, *Professor in Charge of Graduate Programs in Human Development and Family Studies*
119 Health and Health and Human Development Building
Phone: 814-863-8000

Degrees Conferred:

Ph.D., M.S. (The program does not admit applicants for the terminal master's degree.)
Dual-Title M.S. and Ph.D. in HDFS and Demography
Dual-Title Ph.D. in HDFS and Social Data Analytics

The Graduate Faculty

The Program

This interdisciplinary program is one of the graduate programs of the College of Health and Human Development. It is administered through the Department of Human Development and Family Studies. The Human Development and Family Studies graduate program is designed to educate students about research, theory, and methodology related to the study of individuals and families across diverse populations and diverse settings. There is a strong interest in the ways in which social institutions and settings such as day care facilities, schools, neighborhoods, and social policy institutions facilitate (or inhibit) opportunities for development and change for individuals and families. Understanding the characteristics and conditions that place individuals or families at risk for developing problems, designing effective prevention programs to address those risks, and mounting rigorous evaluations of such programs is a growing emphasis in the program. All students, regardless of substantive area, are encouraged to develop strong skills in research methods, a hallmark of our graduate training. Through course work and apprenticeship experiences, students develop an understanding of the program's multidisciplinary life span/life course, and applied orientation. As students progress through the program, they are expected to develop specialized expertise in two or more of the department's areas of concentration: individual development, family studies, intervention research, and research methods.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE) are required for admission. Entering students should have some course work in social sciences, such as developmental and family science courses from psychology or sociology programs; and foundational courses in research methods and statistics. At the discretion of the program, students not meeting these requirements may be provisionally admitted with limited deficiencies to be made up concurrently with their graduate work.

Students with appropriate backgrounds will be considered for admission for fall semester only. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students who enter the graduate program without a master's degree must complete a master's degree en route to the Ph.D. For the Master of Science degree, a minimum of 30 credits at the 400, 500, or 800 level is required, with at least 18 credits in the 500 and 600 series combined. Students are required to complete three 3-credit substantive core courses: HDFS 501, HDFS 503, and HDFS 525. Students are also required to complete two 3-credit courses in research methods: HDFS 516 and HDFS 519. In addition to the required courses, students take a minimum of 9 credits of course work (400 and 500 level) in their substantive field, 6 of which must be in HD FS (excluding independent study), and 6 credits of thesis research (HDFS 600 or 610). The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. Course work completed for the HD FS master's degree at Penn State can be applied to satisfy the degree requirements for the HD FS Ph.D.

For the Ph.D., a minimum of 40.5 credits at the 400, 500, or 800 level is required. Students are required to complete three 3-credit substantive core courses: HDFS 501, HDFS 503, and HDFS 525. Students are also required to complete four 3-credit courses in research methods: HDFS 516, HDFS 519, HDFS 523, and HDFS 526. In addition to the required courses, students must take a minimum of 6 additional credits in methodology, for a total of 18 credits in methodology. Students will also take a minimum of 12 credits of elective course work (400 and 500 level) in their substantive field, 9 of which must be in HD FS seminars. These 12 credits must be in addition to the 6 additional credits in methodology and cannot be double-counted towards that requirement. Students must also take HDFS 596: Professional Development Orientation (1 credit) in their first year and HDFS 515 (1.5 credits) by the end of their second year in the program.

All doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Doctoral Degree in HDFS and Demography

This program is designed for students who want to integrate Population Studies (including such foci as fertility, marriage, cohabitation, labor force participation, mortality) with the study of human development and family studies. Details can be obtained from the HDFS graduate officer or director of the graduate program in Demography. Please see the Demography website for more information.

Admission Requirements

Students must apply and be admitted to the graduate program in HDFS and the Graduate School before they can be admitted to a dual-title degree program. Applicants interested in the dual-title degree program may note their interest in their applications to HDFS. Students admitted to the HDFS program will be admitted to the dual-title program in Demography upon the recommendation of a Demography Program faculty member in HDFS. Ph.D. students must apply and be admitted to the dual-title degree program in Demography prior to taking the candidacy exam.
Additional admissions requirements are listed in the Admissions Requirements section of the Demography Bulletin page.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D. in HDFS, listed above. In addition, students pursuing the dual-title Ph.D. in HDFS and Demography must complete the degree requirements for the dual-title Demography Ph.D., listed on the Demography Bulletin page.

The Candidacy Examination committee for the dual-title degree will be composed of Graduate Faculty from HDFS and must include at least one Graduate Faculty member from Demography. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be

a single candidacy examination, containing elements of both HDFS and Demography. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The chair and at least one additional member of the student's doctoral committee must be members of the Graduate Faculty in Demography. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. The Demography faculty members on the student's committee are responsible for administering an examination in demography that constitutes a portion of the comprehensive examination of the doctoral student in the dual-title.

Ph.D. candidates must complete a dissertation on a topic that reflects their original research and education in both HDFS and Demography. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Dual-Title Doctoral Degree in HDFS and Social Data Analytics

HDFS doctoral students interested in having a degree that reflects interdisciplinary training in an array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with HDFS, may apply to pursue a dual-title Ph.D. in HDFS and Social Data Analytics.

Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. program provides additional training with the aim of providing scientists with the skills required to expand the field of social data analytics, creatively answer important social scientific questions, and communicate effectively with both academic and nonacademic audiences.

Admission Requirements

Students must apply and be admitted to the graduate program in HDFS and the Graduate School before they can be admitted to a dual-title degree program. Applicants interested in the dual-title degree program may note their interest in their applications to HDFS. Students admitted to the HDFS program will be admitted to the dual-title program in Social Data Analytics upon the recommendation of a Social Data Analytics Program faculty member in HDFS. Students must apply and be admitted to the dual-title degree program in Social Data Analytics prior to taking the candidacy exam.

Additional admissions requirements are listed in the Admissions Requirements section of the Social Data Analytics Bulletin page.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D. in HDFS, listed above. In addition, students pursuing the dual-title Ph.D. in HDFS and Social Data Analytics must complete the degree requirements for the dual-title Social Data Analytics Ph.D., listed on the Social Data Analytics Bulletin page.

The Candidacy Examination committee for the dual-title degree will be composed of Graduate Faculty from HDFS and must include at least one Graduate Faculty member from Social Data Analytics. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both HDFS and Social Data Analytics. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The doctoral committee of a dual-title doctoral degree student must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the committee representing HDFS is not also a member of the Graduate Faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair. The Social Data Analytics representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Ph.D. candidates must complete a dissertation on a topic that reflects their original research and education in both HDFS and Social Data Analytics. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HUMAN DEVELOPMENT AND FAMILY STUDIES (HD FS) course list

Last Revised by the Department: Spring Semester 2017

Blue Sheet Item #: 45-06

Review Date: 4/4/2017

Faculty linked: 6/20/14; Department head updated 7/30/14

Human Dimensions of Natural Resources and the Environment (HDNRE)

Co-Chairs, Department of Agricultural Economics and Rural Sociology and Department of Geography

Degrees Conferred:

Students electing the dual-title intercollege program in HDNRE through participating majors may earn a degree with the dual-title at both the Ph.D. and M.S./M.A. levels, i.e., Ph.D. in (graduate program name) and Human Dimensions of Natural Resources and the Environment, or M.S./M.A. in (graduate program name) and Human Dimensions of Natural Resources and the Environment.

The following graduate programs offer dual-title degrees in HDNRE: M.A. and Ph.D. in Anthropology and HDNRE; M.S. and Ph.D. in Architecture and HDNRE; M.S. and Ph.D. in Energy and Mineral Engineering and HDNRE; M.S. and Ph.D. in Entomology and HDNRE; M.S. and Ph.D. in Forest Resources and HDNRE; M.S. and Ph.D. in Geography and HDNRE; M.S. in Landscape Architecture; M.S. and Ph.D. in Recreation, Park and Tourism Management and HDNRE; and M.S. and Ph.D. in Rural Sociology and HDNRE.

The Graduate Faculty

The Program

The HDNRE dual-title intercollege degree program is administered by the HDNRE Program Committee. The committee maintains program definition, identifies appropriate faculty and courses, and recommends policies and procedures for its operation. This dual-title intercollege degree program is offered through graduate major programs in four colleges: Agricultural Sciences, Earth and Mineral Sciences, Health and Human Development, and the Liberal Arts. HDNRE enables students to attain and be identified with the content, techniques, applications, methods, and policy implications of an interdisciplinary focus on Human Dimensions of Natural Resources and the Environment, while maintaining a close association with areas of application.

Through participation in HDNRE, student's programs of study will emphasize integrated, multidisciplinary approaches designed for improving their understanding about and management of natural resources. Areas of study will reflect the faculty adviser's home department and disciplinary thrust.

Admission Requirements

To pursue a dual-title intercollege degree under this program, the student must first apply and be admitted through one of the existing graduate programs that offers the dual-title degree in HDNRE (Anthropology; Architecture; Energy and Mineral Engineering; Entomology; Forest Resources; Geography; Landscape Architecture; Recreation, Park, and Tourism Management; or Rural Sociology).

Once accepted into their home degree program, the student can apply to the Admissions Committee of Human Dimensions of Natural Resources and the Environment. The Human Dimensions of Natural Resources and the Environment admissions committee reviews applications and recommends students for admission to the dual-title degree program to The Graduate School. HDNRE admission requirements include: (1) a minimum baccalaureate Jr/Sr grade point average of 3.0 out of a 4.0 scale; (2) a statement of professional goals, natural resource management philosophy, and reasons for applying to the program; and (3) three letters of reference from individuals capable of evaluating the applicant's potential for graduate work in interdisciplinary natural resource management. Doctoral students must apply and be admitted to the HDNRE dual-title program prior to taking the candidacy examination.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

To qualify for the HDNRE dual-title intercollege degree, students must satisfy the requirements of the major degree program in which they are enrolled, including the communication/foreign language requirements, if any. In addition, they must satisfy the minimum requirements in the HDNRE dual-title intercollege program described here. Final course selection is determined by the student and her/his advisers and/or doctoral committee. All dual-title intercollege degree candidates must enroll in HDNRE 590 in each of their first two semesters.

M.S./M.A. Degree: A candidate for the dual-title intercollege M.S./M.A. in HDNRE must complete 17 credits of HDNRE course work beyond the bachelor's degree in addition to curricular requirements for the master's degree in the student's primary program. The HDNRE requirement includes four core courses in the HDNRE curriculum: HDNRE 590 Colloquium (2), HDNRE 574 Integrated Perspectives in Human Dimensions of Natural Resources and the Environment (3), HDNRE 575 Ethical Issues in Human Dimensions of Natural Resources and the Environment (3), and R SOC 555 Human Dimensions of Natural Resources (3). In addition, each HDNRE student will take either ANTH 559 Human Ecology (3) or FOR 565 GIS-Based Socio-Ecological Landscape Analysis (3), and one 3-credit additional course selected in consultation with the student's advisers and/or committee. The HDNRE Colloquium (HDNRE 590) must be taken in each of the first two semesters of enrollment in the dual-title intercollege degree program. In addition, 6 credits of Thesis Research (600 or 610 in the student's home graduate degree program) are required if the candidate is writing a thesis. Particular courses may satisfy both the graduate major program requirements and those of the HDNRE dual-title intercollege program. All courses must be approved by the student's M.S./M.A. advisers and/or committee.

The thesis supervisor and chair of the student's committee shall be a member of the student's major program, and a member of the dual-title program. All members of the committee must hold Graduate Faculty status or secure the same before serving on the committee.

The culminating experience (e.g., thesis or scholarly paper) must incorporate an HDNRE interest together with the primary field of study. All students are also required to successfully complete an oral defense of the M.S./M.A. thesis as part of the master's requirements if required by the participating program.

Ph.D. Degree: A candidate for the dual-title intercollege HDNRE Ph.D. must complete, in addition to curricular requirements for the doctoral degree in the student's primary program, a minimum of 18 credits of HDNRE coursework. This includes the four core courses in the HDNRE curriculum: HDNRE 590 Colloquium (3), HDNRE 574 Integrated Perspectives in Human Dimensions of Natural Resources and the Environment (3), HDNRE 575 Ethical Issues in Human Dimensions of Natural Resources and the Environment (3), and R SOC 555 Human Dimensions of Natural Resources (3). In addition, each HDNRE student will take either ANTH 559 Human Ecology (3) or FOR 565 GIS-Based Socio-Ecological Landscape Analysis (3), and one 3-credit additional course selected in consultation with the student's doctoral committee. The HDNRE Colloquium (HDNRE 590) must be taken each of the first two semesters of enrollment in the dual-title intercollege degree program, and once more prior to graduation, for a total of 3 credits. Particular courses may satisfy both the graduate major program requirements and those of the HDNRE program. If an HDNRE M.S./M.A. student continues into the HDNRE Ph.D. program, 15 credits of interdisciplinary course work must be selected, with the approval of the student's doctoral committee. As well, a continuing doctoral candidate must take 3 additional credits of HDNRE 590 (each student must enroll the first two semesters of the doctoral program and then once more prior to graduation).

There will be a single candidacy examination, containing elements of both the student's graduate major program and HDNRE. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The candidacy examination committee and the doctoral committee must include at least one graduate faculty member from HDNRE. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. The HDNRE representative on the candidacy examination committee will participate in constructing and evaluating the candidacy examination, and the HDNRE representative on the doctoral committee will participate in constructing and evaluating the comprehensive examination. If the chair of the doctoral committee is not also a member of the Graduate Faculty in HDNRE, the member of the committee representing HDNRE must be appointed as co-chair.

All Ph.D. students will be required to complete, present, and defend a dissertation that incorporates a topic related to both their graduate major program and HDNRE. Candidates for the dual-title Ph.D. degree in HDNRE will be required to pass a final oral examination (the dissertation defense) covering their graduate major program field and HDNRE, with emphasis on the student's area of specialization. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HUMAN DIMENSIONS OF NATURAL RESOURCES AND THE ENVIRONMENT (HDNRE) course list

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-01-000

Review Date: 8/23/16

Faculty linked: 6/20/14

Higher Education (HIED)

Program Home Page

DAVID GAMSON, *Director of Graduate Studies*
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dag17@psu.edu

Degrees Conferred:

M.Ed., D.Ed., Ph.D.

The Graduate Faculty

Higher Education

Higher Education (World Campus)

The Program

The graduate program in Higher Education has as its goal the preparation of individuals who will pursue careers and exert leadership in postsecondary education as administrators, faculty, or researchers in the nation's colleges and universities and in a variety of public and private agencies and associations in the United States and other nations. With emphasis on the systematic study of higher education, the program builds on the scholarly and scientific disciplines offered throughout the University and applies these studies to the professional functions and responsibilities that its graduates will assume, and to the knowledge of the field of higher education.

The Higher Education program offers the Ph.D. D.Ed., and M.Ed. in residence at the University Park campus. The Higher Education program also offers the M.Ed either in part or in full through World Campus.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Doctoral applicants must submit test scores from either the GRE, GMAT, or LSAT, taken no more than 5 years prior to the application date. Master's applicants must submit test scores from either the GRE, GMAT, MAT, or LSAT, taken no more than 5 years prior to the application date.

The requirement for test scores is waived for World Campus M.Ed. applicants who have either: 1) completed three years of full-time professional experience in higher education; 2) a master's degree in another field; or 3) completed the Institutional Research Certificate Program at Penn State.

Applicants must also submit a curriculum vitae (CV), a statement of purpose, and three letters of recommendation.

Students in the M.Ed., D.Ed., and Ph.D. programs at University Park normally will begin the program in the fall semester. Students in the M.Ed. program through World Campus may begin the program in the summer, fall, or spring semesters.

M. Ed. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits is required, and must include:

- HIED 808 Pro-Seminar in U.S. Higher Education and Student Affairs (3 cr.)
- HIED 545 Foundations of Higher Education and Student Affairs (3 cr.)
- HIED 842 Administrative Leadership in Higher Education (3 cr.)
- HIED 846 College Students and Their Success (3 cr.)
- Either HIED 841 Research and Assessment in Student Affairs or HIED 801 Foundations of Institutional Research (3 cr.)
- HIED 596 Individual Studies (3 cr.)
- Emphasis Area in Higher Education (6 cr.): Students will choose an emphasis area to tailor a program of study to fit an intended career path, in consultation with their adviser. A list of acceptable emphasis areas and their required courses is maintained by the program.
- Elective Courses (6 cr.): Students will choose from a list of approved electives maintained by the program office, in consultation with the student's adviser.

Culminating Experience in Higher Education (3 cr.): HIED 596 Individual Studies (3 cr) Like other capstone courses, this course provides students the opportunity to demonstrate knowledge and skills that they have developed during the program in a culminating project that, in turn, may showcase their interests and abilities as they seek employment beyond graduation. In addition, students will self-assess their relative progress towards the intended learning outcomes of the program.

D. Ed. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The D.Ed. requires a minimum of 90 credits, of which at least 30 credits must be earned in residence at the University Park campus. A maximum of 30 credits from a completed master's degree earned at an institution that does not grant a doctorate in Higher Education may be accepted towards this minimum, subject to limitations listed in the Transfer Credit section of the Doctoral Degrees Bulletin page. A maximum of 60 credits beyond the baccalaureate may be accepted towards this minimum, subject to limitations listed in the Transfer Credit section of the Doctoral Degrees Bulletin page.

- Core Courses (12 cr.): HIED 501 Foundations in Higher Education (3 cr.); HIED 552 Administration and Organization in Higher Education (3 cr); HIED 556 Higher Education Students and Clientele (3 cr.); and HIED 502 Equity and Diversity in Higher Education (3 cr.).
- Specialization (HIED) (9 cr.): 9 credits in additional HIED course work.
- Theoretical/Conceptual (9 cr.): 9 credits
- Methodological (12 cr.): At least (a) one quantitative course (e.g., STAT 500 or EDPSY 406) and (b) one qualitative course (e.g., HIED 586).
- Proposal (3 cr.): HIED 594 Research Proposal Topics
- Dissertation: (15 cr.)

In addition, the program may require a 9-credit internship depending on students' previous professional experiences in higher education administration. D.Ed. students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). Their dissertation must also be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Ph.D. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Ph.D. students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). Their dissertation also must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

A minimum of 51 credits is required:

- Core Courses (12 cr.)**:** HIED 501 Foundations in Higher Education (3 cr.); HIED 552 Administration and Organization in Higher Education (3 cr.); HIED 556 Higher Education Students and Clientele (3 cr.); and HIED 502 Equity and Diversity in Higher Education (3 cr.).
- Specialization (HIED): (9 cr.): 9 credits in additional HIED course work.
- Theoretical/Conceptual (9 cr.): 9 credits
- Methodological (18 cr.): At least (a) one quantitative course (e.g., STAT 500 or EDPSY 406) and (b) one qualitative course (e.g., HIED 586).
- Proposal (3 cr.): HIED 594 Research Proposal Topics

Dual-Title M.Ed., D.Ed., and Ph.D. in Comparative and International Education

Admission Requirements

Students must apply and be admitted to the graduate program in Higher Education and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Comparative and International Education dual-title program. Refer to the Admission Requirements section of the Comparative and International Education Bulletin page. Doctoral students must be admitted into the dual-title degree program in Comparative and International Education prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Higher Education, listed above. In addition, students must complete the degree requirements for the dual-title in Comparative and International Education, listed on the Comparative and International Education Bulletin page. Some courses may satisfy both Higher Education and Comparative and International Education degree requirements. Final course selection must be approved by the student's doctoral committee.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Higher Education and must include at least one Graduate Faculty member from the Comparative and International Education program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Higher Education and Comparative and International Education. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Higher Education and Comparative and International Education dual-title Ph.D. student must include at least one member of the Comparative and International Education Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Comparative and International Education, the member of the committee representing Comparative and International Education must be appointed as co-chair. The Comparative and International Education representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Higher Education and Comparative and International Education. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Joint Degree Program between Penn State Law (J.D.) and the Higher Education Program (M.Ed., D.Ed., Ph.D.)

Penn State Law (PSL) and the Higher Education (HIED) Program offer a joint degree program leading to a Juris Doctor (J.D.); and either a Master of Education (M.Ed.), a Doctor of Education (D.Ed.), or a Doctor of Philosophy (Ph.D.) in Higher Education.

Admission Requirements

Applicants to the joint degree program must apply and be admitted first to Penn State Law, and subsequently to the Higher Education graduate program. Admissions requirements and applications for admission for Penn State Law are listed in the J.D. Admissions section of the Penn State Law website. The admission requirements for the Higher Education graduate program are listed above. When applying to the Higher Education graduate program, applicants must include two letters of recommendation from Penn State Law faculty members and a career statement. Applicants to the joint degree program may submit LSAT scores instead of GRE scores.

Residency

Students will normally spend four semesters in residence at PSL and as many additional semesters in residence as needed to complete the additional requirements for the pertinent HIED degree. Ph.D. candidates must arrange the sequence of semesters to ensure that they are in residence as full-time students in the HIED program for at least two consecutive semesters (Fall-Spring or Spring-Fall) excluding summer in a single twelve-month period.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website. Degree requirements for the Ph.D., D.Ed., and M.Ed. degrees are listed above.

PSL: A maximum of twelve credits for HIED course work may be double-counted for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited towards the J.D. degree. The following HIED program may qualify for credit in PSL: (1) HIED 545 (Higher Education in the United States); (2) HIED 552 (Administration in Higher Education); (3) HIED 560 (Legal Issues in Higher Education); (4)HIED 546 (College Teaching) and (5) HIED 587 (Education Policy and Politics).

HIED: The courses that may be double-counted will be determined by the student's degree program. Normally a maximum of twelve credits of PSL course work will be counted for credit for the minimum requirements for a master's degree, subject to approval by the student's advisory committee.

Sequence: The sequence of courses will be determined by the students and their advisors.

Recommended Program of Study and Advising: All students in the program will have two advisers, one from PSL and one from HIED. Periodic interaction between the two advisers is encouraged.

Tuition: Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the HIED degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships: Decisions on financial aid and assistantships will be made by each school according to that school's procedures. Generally, assistantships and financial aid granted by HIED will not apply to time spent at PSL.

Fulfillment of Degree Requirements and Graduation: All courses in one program that will count toward meeting the requirements of the other program must be completed before the awarding of either degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the Higher Education degree if all Higher Education degree requirements have been satisfied.

Student Aid

Graduate assistantships available to doctoral students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HIGHER EDUCATION (HI ED) course list

Lasted Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07

Review Date: 6/26/2018

Faculty links inserted: 6/10/15

History (HIST)

Program Home Page

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Degrees Conferred:

Ph.D., M.A.
Dual-Title Ph.D. in History and African American and Diaspora Studies
Dual-Title Ph.D. in History and Asian Studies
Dual-Title Ph.D. and M.A. in History and Women's Studies
Integrated B.A. in History/M.A. in History

The Graduate Faculty

The Program

Graduate instruction at the master's and doctoral degree level is offered in the following areas: United States (19th and 20th century), Europe (Medieval, Early Modern and Modern), Asia (Late Imperial and 20th century), and Latin America (Colonial and Modern). Only students focusing their course of study on the department's four primary areas of strength (Latin America, Early Modern Global, 19th-century United States, and Late Imperial and Republican China) are admitted into the graduate program. Courses in all other areas are offered on a regular basis and encouraged as secondary areas of focus.

Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Applicants to the doctoral program must hold or be near completion of the master's degree (or its equivalent); all others will be considered for admission to the master's program, even if it is their ultimate intention to pursue a doctoral degree at Penn State.

To be considered for admission, applicants must submit a completed online Graduate School application and payment of the application fee. In addition, applicants must submit official transcripts from all post-secondary institutions attended that show (1) substantial course work in history, (2) a minimum GPA of 3.50 (on a 4.0 scale), (3) at least three semesters of college-level work in a foreign language (additional language training appropriate to the fields in which the applicant proposes to work may also be required for admission) and (4) where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken. Each applicant must submit the scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application; the general examination scores are mandatory, the history examination is optional. Successful applicants typically have minimum scores of 160 (or 650 old scoring) on the verbal and quantitative sections, and 5.0 on the analytical writing section of the general examination.

The Department of History further requires all applicants to submit directly to the department a statement of intent outlining their proposed fields of study and career goals, as well as a sample of their written work (undergraduate history thesis, master's thesis, seminar paper or equivalent research paper) as evidence of their historical research and writing skills. Three letters of recommendation are required; it is strongly preferred that at least two of them be from historians.

Integrated Undergraduate-Graduate Bachelor/Master's Degree Admission Requirements

In addition to the admission requirements noted above, admission to the History IUG will be based upon students' having:

1. completed at least one 400-level history course in a primary area of interest (with a B grade or higher) and attained a minimum GPA of 3.5 in all courses.
2. completed at least 60 credits (but no more than 100 credits).
3. submitted a proposed program plan directly to the Department of History's Director of Graduate Studies prior to the fall application deadline. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Students must apply to the program via the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the History graduate program for the Master of Arts degree. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

Candidates for the M.A. degree must earn a minimum of 36 credits of course work that can be counted towards a graduate degree, of which 12 credits will be in the student's primary area and 6 credits in one secondary area. At least 30 credits must be at the 500 level, with no more than 6 credits of HIST 596. The only required course is HIST 500 - Theory, Method and the Practice of History. Course work offered by outside departments may be scheduled as part of the student's program with approval of the student's academic committee and the Director of Graduate Studies. In some cases, students may be required to take additional credits in order to make up deficiencies in foreign language skills and/or undergraduate coursework.

Reading proficiency in at least one foreign language must be demonstrated no later than the beginning of the second year of residence.

Students are required to convene two separate, formal meetings with their advisers and master's committees: Committee Formation Meeting and the Master's oral examination. The convening of the student's master's committee must take place no later than the end of the first year in the master's program. Every student should, in consultation with the permanent adviser, select at least two other members of the Graduate Faculty to serve on their master's committee (for a minimum total of three faculty members). There must be faculty representation of each of the students' two fields (selected from the department's list of officially recognized fields). At this first meeting there should be a discussion and approval of the general program plan (seminars, courses and other requirements)

Students must hold a Master's oral examination. The examination consists of an oral defense of two research papers written while in the M.A. program in two department- defined fields of study (e.g., 19th century US and Modern Europe). The research papers must be of a length, substance, and quality that the committee deems to be of journal article-caliber. Students must submit the papers to the committee a minimum of two weeks prior to the oral examinations; the papers then must be orally presented and successfully defended before the committee in the M.A. examination. Submission and defense of these two research papers constitutes the culminating experience for the Master of Arts degree.

Integrated Undergraduate-Graduate Bachelor/Master's Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below.

Degree requirements for the B.A. in History are listed in the Undergraduate Bulletin. Degree requirements for the M.A. degree are listed in the Master's Degree Requirements section above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. Courses at the 400 and 500-level that can be double counted include HIST 453, HIST 454, HIST 463, HIST 514, HIST 515, HIST 516, HIST 544, HIST 545, HIST 546, and HIST 580.

History IUG students should compose their master's committee and convene a committee meeting with all members present in the semester immediately following admission to the IUG (typically the sixth semester). At this first meeting there should be a discussion and approval of the general program plan (seminars, courses, and other requirements).

If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

CREDIT & COURSE REQUIREMENTS: Candidates for the Ph.D. degree in History must complete at least 27 credits of graduate-level work at the 500-600 level (with no more than one HIST 596 per academic year), of which 12 credits will be in the student's primary area and 6 credits each in two secondary areas. The only required course is HIST 500 - Theory, Method and the Practice of History. The remainder of a student's doctoral program, including foreign language requirements, should be determined in consultation with the doctoral committee. Coursework offered by outside departments may be scheduled as part of the student's program with approval of the student's doctoral committee and the Director of Graduate Studies.

FOREIGN LANGUAGE REQUIRMENTS: Reading proficiency in at least one foreign language must be demonstrated no later than the third semester of residency (not including summer semester).

ENGLISH COMPETENCE: A candidate for the degree of Doctor of Philosophy in History is required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking. At the end of the first year of enrollment all students who are non-native speakers of English must submit a portfolio which includes at least two pieces of written work from every seminar. In addition, the Director of Graduate Studies will solicit evaluations from their adviser(s) and seminar instructors in order to identify any deficiencies. Students with any identified deficiencies will be directed into appropriate remedial activities. The deficiencies must be met before the candidacy examination. Competence must be formally attested by the program before the doctoral comprehensive examination is scheduled. (International students should note that passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a Ph.D. from Penn State.

DOCTORAL COMMITTEE COMPOSITION: By the end of the first year in the doctoral program, every student should, in consultation with the permanent adviser, select at least two other members of the Graduate Faculty to serve on their doctoral committee. Doctoral committees for History Ph.D. candidates must meet all Graduate Council requirements.

Only those faculty who have been approved and designated by the Graduate School as members of the Graduate Faculty in History can serve as representatives of the three primary and secondary fields on any doctoral committee. The list of History Graduate Faculty is available online.

CANDIDACY: The candidacy examination may be taken after the completion of at least 18 credits of acceptable graduate work at Penn State and must be taken within three semesters (excluding summer sessions) of entry into the doctoral program. Following successful passage of the candidacy exam, a program plan will be submitted to the Departments of History and the participating program after consultation with members of the student's doctoral committee.

FORMAL MEETINGS: Students are required to convene two separate, formal meetings with their advisers and doctoral committees for: 1) a discussion and approval of the general program plan (seminars, courses and other requirements) and 2) their Ph.D. comprehensive examinations.

DOCTORAL DISSERTATION DEFENSE: Upon the researching, writing, and completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense). The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in History and African American and Diaspora Studies

Admission Requirements

Students must apply and be admitted to the graduate program in History and The Graduate School before they can apply for admission to the dual-title degree program. After admission to History, students must apply for admission to and meet the admissions requirements of the African American and Diaspora Studies dual-title program. Refer to the Admission Requirements section of the African American and Diaspora Studies Bulletin page. Doctoral students must be admitted into the dual-title degree program in African American and Diaspora Studies prior to obtaining candidacy in their home department.

Ph.D. Degree

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in History, listed above. In addition, students pursuing the dual-title Ph.D. in History and African American and Diaspora Studies must complete the degree requirements for the dual-title Ph.D. in African American and Diaspora Studies, listed on the African American and Diaspora Studies Bulletin page.

Candidacy

The candidacy committee must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The dual-title field must be fully integrated into the candidacy exam for the doctoral program. In addition, candidates for the dual-title Ph.D. in African American and Diaspora Studies will be required to present to their committee a portfolio of work in African American and Diaspora Studies which includes a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's interest in questions taken up by scholars of African American and Diaspora Studies.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a History and African American and Diaspora Studies dual-title Ph.D. student must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in African American and Diaspora Studies, the member of the committee representing African American and Diaspora Studies must be appointed as co-chair.

Comprehensive Exams

The African American and Diaspora Studies Graduate Faculty member on the student's committee is responsible for developing and administering the African American and Diaspora Studies portion of the student's comprehensive exams. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student's thematic or regional area of interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam will include the following components: broad history of the field, contemporary theory and debates, and either sexual and gender politics or a topic related to the student's specific area of interest.

Dissertation

Ph.D. candidates must complete a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in both History and African American and Diaspora Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Dual-Title Ph.D. in History and Asian Studies

Graduate students with research and educational interests in international education may apply to the dual-title Ph.D. in History and Asian Studies. The goal of the dual-title Ph.D. in History and Asian Studies is to enable graduate students from History to acquire the knowledge and skills of their major area of specialization in History while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students, the dual-title Ph.D. in History and Asian Studies will add value to their degree and their status as candidates. It will produce excellent historians who are experts in Asian Studies as well. The dual-title degree in History and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Additional details of the dual degree program are available on the Asian Studies Bulletin page.

Admission Requirements

Students must apply and be admitted to the graduate program in History and The Graduate School before they can apply for admission to the dual-title degree program. After admission to History, students must apply for admission to and meet the admissions requirements of the Asian Studies dual-title program. Refer to the Admission Requirements section of theAsian Studies Bulletin page. Doctoral students must be admitted into the dual-title degree program in Asian Studies prior to obtaining candidacy in their home department.

Ph.D. Degree Requirements

The doctoral degree in History and Asian Studies is awarded only to students who are admitted to the History doctoral program and subsequently admitted to the dual-title in Asian Studies. To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in History, listed above. In addition, students pursuing the dual-title Ph.D. in History and Asian Studies must complete the degree requirements for the dual-title Ph.D. in Asian Studies, listed on theAsian Studies Bulletin page. The minimum course requirements for the dual-title Ph.D. degree in History and Asian Studies are as follows:

- HIST 580 (Pre-Modern China) and HIST 581 (Late Imperial and Modern China)
- ASIA 501 and 502 (the required proseminar sequence in Asian Studies).
- An additional three credits in an Asia-related course (400-level and above) in Asian Studies or in any department other than History.

Foreign Language Requirements

All-skills proficiency in one Asian language and two years' college study (or equivalent knowledge) of another Asian language, or alternative proficiency appropriate to the student's field.

Candidacy

There will be a single candidacy examination, containing elements of both History and Asian Studies. The candidacy committee must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by the History department. In addition, the student will be required to present a portfolio of work in Asian Studies to their committee. Such a portfolio would minimally include a statement of the student's interdisciplinary research interests and a program plan.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a History and Asian Studies dual-title Ph.D. student must include at least one member of the Asian Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair.

Comprehensive Exams

The Asian Studies affiliated faculty member on the student's committee is responsible for ensuring that Asian Studies content constitutes a portion of the student's comprehensive exams. The Asian Studies' content will focus on the following areas: theory, methodology, transnationalism, and interdisciplinary material related to the student's discipline.

Dissertation

Ph.D. candidates must complete a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in both History and Asian Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Dual-Title Graduate Degree in History and Women's Studies

Dual-title degrees in History and Women's Studies foster interdisciplinary scholarly work that is grounded in historical study, research, and teaching. A dual-title program will enhance the intellectual rigor and breadth of graduate work through core courses in feminist theory and methodologies; by exposure to a range of interdisciplinary approaches to scholarship that focuses on the intersections of gender, sexuality, race, ethnicity, nation, and citizenship; and by offering students a pedagogical framework that encourages an interdisciplinary approach to teaching.

Admission Requirements

Students must apply and be admitted to the graduate program in History and The Graduate School before they can apply for admission to the dual-title degree program. After admission to History, students must apply for admission to and meet the admissions requirements of the Women's Studies dual-title program. Refer to the Admission Requirements section of theWomen's Studies Bulletin page. Doctoral students must be admitted into the dual-title degree program in Women's Studies prior to obtaining candidacy in their home department.

M.A. Degree

To qualify for the dual-title degree, students must satisfy the degree requirements for the M.A. in History, listed above. In addition, students pursuing the dual-title M.A. in History and Women's Studies must complete the degree requirements for the dual-title M.A. in Women's Studies, listed on theWomen's Studies Bulletin page.

For the dual-title M.A., a minimum of one member of the master's committee will be a member of the Graduate Faculty in Women's Studies.

Ph.D. Degree

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in History, listed above. In addition, students pursuing the

dual-title Ph.D. in History and Women's Studies must complete the degree requirements for the dual-title Ph.D. in Women's Studies, listed on the Women's Studies Bulletin page.

Candidacy

There will be a single candidacy examination, containing elements of both History and Women's Studies. The candidacy committee must include at least one member of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by the History department. In addition, the student will be required to present a portfolio of work in Women's Studies to their committee. Such a portfolio would include a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's work in Women's Studies.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a History and Women's Studies dual-title Ph.D. student must include at least two members of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee representing History is not also a member of the Graduate Faculty in Women's Studies, one of the members of the doctoral committee representing Women's Studies must be appointed as co-chair.

Comprehensive Exams

The Women's Studies affiliated faculty members on the student's doctoral committee are responsible for ensuring that Women's Studies content constitutes a portion of the student's comprehensive exams. The Women Studies' content will focus on the following areas: feminist theory, feminist methodology, global feminism, and feminist studies.

Dissertation

Ph.D. candidates must complete a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in both History and Women's Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Other Relevant Information

The Director of Graduate Studies, who supervises the overall graduate program in history and maintains student records, will assign newly admitted graduate students to advisers on the basis of each student's expressed area of interest. Advisers provide assistance in planning courses of study, guidance in choosing scholarly papers and dissertation topics, direction in conducting research, and career counseling. Students who serve as graduate assistants will be given a variety of experiences as they assist different professors, ranging from paper-grading and administering exams, to preparing and delivering occasional lectures, to conducting review or discussion sections for large lecture courses. Advanced doctoral students may hold lectureships while working on their dissertations; lecturers have complete instructional responsibility for one or two sections of an undergraduate course in their area of specialization.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

In addition to the fellowships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the Graduate Bulletin, the following awards typically have been available to graduate students in this program:

JAMES HAMILTON HARTZELL AND LUCRETIA IRVINE BOYD HARTZELL HISTORY AWARD
A $200 to $300 award made annually to a graduate student in the Department of History whose field of interest is Pennsylvania history.

JAMES LANDING FELLOWSHIP AND THE WARREN HASSLER FELLOWSHIP FOR STUDY IN THE CIVIL WAR
Each fellowship is available each year to doctoral candidates who are working on their dissertations. The award consists of a stipend that earns the successful candidate one semester of release time for research and writing. No tuition waiver is offered.

HILL FELLOWSHIPS FOR STUDY IN HISTORY
Awarded annually by the Department of History to doctoral candidates who are working on their dissertations. The amount of the award varies, but it generally supports one semester free of duties.

EDWIN ERLE SPARKS FELLOWSHIP IN THE HUMANITIES
One fellowship is available each year to doctoral candidates in the Department of History who are working on their dissertations.

MARK AND LUCY MACMILLAN STITZER AWARD
Awarded by the Department of History each year to support graduate student travel for the purpose of research. The number and value of these awards depends on the quality of proposals received, the level of funding required by each meritorious project, and the funds available in the endowment. Preference is given to request for doctoral dissertation research.

THE E-TU ZEN SUN AWARD FOR OUTSTANDING TEACHING BY A GRADUATE ASSISTANT
One award is made each year to recognize excellence in teaching by a History graduate assistant in the conduct of discussion sections, review sessions, or lecture presentations. The value of the award varies depending on funds available, but it is normally about $500.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-04

Review Date: 1/10/17

Faculty linked: 6/20/14

Health Education (HLHED)

Program Home Page

WESTON KENSINGER, *Program Coordinator*
Penn State Harrisburg
W314 Olmsted Building
777 W. Harrisburg Pike
Middletown, PA 17057-4898
717-948-6730
Email: orl100@psu.edu

Degrees Conferred:

M.Ed.

The Graduate Faculty

The Program

The Health Education program emphasizes behavioral and organizational strategies to plan, implement, and evaluate interventions that enable individuals, groups and communities to achieve personal, environmental, and social health. It complements other professional fields such as education, nutrition, physical therapy, occupational therapy, dental hygiene, nursing, health care administration, and preventive psychology.

The program follows a professional development focus, as many of the students are employed in the broad areas of disease prevention andhealth promotion and are pursuing graduate study on a part-time basis. The M.Ed. is a professional degree emphasizing applied research.

The program requires a research-based culminating experience. The faculty has a broad range of interests, including health promotion, family systems, teaching and training methods, violence and substance abuse prevention and control, and multicultural health issues.

A minimum of 30 graduate credits is required for the completion of the degree. A 3 credit research-based culminating writing experience is required. The program requires students to complete 21 credits in Prescribed Core courses and 9 credits in Elective courses.

Admission Requirements

Students must have a baccalaureate degree from an accredited college or university, an overall minimum undergraduate grade-point average of 2.50 and a junior/senior GPA of 3.00 (on a 4.00 scale) for admission into the program. Students are also required to submit:

- A completed application form with application fee;
- Two copies of an official transcript from an accredited, college-level university;
- Supplementary application.

An application is available on the Web at
www.hbg.psu.edu
or by calling 717-948-6250.

Degree Requirements

A minimum of 30 graduate credits is required for the completion of the degree. A 3-credit research-based culminating experience is required. The program has a required core of courses totalling 18 credits as follows:

Prescribed Core Courses: 21 credits

- HLHED 415 Planning and Development of Health Education Programs (3)
- HLHED 456 Advanced Techniques in School and Community Health Education (3)
- EDUC 440 Education Statistics and Measurement (3) or EDPSY 400 Introduction to Statistics in Educational Research (3)
- HLHED 552 Current Health Education Issues (3)
- HLHED 553 Multicultural Health Issues (3)
- EDUC 586 Educational Research Design (3) or HLHED 530 Research Techniques in Health Education (3)
- *Culminating Experience:* HLHED 591 Culminating Health Education Seminar (3) or HLHED 587 Master's Project (3)

Elective Courses: 9 credits

A minimum of 12 credits is to be selected from the following HLHED courses: HLHED 420, 421, 443, 497, 501, 516, 590, 596, or 597.

Students also may select electives from suitable courses in Psychology, Community Psychology and Social Change, Education, Training and Development, or Health Administration programs. Note that 6 credits must be at the 500 level. Please contact the program office for further information about electives.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HEALTH EDUCATION (HLHED) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/26/04

Last Revised by the Department: Fall Semester 2007

Blue Sheet Item #: 35-07-435

Review Date: 6/12/07

Faculty linked: 8/14/14

Horticulture (HORT)

Program Home Page

ERIN CONNOLLY, Head of the Department of Plant Science
116 Agricultural Sciences & Industries Building
814-865-2025

JONATHAN LYNCH, Director of Graduate Studies in Horticulture
221 Tyson Building
814-863-2256

Degrees Conferred:

Ph.D., M.S.
Dual-Title M.S. in Horticulture and International Agriculture and Development
Dual-Title Ph.D. in Horticulture and International Agriculture and Development

The Graduate Faculty

The Horticulture program is administered in the Department of Plant Science, College of Agricultural Sciences. Each student will be associated with an adviser who may provide financial support, research facilities, and/or office space. Applicants are encouraged to explore, study, and research opportunities by contacting faculty who may be prospective advisers.

This program provides opportunities for candidates interested in Horticulture to become a professional leader and an independent scholar. Faculty in this program are competent to prepare candidates in the subfields of Horticulture including: crop production and marketing, integrated crop management, plant genetics and breeding, horticultural plant physiology, postharvest physiology, plant molecular biology and biotechnology, and horticultural ecology.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Horticulture graduate program, are required for admission. At the discretion of the graduate program officer, a student may be admitted for graduate study in a program without these scores.

Prerequisites for admission vary according to the area of specialization, but basic courses in physical sciences, mathematics, biological sciences, communication skills, and social sciences and humanities are required. Students who lack prerequisite courses may be provisionally admitted but are required to make up deficiencies without degree credit.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with least 18 credits at the 500 and 600 level, combined, including:

- 12 credits of 400- or 500-level formal courses in the major field (at least 6 credits at the 500-level)
- 3 credits in statistical methods at the 500-level
- AGRO 501 (1 cr.)
- HORT 590 (2 cr.)
- AGRO 555 (2 cr.)
- Minor/general studies courses 4XX or 5XX (6 cr.)
- 6 credits of thesis research (HORT 600 or 610)

All M.S. degree candidates must complete, at least 2 credits of Supervised Experience in College Teaching (HORT 602); however, these 2 credits cannot be counted towards the minimum credits required for the degree. A thesis is required for the M.S. degree. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The communication requirement for the Ph.D. degree may be satisfied by completing at least 6 graduate credits in an area of communications skills approved by the student's advisory committee.

Students must complete 55-60 credits of formal course work beyond the baccalaureate, plus additional seminar, teaching, and research credits. A minimum of 12 credits of 500 level formal courses beyond the bachelor's degree is required. Courses will be chosen by the student and dissertation adviser in consultation with the doctoral committee. Ph.D. students must complete:

o AGRO 501 (1 cr.)
o HORT 590 (3 credits are required, including 1 credit from the master's)
o Statistics course (6 cr., at least 3 credits must be at the 500 level)
o HORT 600 (12 cr.)
o English communication skills and related studies: Either (1) one 3-credit 400- or 500- level course of advanced English technical composition; (2) one 3-credit 400- or 500- level course chosen from a list maintained by the graduate program office; or (3) one 3- credit 400- or 500-level writing intensive course.
o HORT 602 (2 cr.). These 2 credits cannot be counted towards the minimum credits required for the degree

The candidacy examination may be given after at least 18 credits have been earned in graduate courses beyond the baccalaureate, and must be taken within three semesters (excluding summer sessions) of entry into the doctoral program. Within one semester after passing the candidacy examination, the student's doctoral committee, with the dissertation adviser in charge, will have the program planning meeting. The purposes of this meeting are to (1) determine the student's strengths and weaknesses in pertinent subject matter areas; (2) guide the student in developing a plan of study; and (3) review and discuss the proposed dissertation research.

The comprehensive examination, composed of both written and oral parts, will be given when, in the student's and adviser's opinion, the student is ready for the examination, and when the English competence requirement and essentially all courses have been completed.

Ph.D. candidates are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Horticulture. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the

dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Program in International Agriculture and Development

Admissions Requirements

Students must apply and be admitted to the graduate program in Horticulture and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of theINTAD Bulletin page. Doctoral students must be admitted into the dual-title degree program in INTAD prior to taking the candidacy examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Horticulture, listed above. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on theINTAD Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Horticulture and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Horticulture and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Horticulture and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Horticulture and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*. Students who wish to compete for fellowships should be sure that their application materials are complete by January 15 for entry the following fall semester.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HORTICULTURE (HORT) course list

Last Revised by the Department: Spring 2018

Blue Sheet Item #: 46-05

Review Date: 2/20/2018

Faculty linked: 6/20/14

Human Resources and Employment Relations (HRER)

Program Home Page

PAUL F. CLARK, *Head*
506 Keller Building
814-865-5425

Degree Conferred:

- M.S. in Human Resources and Employment Relations
- M.P.S. in Human Resources and Employment Relations
- Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations
- Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations
- Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations (SPHRER)
- Integrated B.S. in Labor and Employment Relations and M.P.S in Human Resources and Employment Relations

The Graduate Faculty

Master of Science in Human Resources and Employment Relations

The Master of Science (M.S.) degree in Human Resources and Employment Relations (HRER) is a two-year program designed for students anticipating careers in some aspect of labor and human resources or labor-management relations. The program has the following objectives:

- provide students with an understanding of the roles employers, employees, employee organizations, and public policy makers play in the employment relationship;
- familiarize students with the complex personal and organizational issues inherent in the employment relationship;
- prepare students to systematically analyze complex issues and evaluate research results in the process of administering labor and human resource systems;
- prepare students for advanced graduate or professional training beyond the master's degree; and
- prepare students for employment as practitioners in the field.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants to the M.S. HRER program:

- Must submit a 2-3 page essay articulating career and educational goals that demonstrates the applicant's written communication skills.
- Must submit scores from the Graduate Record Examinations (GRE) or the Graduate Management Admission Test (GMAT)
- Must submit official transcripts from all post-secondary institutions attended. Applicants with a 3.00 junior/senior grade-point average (on a 4.00 scale) will be considered for admission. Exceptions to the minimum grade-point average may be made at the discretion of the program for students with special backgrounds, abilities, and interests.
- Must submit three letters of recommendation sent from people who can adequately assess the student's likelihood of completing the graduate program.
- Must have successfully completed an undergraduate statistics course plus a minimum of 12 undergraduate credits in the social sciences as part of their baccalaureate degree.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

M.S. Requirements

A minimum of 37 credits at the 400, 500, or 800 level is required; with at least 18 credits in the 500 and 600 series. A minimum of 12 credits in course work (400, 500, and 800 series) must be completed in HRER. If the student chooses to write a thesis, at least 6 credits in thesis research (600 or 610) must be completed. If the student chooses the research paper option, at least 18 credits must be in 500-level courses.

For the degree, an overall 3.00 (B) grade-point average must be earned in the 400, 500, and 800-level courses, and a grade of B or above must be earned in all 500-level courses.

Core Courses (22 credits)

HRER 501(3), HRER 502(3), HRER 504(3), HRER 505(3), HRER 510(1), HRER 512(3), HRER 513(3), HRER 516(3)

Required courses are offered once per academic year and elective courses at least once every two academic years.

Emphasis Courses (6 credits)

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

Elective Courses (3-9 credits)

With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending whether the student completes a thesis or a research paper. A list of approved elective courses is maintained by the graduate program office.

Culminating Experience

Students may choose to complete either a thesis or a research paper.

The HRER thesis is intended for students anticipating additional graduate education beyond the master's degree. A student's thesis should reflect their chosen emphasis. The thesis must be accepted by the student's advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master's degree. A student's research paper should reflect their chosen emphasis.

Master of Professional Studies in Human Resources and Employment Relations (MPS HRER)

The M.P.S. in Human Resources and Employment Relations (HRER) is a 33 credit program of study for professionals working in human resources/employment relations or considering a career in some aspect of human resources and employment relations. The program will prepare students to:

- understand the roles that employers, employees, employee organizations and unions, and public policy makers play in the employment relationship;
- analyze the complex personal, legal, and organizational issues inherent in the employment relationship;
- understand the ethical dimensions of human resource and employment relations; and
- analyze complex issues and evaluate research results in the process of administering labor and human resource systems;

Courses include the study of employment law, labor and employment relations, human resources, workplace organization, labor markets, ethics, the employment relationship, recruiting/selection, compensation and benefits, workforce development, and diversity in the workplace.

The program highlights the changing nature of the HRER field, including the impact of the globalization of private and public organizations and the growing importance of diversity in the workforce. It culminates in a capstone class in which students will demonstrate their understanding of the curriculum and apply it to their professional areas of interest. Upon completion of the M.P.S. HRER, students will be equipped to work as professionals in human resource management, employment relations, and general management with private employers, unions, government agencies, and non-profit organizations.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

Students who do not have a GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Applicants who are still completing their baccalaureate requirements at the time of application may be provisionally admitted to the Graduate School. Completion of admission in such cases is dependent upon receipt of the missing credentials. Students are also expected to have a minimum of two years of full-time work experience prior to admission.

Admissions decisions for the program are based on the quality of the applicant's credentials. The decisions are based on a review of the complete application portfolio. During the admission process, students who are better suited for another graduate level program will be encouraged to apply to the appropriate program. Applicants to the M.P.S. HRER must submit the following materials:

- A 2-3 page essay articulating career and educational goals that demonstrates the applicant's written communication skills. Documentation of a minimum of two years of full-time work and a resume should be attached as a supplement;
- Three letters of recommendation that attest to the applicant's readiness for graduate study and document the requisite minimum of two years of work experience;
- Official transcripts from all post-secondary institutions attended.

Graduate Record Examination (GRE) scores are not required.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

Students pursuing the M.P.S. in HRER are required to complete a concentration designed to provide the student an opportunity to develop expertise in a specific area of human resources and employment relations.

Students will choose and complete one concentration which will include 6 credits beyond the 27 required core course credits. Students will be required to complete the capstone project in their area of concentration. For example, students choosing the Benefits and Compensation concentration would be required to complete a capstone project that focused on some aspect of benefits and compensation. The program culminates with a research project which is completed through the capstone course, HRER 894.

Total Required Credits for the M.P.S.: 33 credits at the 400-level or higher; at least 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500-level

Core Courses (27 credits)

HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)
501. Labor and Employment Law (3 credits)
504. Seminar in Employment Relations (3 credits)
505. Seminar in Human Resources (3 credits)
802. Organizations in the Workplace (3 credits)
803. Human Resources in Multinational Enterprises (3 credits)
816. Labor Market Analysis (3 credits) or 825. Strategic Business Tools for HRER Professionals (3 credits)
836. Diversity in the Workplace (3 credits)
860. Ethical Decision Making for HR Practitioners (3 credits)
894. Research Topics (3 credits)

Elective Courses (6 credits)
Select 6 credits in area of concentration.

AREAS OF CONCENTRATION (student must complete one)

--Benefits and Compensation

LER 424. Employment Compensation (3 credits)
LER 425. Employment Benefits (3 credits)

--Employment and Labor Law

LER 401. Law of Labor-Management Relations (3 credits)
HRER 811. Labor and Employment Law II (3 credits)

--Ethics and Leadership

LER 464. Communication Skills for Leaders in Groups and Organizations (3 credits)
LER 409. Leadership Development: A Life-Long Learning Perspective (3 credits)
or
LER 465. Collective Decision Making (3 credits)

--International Human Resources and Employment Relations

LER 403. International Human Resource Studies (3 credits)
HRER 801. Comparative and International Employment and Labor Law (3 credits) or LER 400. Comparative Employment Relations Systems (3 credits)

--Labor and Collective Bargaining

LER 401. Law of Labor-Management Relations (3 credits)
LER 435. Labor Relations in the Public Sector (3 credits)

--Labor Unions: Organization and Strategy

LER 466. Labor Union Structure, Administration, and Governance (3 credits)
LER 468. American Labor Unions (3 credits)

--Staffing, Training, and Development

LER 426 Staffing and Training in Organizations (3 credits) or WF ED 471 Training in Industry and Business (3 credits)
WF ED 573 Needs Assessment for Workforce Development Professinoals (3 credits)

Integrated B.S. in Labor and Employment Relations and M.S. in Human Resources and Employment Relations

The integrated LER B.S. and HRER M.S. is a five-year program designed for academically talented baccalaureate students to obtain both the B.S. and the M.S. degrees in LER and HRER with five years of study. Students will develop expertise in the human resources and labor relations fields beyond the B.S. degree. The undergraduate curriculum educates students about (1) the roles of employers, employees, employee organizations and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship (3) and how to systematically analyze those complex issues and evaluate research relevant to those analyses. The graduate curriculum provides for more individualized, focused learning in a concentrated sub-area of the HRER field. The program culminates with an M.S. thesis or research paper. Upon completion of the integrated degree, students will enter the workforce with advanced knowledge and expertise gained from conducting and analyzing empirical work and participating in seminar-style classes.

Admission Requirements

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Science degree in HRER, listed above.

The number of openings in the integrated B.S./M.S. program will be limited to undergraduates with strong academic records. Applicants to the integrated program:

1. must be enrolled in the LER B.S. program;
2. shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer of AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
3. must have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in the major;
4. must obtain letters of recommendation from the chairs of the Department's undergraduate and graduate committees; and
5. must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to those from the chairs of the Department's undergraduate and graduate committees), and a career statement.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

No GRE or GMAT scores are required for admission to the program.

Degree Requirements

To earn the Master of Science degree in HRER, students in the IUG program must complete all of the degree requirements for the Master of Science described above, with one exception. The requirement for the 1-credit course HRER 510 is waived for students accepted into the IUG degree program. HRER 510 is intended to familiarize new students with the field and the department, and it is anticipated that IUG students will already have a foundation in the field. Therefore, the total minimum credits required for the M.S. for students accepted into the IUG program is 36.

12 credits may be applied to both undergraduate and graduate degree program requirements. Students can choose which 12 credits will double-count for both the undergraduate and graduate degrees from the following list:

LER 401
LER 458Y
LER 460
HRER 501
HRER 502
HRER 504
HRER 505
HRER 516

At least 6 of the 12 double-counted credits must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the

undergraduate degree requirements have been satisfied.

Integrated B.S. in Psychology and M.S. in Human Resources and Employment Relations

The integrated Psychology (PSYBS) B.S. and Human Resources and Employment Relations (HRER) M.S. is a five-year program designed for academically-talented undergraduate Psychology baccalaureate students to obtain both the B.S. degree in Psychology and the M.S. degree in HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond that provided by their Psychology B.S. degree. The undergraduate psychology curriculum potentially introduces students to (1) personnel selection, (2) training and development, and (3) organizational psychology. The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field, including (1) the roles employers, employees, employee organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, (3) the laws that form the legal framework for the employee-employer relationship, (4) the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses, and (5) human resource management policies and practices that contribute to individual and organizational success. It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. The program culminates with the student either completing a thesis or master's paper. Upon completion of the integrated degree, students will be well-positioned to assume positions of greater responsibility in Industrial/Organizational Psychology, Human Resource Management, Employment Relations, and related careers as a result of the advanced knowledge and expertise gained through the program.

Admission Requirements

Students must apply to and meet admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master's degree. Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Admission decisions for the B.S. Psychology /M.S. Human Resources and Employment Relations program are based on the quality of the applicant's credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S./M.S. program will be limited to highly- talented undergraduates. Applicants to the integrated program:

- Must be enrolled in the PSYBS program, pursuing the Business Option, with the successful completion of PSYCH 281, Introduction to Industrial-Organizational Psychology, AND one of the following: PSYCH 482, Selection and Assessment in Organizations, PSYCH 484, Work Attitudes and Motivation, or PSYCH 485, Leadership in Work Settings;
- Shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- Must have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in the major;
- Must submit three letters of recommendation; and

- Must submit a writing sample, a resume, and a 2-3 page essay articulating career and educational goals that demonstrates the applicant's written communication skills.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

No GRE or GMAT scores are required for admission to the program.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

M.S. Requirements

37 credits at the 400-level or higher, of which at least 20 must be earned at the established graduate campus/center of the University where the program is offered. At least 18 credits in the 500 and 600 series, combined, must be included in the program. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program. If a student chooses to write a thesis, at least 6 credits in thesis research (600 or 610) must be included in the program. If the student chooses the research paper option, at least 18 credits must be in 500-level courses.

12 credits may be applied to both undergraduate and graduate degree program requirements. Students can choose which 12 credits will double-count for both the undergraduate and graduate degrees from the following list:

LER 401
LER 460
HRER 500
HRER 501
HRER 502
HRER 503
HRER 504
HRER 505

At least 6 of the 12 double-counted credits must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree. Students accepted into the program can receive their B.S. in Psychology if they are unable to complete the M.S. in HRER.

Core Courses (22 credits)

HRER 501(3), HRER 502(3), HRER 504(3), HRER 505(3), HRER 510(1), HRER 512(3)*, HRER 513(3), HRER 516(3)
*or other statistics course approved in advance by graduate director

Emphasis Courses (6 credits)

An emphasis is an area of study related to a particular aspect or domain of industrial relations and human resources. Students select an emphasis in consultation with their master's advisory committee.

Elective Courses (3-9 credits)

With the faculty adviser's approval, a student selects at least 3 or more elective credits, depending on the chosen option. A list of approved elective courses is maintained by the graduate program office.

Thesis Option

The HRER thesis option is intended for students anticipating additional graduate education beyond the master's degree. It requires 37 credits, including a minimum of 30 at the 400- , 500-, and 800-level, and a minimum of 6 600-level thesis credits. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student's thesis should reflect the chosen emphasis. The thesis must be accepted by the student's advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Research Paper Option

The HRER research paper option is intended for students expecting to enter the labor market upon completion of the master's degree. It requires a minimum of 37 credits at the 400- , 500-, and 800-level. For the degree, an overall 3.00 (B) grade-point average must be earned in the 400- and 500-level work and a grade of B or above must be earned in all 500-level courses. At least 6 credits must emphasize a particular aspect of employment relations, as described above. A student's research paper should reflect the chosen emphasis.

Integrated B.S. in Spanish and M.S. in Human Resources and Employment Relations

The integrated Spanish B.S. and HRER M.S. is a five-year program designed for highly qualified and motivated students seeking employment within a culturally diverse workplace. Students will develop basic skills in speaking, understanding, reading, and writing Spanish. Students will gain familiarity with Hispanic cultures through literature and the University's international education program, if they choose to have that experience. Students also will learn about (1) the roles that employers, employees, employee organizations, and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship, and (3) how to systematically analyze those complex issues and evaluate research relevant to those analyses.

Admission Requirements

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Science degree in HRER, listed above.

The number of openings in the integrated B.S./M.S. program will be limited to undergraduates with strong academic records. Applicants to the integrated program:

- must be enrolled in the Spanish B.S. program
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- must have an overall GPA of 3.2 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.5 in the major;
- must obtain letters of recommendation from the chairs of the Spanish undergraduate committee and the HRER graduate committee; and
- must submit a writing sample, 2 transcripts, 1 letter of recommendation (in addition to those from the chairs of the Department's undergraduate and graduate committees), and a career statement.

In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

No GRE or GMAT scores are required for admission to the program.

Degree Requirements

To earn the Master of Science degree in HRER, students in the IUG program must complete all of the degree requirements for the Master of Science described above.

12 credits may be applied to both undergraduate and graduate degree program requirements . Students can choose which 12 credits will double-count for both the undergraduate and graduate degrees from the following list:

LER 400
LER 458Y
LER 460
HRER 501
HRER 512

At least 6 of the 12 double-counted credits must be at the 500-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Integrated B.S. in Labor and Employment Relations and M.P.S. in Human Resources and Employment Relations

The integrated LER B.S. and HRER M.P.S is a five-year program designed for academically talented World Campus baccalaureate students to obtain both the B.S. and the M.P.S. degrees in LER and HRER in an intense, accelerated program of study. Students will develop expertise in the human resources and employment relations field beyond the B.S. degree. The undergraduate curriculum introduces students to (1) the roles employers, employees, employee organizations and public policy makers play in the employment relationship, (2) the complex personal and organizational issues inherent in the employment relationship (3) the laws that form the legal framework for the employee-employer relationship, and (4) the tools needed to systematically analyze those complex issues and evaluate research relevant to those analyses. The graduate curriculum provides for a more intensive, individualized, and focused examination of the human resources and employment relations field. It also provides an opportunity for students to explore a concentrated sub-area of the HRER field in depth. Upon completion of the integrated degree, students will have gained advanced knowledge and expertise from conducting and analyzing empirical work and participating in online classes that can be directly applied to the workplace.

Admission Requirements

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Professional Studies degree in HRER, listed above.

Admissions decisions for the B.S. /M.P.S. program are based on the quality of the applicant's credentials. The decisions are made after a review of the complete application portfolio. The integrated B.S. /M.P.S. program will be limited to highly talented undergraduates. Applicants to the integrated program:

- must be enrolled in the LER B.S. program;
- shall be admitted no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study;
- must have an overall GPA of 3.4 (on a 4.0 scale) in undergraduate course work and a minimum GPA of 3.6 in the major;
- must submit 2 letters of recommendation from current or previous Penn State instructors and 1 additional letter of recommendation (either professional or academic);
- must submit a writing sample, a resume, and 2-3 page essay articulating career and educational goals that demonstrates the applicant's written communication skills;
- must present an approved plan of study (to be determined in consultation with the student's undergraduate adviser and the Graduate Director, and to be signed by both; the approved Plan of Study should be reviewed periodically with an adviser as the student advances through the program); and
- must possess the equivalent of two years of full-time work experience prior to admission.

No GRE or GMAT scores are required for admission to the program.

Degree Requirements

To earn the Master of Professional Studies degree in HRER, students in the IUG program must complete all of the degree requirements for the Master of Professional Studies described above, with one exception. The requirement for the 3-credit course HRER 860 is waived for students accepted into the IUG degree program, as a course required for the B.S. in Labor and Employment Relations covers the same material. Students must choose an additional 3-credit elective in consultation with their advisers to meet the minimum 33 credits required for the M.P.S. degree.

9 credits (400-level and above) can apply to both undergraduate and graduate degrees. Students can choose which 9 credits will double-count for both the undergraduate and graduate degrees from the following list:

LER 401
LER 458Y
LER 460
HRER 501
HRER 504
HRER 505
HRER 802
HRER 816

At least 6 of the 12 double-counted credits must be at the 500- or 800-level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

If students accepted into the IUG program are unable to complete the M.P.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Joint Degree Program between Penn State Law (J.D.) and the College of the Liberal Arts, in Human Resources and Employment Relations (M.S.)

Penn State Law and the Human Resources and Employment Relations graduate program (HRER) offer a joint degree program leading to a Juris Doctor (J.D.) and a Master of Science (M.S.) in Human Resources and Employment Relations.

Admissions Requirements

The number of openings in the joint degree J.D./M.S. program will be limited to students with an outstanding academic record who have successfully completed thefirst-year curriculum at Penn State Law. Admissions requirements and applications for admission for Penn State Law are available at the J.D. Admissions section of the Penn State Law website.

Students apply to the joint degree program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Science degree in HRER, listed above.

Applicants to the joint degree program:

- must have been admitted to Penn State Law;
- must have successfully completed the first-year curriculum at Penn State Law with a minimum grade point average of 3.0;
- must complete a plan of study, to be determined in consultation with the student's Law School Adviser and the Director of the HRER Graduate Program;

- must submit two letters of recommendations from Penn State Law faculty;
- must submit two transcripts from Penn State Law; and
- must submit a career statement outlining the student's objectives and reasons for applying to the program.

Please note that applicants to the J.D./M.S. HRER program are not required to submit GRE or GMAT scores.

International Applicants

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on thePenn State Law website. Degree requirements for the M.S. degree in HRER are listed in the Degree Requirements section above.

If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.S. degree if all the M.S. degree requirements have been satisfied.

Double-Counting of Credits

Penn State Law: Twelve (12) credits of relevant course work for the HRER graduate program can be double-counted towards the requirements for the J.D. degree. The only two HRER courses that will not be credited toward the J.D. degree are HRER 501 and HRER 510.

HRER: Twelve (12) credits of relevant course work from Penn State Law can be double-counted toward the 37 credits required for the M.S. degree. The twelve credits can be chosen from the law school courses below:

LABOR 962, The Employment Relationship

LABOR 964, Employment Discrimination

LABOR 965 Workers' Compensation Law

LABOR 966, The Law of Employee Benefits

LABOR 970, Labor Law

Advising

All students in the program will have two advisers, one from Penn State Law and one from the School of Labor and Employment Relations. Periodic interaction between the two advisers is encouraged. A program of study will be developed for each student, taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

education but not to meet requirements for an advanced degree.

HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER) course list

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-01-142; IUG 41-05-162

Review Date: 08/23/2016

UCA Revision #1: 8/8/06

Faculty linked: 6/20/14

Hospitality Management (HM)

Program Home Page

ANNA MATTILA, *Professor in Charge*
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814-863-5757
klh3@psu.edu

For more information please contact:
Lanora Holler, Graduate Program Coordinator
klh3@psu.edu
814-865-8426

Degree Conferred:

Ph.D., M.S.

The Graduate Faculty

The Programs

The Hospitality Management M.S. and Ph.D. degree programs are designed to prepare individuals for research and educational roles in the hospitality industry. The programs offer advanced graduate research training for students who desire to become educators, researchers, and knowledge-based professionals in the hospitality field. Student's individualized programs are designed to ensure they will have a mastery of the scope of knowledge covering the entire spectrum of hospitality management as well as the ability the complete significant research in a specific hospitality area.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. For admission to the Graduate School, an applicant must hold a degree from an officially recognized degree-granting institution in the country in which it operates. Degree must be a:

1. Baccalaureat degree from a regionally accredited U.S. instutions or
2. Tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution.

Entry into the program requires a baccalaureate degree from a regionally accredited institution as well as a minimum of one year of work experience in the hospitality industry.

Scores for the Graduate Record Examinations (GRE), Graduate Management Aptitude Test (GMAT), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School are required for admission.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) will be considered for admission. Exceptions to this minimum average are sometimes made for students with special backgrounds, abilities, interests, and circumstances. Students are expected to have managerial competency in accounting, marketing, economics, human resource management, management information systems, and computer technology prior to entry into the program. Deficiencies in any of these areas must be made up in the first year that the student is enrolled (and will not be counted toward the program's degree requirement).

Master's Degree (M.S.) Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.* The master's degree program is designed to help students develop solid graduate-level research skills within a focused hospitality research area. Each student must complete a core of 12 credits of Methods Courses to include HM 503, STAT 500, and 6 credits of Methods Courses. In addition, students must take a minimum of 4 credits of HM 590 Colloquium. Students also complete a minimum of 15 credits of concentration area course work that is custom tailored to the student's hospitality research interests and academic and professional background.

A master's thesis is required of all students. Students must register for at least 6 credits in thesis research (HM 600 or 610), and a total of 37 credits is required for the degree, with at least 18 in the 500 and 600 series, combined. The thesis is based on original empirical research. A master's committee of three persons who oversee the master's thesis is appointed for each candidate. This committee gives the final master's exam, which is an oral defense of the master's thesis.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The doctoral program is an advanced graduate research program designed for students who want to become educators, researchers, and knowledge-based professionals in the hospitality field. Students' programs are individualized to ensure in addition to a mastery of the scope of knowledge in hospitality management they will also have the ability to complete significant research in a focused hospitality management area. A student must complete the following courses prior to scheduling the Ph.D. comprehensive examination: HM 585, HM 586, HM 590 (total of 4 credits), 12 credits of quantitative and statistical analysis, 18 credits in an HM concentration area, and 12 credits from an outside supporting area.

The language or communication requirement for the Ph.D. can be fulfilled by (1) demonstrating proficiency in an approved foreign language, or (2) demonstrating proficiency in computer programming, or (3) completing a minor. The demonstration of proficiency is determined by an HM faculty committee.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HOTEL, RESTAURANT, AND INSTITUTIONAL MANAGEMENT (HRIM) course list

Last Revised by the Department: Spring Semester 2016

Blue Sheet Item #: 44-05-00

Review Date: 04/5/16

Faculty linked: 6/20/14

Humanities (HUMAN)

Program Home Page

TROY THOMAS, *Graduate Program Coordinator*
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777 W. Harrisburg Pike
Middletown, PA 17057
Phone: 717-948-6194
Email: txt2@psu.edu

Degree Conferred:

M.A.

The Graduate Faculty

The Program

This program is interdisciplinary, emphasizing critical theories and interpretive approaches that transcend disciplinary boundaries as well as providing advanced study within various humanities disciplines. These include art history, communications, history, literature, music history, philosophy, and writing. The program offers small classes, individualized advising, and assistance in developing advanced analytical, synthetic, and interpretive skills. It accommodates both part- and full-time students.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a teriary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree msut be from an officially recognized degree-granting institution in the country in which it operates. In addition, applicants must have earned at least a 3.00 grade-point average in their junior and senior years and have studied in two humanities disciplines (usually a major in one area and some course work in another). Exceptions may be made for those with special backgrounds or abilities who are committed to advanced interdisciplinary study. All applicants must submit the following items: an application form and fee; two copies of official transcripts from all colleges/universities attended; a letter explaining personal or career goals and reasons for wishing to enroll in the program; two letters of reference (preferably from previous professors or others familiar with the applicant's intellectual/creative work or interests); and a writing sample (an academic paper; if this is not available, consult the graduate coordinator for an alternative).

Students applying for fellowships or assistantships must submit scores from the Graduate Record Examinations (GRE) or similar examination by January 15. An admissions committee often interviews applicants in person or by telephone. Applications are reviewed on a rolling basis.

Degree Requirements

All students must complete 30 credits, 18 of which must be at the 500 level, achieve a 3.00 grade-point average, and successfully complete an interdisciplinary master's production (academic thesis or creative production with academic essay). Students work with their faculty advisers and supervisory committees to select courses in accordance with their individual interests.

Courses required of all students include HUM 500, a foundation course in research methods; HUM 560, a capstone course in interdisciplinary theory and research; and HUM 580, the master's production. (See course titles and descriptions in this section.) Recommended courses include HUM 525 Studies in Aesthetics, and HUM 535 Topics in Cultural and Intellectual History, both multidisciplinary courses, covering the content of various disciplines form the perspective of one discipline. To acquire breadth in the humanities, students must take at least one course in each of two disciplines; single-discipline courses are available as HUM 515 Seminar (repeatable for credit). Other courses in particular disciplines are available at the 400 level. Other available 500-level courses are listed in this section. Students planning to teach in a junior or community college may arrange a teaching internship (HUM 550), subject to appropriate preparation and approval by both the program and the community college.

A full-time student can expect to complete the program in four semesters, a part-time student in six or more semesters. Students are expected to complete all requirements for the degree within six years, although the deadline may be extended at the discretion of the graduate coordinator in accordance with policies approved by Graduate Council.

Required Courses

HUMANITIES (HUM)
500. RESEARCH METHODS AND SCHOLARLY INQUIRY IN THE HUMANITIES (3)
560. INTERRELATIONS IN THE HUMANITIES (3)
580. MASTER'S PRODUCTION (1-6)

Recommended Courses

HUMANITIES (HUM)
525. STUDIES IN AESTHETICS (3)
535. TOPICS IN CULTURAL AND INTELLECTUAL HISTORY (3 per semester, maximum of 9)

Other Courses

ENGL 502. THEORY ADN TEACHING OF COMPOSITION (3)
HUM 515. SEMINAR (3 per semester, maximum of 9)
Unit A. Art History (3)
Unit B. History. (3)
Unit C. Literature (3)
Unit D. Music History and Analysis (3)
Unit E. Philosophy (3)
Unit F. Communications (3)
Unit G. Writing (3)
HUM 530. SEMINAR IN COMPARATIVE ARTS (3 per semester, maximum of 9)
HUM 550. JUNIOR COLLEGE TEACHING INTERNSHIP (3)
HUM 590. COLLOQUIUM (1-3)
HUM 596. INDIVIDUAL STUDIES (1-9)
HUM 597. SPECIAL TOPICS (1-9)

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

HUMANITIES (HUM) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/26/04

Last updated: 6/5/12

Faculty linked: 8/14/14

Industrial Engineering (I E)

Program Home Page

JANIS P. TERPENNY, *Peter and Angela Dal Pezzo Chair and Department Head, Harold and Inge Marcus Department of Industrial and Manufacturing Engineering*
310 Leonhard Building
814-865-7601

Degrees Conferred:

M.S., Ph.D.

The Graduate Faculty

Graduate study and research are conducted in manufacturing process, information engineering operations research-management science, production engineering, process design, systems engineering, human factors, ergonomics, quality engineering, and robotics.

Admission Requirements

Scores from the Graduate Record Examination (GRE) are required for admission. To be admitted into the program, an applicant must have received a baccalaureate degree from a regionally accredited institution. Graduates in engineering, physical sciences, and mathematics who present a 3.00 grade-point average will be considered for admission.

All international applicants must submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum composite score for the IELTS is 6.5.

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

Degree Requirements

Two degrees are offered: Master of Science (M.S.) with thesis and non-thesis tracks and the Doctor of Philosophy (Ph.D.).

The M.S. degree program is intended for students to gain advanced knowledge for research, analysis, and design in industrial engineering. The M.S. degree is offered with thesis or research paper tracks, both requiring 32 credits. The M.S. degree with thesis track requires 24 credits of coursework and two credits of I E 590 (Colloquium). Out of the 24 credits of coursework, at least 15 must be I E courses, and at least 12 must be at the 500 level. Of the 12 credits at the 500 level, at least nine must be I E courses. A thesis is required, for which six credits of I E 600 or I E 610 must be taken. The M.S. degree with non-thesis track requires 27 credits of coursework, two credits of I E 590 (Colloquium). Out of the 27 credits of coursework, at least 18 must be I E courses, and at least 18 must be at the 500 level. Of the 18 credits at the 500 level, at least fifteen must be I E courses. A scholarly paper is required for the MS degree with non-thesis track for which three credits of I E 596 must be taken. For both tracks, a core curriculum is required that is composed of I E 505 (Linear Programming) (3 credits) and I E 511 (Experimental Design in Engineering) (3 credits), which all the students must satisfy. The thesis must demonstrate comprehensive and in-depth knowledge of a topic in industrial engineering, and it should be suitable for submission for publication in a refereed journal as approved by the committee. The paper should demonstrate the ability of the student to integrate and apply concepts and techniques learnt in the courses to solve an engineering problem.

The students seeking the Master of Science degree in Industrial Engineering with non-thesis track are expected to start their degree in the Fall semester of every year and complete their degree including all the required coursework and three credits of research resulting in a paper and graduate by the end of summer following the second semester. Students who cannot complete their research paper by this summer can graduate after the summer. The plan of study is as follows:

- Fall semester: Twelve credits of course work, one credit of colloquium and one credit of research (I E 596).
- Spring semester: Twelve credits of coursework, one credit of colloquium and one credit of research (I E 596).
- Summer semester: Three credits of coursework and one credit of research (I E 596).

For the M.S. degree, area options are available in Human Factors/Ergonomics Engineering, Manufacturing Engineering and Quality Engineering. M. S. dual-title degree program in Industrial Engineering and Operations Research is also offered.

The Ph.D. program emphasizes scholarly research, and prepares students for research and development careers in industry, government, and academe. Students are admitted to candidacy after passing a written examination. The Ph.D. is awarded upon completion of a program of advanced study that includes a minimum period of residence, passing the English proficiency and comprehensive examinations, completing a satisfactory dissertation, and passing the final oral examination. The degree requirements consist of 45 credits of course work and four I E 590 (Colloquium) credits. Of the 45 credits of required course work, 36 must be prefixed I E, and at least 30 must be at the 500 level. Nine credits must be from outside the Department and must include a six-credit sequence, with at least three credits at the 500 level. A Ph.D. dual-title degree program in Industrial Engineering and Operations Research is also available.

Continuous registration is required for all graduate students until the paper, thesis, or dissertation is approved.

Master of Science (M.S.) Degree with thesis and non-thesis tracks- Human Factors/Ergonomics Engineering Option

To receive the M.S degree in Industrial Engineering with thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor's degree: 24 credits of course work, 2 credit of colloquium, and 6 credits of research leading to a thesis, as required for the M.S. degree in Industrial Engineering with thesis track. To receive the M.S degree in Industrial Engineering with non-thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor's degree: 27 credits of course work, 2 credit of colloquium, and 3 credits of research leading to a scholarly paper, as required for the M.S. degree in Industrial Engineering with non-thesis track.

The course credits for the Option in Human Factors/Ergonomics Engineering must include the following:

All the following three courses: (9 credits)
I E 549 Design Decision Making
I E 553 Engineering of Human Work
I E 558 Engineering of Cognitive Work

Master of Science (M.S.) Degree with thesis and non-thesis tracks- Manufacturing Engineering Option

To receive the M.S degree in Industrial Engineering with thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor's degree: 24 credits of course work, 2 credit of colloquium, and 6 credits of research leading to a thesis, as required for the M.S. degree in Industrial Engineering with thesis track. To receive the M.S degree in Industrial Engineering with non-thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor's degree: 27 credits of course work, 2 credit of colloquium, and 3 credits of research leading to a scholarly paper, as required for the M.S. degree in Industrial Engineering with non-thesis track.

The course credits for the Option in Manufacturing Engineering must include the following:

All the following three courses: (9 credits)
I E 528 Metal Cutting Theory

I E 550 Manufacturing Systems
I E 563 Computer - Aided Design for Manufacturing

Master of Science (M.S.) Degree with thesis and non-thesis tracks- Quality Engineering Option

To receive the M.S degree in Industrial Engineering with thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor's degree: 24 credits of course work, 2 credit of colloquium, and 6 credits of research leading to a thesis, as required for the M.S. degree in Industrial Engineering with thesis track. To receive the M.S degree in Industrial Engineering with non-thesis track and with an Option in Human Factors/Ergonomics Engineering, a student must complete at least 32 credits beyond the bachelor's degree: 27 credits of course work, 2 credit of colloquium, and 3 credits of research leading to a scholarly paper, as required for the M.S. degree in Industrial Engineering with non-thesis track.

The course credits for the Option in Quality Engineering must include the following:

All the following three courses (9 credits)
I E 555 Statistical Process Monitoring and Analysis
I E 566 Quality Control
I E 583 Response Surface Methodology and Process Optimization

Other Relevant Information

Students in this program may elect the dual-title degree program in Operations Research for the Ph.D. and M.S. degrees.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the Graduate Bulletin, the following award typically has been available to graduate students in this program:

HAROLD & INGE MARCUS GRADUATE FELLOWSHIPS--Consideration for these fellowships shall be given to all students exhibiting academic excellence who have been admitted to Penn State as candidates for a graduate degree in the Department of Industrial and Manufacturing Engineering, College of Engineering.

BENJAMIN W. NIEBEL MANUFACTURING FELLOWSHIP
Consideration for this fellowship shall be given to all students exhibiting academic excellence who have been admitted to Penn State as candidates for a graduate degree in the Department of Industrial and Manufacturing Engineering, College of Engineering.

Courses

Graduate courses carry numbers from 500 to 699. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

INDUSTRIAL ENGINEERING (I E) course list

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06

Review Date: 04/14/2015

UCA Revision #2: 7/30/07

Faculty linked: 6/20/14

International Affairs (INTAF)

Program Home Page

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Degrees Conferred:

M.I.A.
Integrated B.A. in Asian Studies, Chinese, or Japanese/M.I.A. in International Affairs
Integrated B.A. in German/M.I.A. in International Affairs
Integrated B.S. in German/M.I.A. in International Affairs
Integrated B.A. in International Politics/M.I.A. in International Affairs
Integrated B.A. in Political Science/M.I.A. in International Affairs
Integrated B.A. in Russian/M.I.A. in International Affairs

The Graduate Faculty

The Program

The School of International Affairs (SIA) is designed to prepare students for occupations involving public service, private enterprise, nonprofit organizations, and international organizations worldwide. The Master of International Affairs (MIA) degree program will provide students with a substantial knowledge base in international systems, institutions, issues and history and the advanced analytical tools and cross-cultural skills and competencies necessary for these occupations. Students will work closely with faculty to design a curriculum around their core course work, which incorporates a functional or regional theme and provides the opportunity to apply and enhance the core knowledge component with a thematically based set of graduate courses from across Penn State's existing graduate and professional curriculum.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission.

All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.

International applicants are required to submit English proficiency test scores, unless they are from one of the countries listed as exempt in the *Graduate Bulletin*. English proficiency test scores must meet or exceed the minimum acceptable scores listed in the Bulletin. Applicants with a score of 19 or higher on the speaking section of the TOEFL Internet-based test will be considered for admission, though a score of 23 or higher is desirable.

Admissions will be based on a review of all submitted materials and spaces will be offered to the best qualified applicants, taking into account academic achievement, relevant work experience and other indices of aptitude for advanced study in international affairs.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The program requires six courses which are designed to establish a base of knowledge in key subject areas which reflect the basic mission of the SIA. These courses will form the core curriculum for the M.I.A. This core curriculum is designed to provide students with a strong foundation in the ethical dimensions of international exchange, with skills essential to perform quantitative and qualitative analysis in cross-cultural contexts and with leadership training designed to understand and bridge the cultural differences**A minimum of 42 credits** at the 400, 500 or 800 level will be required for completion of the program, at least 18 of which must be from courses at the 500 and 800 level. A minimum of 6 credits must be at the 500 level. Students are required to take 18 credits of core courses in: INTAF 506(3), INTAF 801(3), INTAF 802(3), INTAF 803(3), INTAF 804(3), and INTAF 890(3).

In addition to completing the core curriculum, students will choose their remaining courses, with faculty guidance, from a substantial list of elective courses **for a total of 21 credits**. A list of approved elective courses is maintained by the graduate program office. The courses usually will be clustered around areas of concentration designated by the SIA faculty, but students also will be permitted to design an independent interdisciplinary curriculum with faculty approval. The areas of concentration, which will be pre-approved by the faculty, will take advantage of Penn State's rich graduate curriculum by aggregating in appropriate thematic clusters pre-existing and specially-created graduate-level classes.

In addition to the core curriculum and elective courses, degree candidates must complete either: (i) a master's paper; or (ii) a supervised internship placement. If the first option is chosen and the candidate opts to complete a paper, they must enroll in 3 credits of INTAF 594. The master's paper will involve integrating and showing mastery of the subject matter of the student's curricular emphasis, and may also involve original research. If the second option is chosen, the candidate will enroll in 3 credits of INTAF 595. The student will participate in a supervised internship placement of sufficient depth and professionalism that would allow the student to experience the integration of their curricular studies in an actual professional environment. A reflective paper will be submitted as a part of this credit requirement.

In order to graduate, students also will need to demonstrate proficiency in a language other than English. Proficiency will be defined as follows: (i) four semesters of a Penn State language sequence or its equivalent (15 credits with a quality grade of a C or better using a 4.0 scale); (ii) native acquisition, as shown by the candidate's personal history and approved by the SIA faculty; or (iii) performance on a proficiency evaluation sufficient to equal four semesters of language learning: for this purpose, either Penn State's proficiency certification process (described below) or another pre-approved proficiency assessment may be used.

Joint Degree Program between Penn State Law (J.D.) and the School of International Affairs (M.I.A.)

Joint Degree Program:

Penn State Law and the School of International Affairs (SIA) are offering a joint degree program that will enable a student to complete in four academic years both a Juris Doctor degree (J.D.) and a Master of International Affairs (M.I.A.). A J.D./M.I.A. graduate will have the education and skills background to practice law in the United States, to work in an international context and to assume a leadership role in international affairs.

Admission Requirements

Students must apply to and meet the admission requirements of both the graduate program in which they intend to receive their graduate degree and the professional degree program. The admission requirements for the Master of International Affairs degree are listed above. Admissions requirements and applications for admission for Penn State Law are available at the J.D. Admissions section of the Penn State Law website.

Students applying to the joint degree program must be admitted separately into both Penn State Law and the School of International Affairs.

Residency

A typical J.D./M.I.A. joint degree student will be in residence at Penn State Law for six semesters and at SIA for two semesters.

Liaisons

The respective liaisons for Penn State Law and SIA shall be as follows: the department and faculty liaisons for Penn State Law shall be the Associate Dean for Academic Affairs and the student adviser will be the Associate Dean for Academic Affairs or such other faculty member(s) as may be designated by the Dean. The liaison for SIA shall be the Director or such faculty member(s) as may be designated by the Director.

Double-Counting of Credits

Penn State Law: A maximum of twelve credits of M.I.A. course work may be double-counted for credit toward the J.D. degree at Penn State Law. Courses eligible for double-counting towards the J.D. and M.I.A. include the courses on the M.I.A. Electives list and any other courses taken as M.I.A. electives with the express written permission of the M.I.A. and J.D. advisers. Students must obtain a grade satisfactory to Penn State Law for the course work to be credited towards the J.D. degree.

SIA: A maximum of twelve credits of law school course work may be double-counted for credit toward the M.I.A. degree. Courses eligible for double-counting towards the J.D. and M.I.A. include the courses on the M.I.A. Electives list and any other courses taken as M.I.A. electives with the express written permission of the M.I.A. and J.D. advisers.

Sequence

Joint Degree students will complete their SIA core courses by the end of the second year of the joint degree program. The third and fourth year of the joint program will be in residence with Penn State Law and will include both required law classes and remaining electives to fulfill the M.I.A.

Recommended Program of Study and Advising

All students in the program will have two advisers, one from Penn State Law and one from SIA. Periodic interaction between the two advisers is encouraged. A program of study is developed for each student, taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis. Many courses are offered every year but some are offered every two or three years. Advisers will have available a list of projected relevant courses or educational experiences in order to work with the student on an individualized program of study. The standard committee structure will apply to the SIA programs.

Tuition

Students will be charged the applicable Penn State Law tuition to cover the J.D. program and the applicable SIA tuition to cover the M.I.A. degree program. The Penn State Law tuition will be paid for the semesters that the student is in residence at Penn State Law, and the SIA tuition will be paid for the semesters that the student is in residence there. A student may take up to one course (3 credit hours) per semester in the school where the student is not in residence without any change in tuition, but must pay additional tuition to the non-residential program if he or she wishes to take additional course work in that program during that semester.

Financial Aid and Assistantships

Decisions on financial aid and assistantships are made by each school according to that school's procedures. Students on graduate assistantships must adhere to thecourse load limits set forth in the *Graduate Bulletin*.

Fulfillment of Degree Requirements and Graduation

A student in the program may complete the requirements for one of the degrees and be awarded that degree prior to completing all the requirements for the other degree; provided, however, that the student shall have successfully completed at least two semesters of work towards the other degree. All courses in one program that will count towards meeting the requirements of the other must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the inter-program transfer of credits. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.I.A. degree if all the M.I.A. degree requirements have been satisfied.

Important Note: If the joint degree student is using law (900-level) credits toward the graduate degree during their last semester of enrollment, they should be prepared to extend their graduate degree graduation to a subsequent semester (the following semester at a minimum). This is due to the graduate degree approval deadline falling before the law (900-level) course grading processes are complete.

Integrated Undergraduate-Graduate (IUG) Degree Program B.A. in Asian Studies, Chinese, or Japanese and Master of International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in Asian Studies, Chinese, or Japanese/M.I.A. in International Affairs) provides an opportunity for strong students in these majors to complete a master's degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply.

The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in Asian Studies or Asian languages and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Asian Studies, Chinese, or Japanese B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Asian Studies.

M.I.A. Requirements for the Integrated B.A./M.I.A.

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below.

Degree requirements for the Bachelor of Arts in Asian Studies, Chinese, and Japanese are listed on the Undergraduate Degree Programs Bulletin. Degree requirements for the M.I.A. degree are listed in the Master's Degree Requirements section above. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Courses that may be double-counted include: ASIA 463, ASIA 465Y, ASIA 469, ASIA 475Y, ASIA 476, ASIA 481, ASIA 486, ASIA 489, ASIA 493, ASIA 501, ASIA 502, and ASIA 577. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships

Students admitted to the School of International Affairs through the IUG with a B.A. in Asian Studies, Chinese, or Japanese may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Integrated Undergraduate/Graduate (IUG) Degree Program B.A. in German and Master of International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in German/M.I.A. in International Affairs) provides an opportunity for strong students in these majors to complete a master's degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in German and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the German B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Germanic and Slavic Languages and Literatures.

M.I.A. Requirements for the Integrated B.A./M.I.A.

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in German are listed in the Undergraduate Degree Programs Bulletin. Degree requirements for the M.I.A. degree are listed in the Master's Degree Requirements section above. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. The list of courses that can double count includes GER 408, GER 431, GER 432, GER 489, GER 494, GER 540, GER 581, and GER 592. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships

Students admitted to the School of International Affairs through the IUG with a B.A. in German may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Integrated Undergraduate-Graduate (IUG) Degree Program B.S. in German and Master of International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.S. in German/M.I.A. in International Affairs) provides an opportunity for strong students in these majors to complete a master's degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in German and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

The number of openings in the integrated B.S./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the German B.S. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Germanic and Slavic Languages and Literatures.

M.I.A. Requirements for the Integrated B.A./M.I.A.

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in German are listed in the Undergraduate Degree Programs Bulletin. Degree requirements for the M.I.A.

degree are listed in the Master's Degree Requirements section above. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. The list of courses that can double count includes GER 408, GER 431, GER 432, GER 489, GER 494, GER 540, GER 581, and GER 592. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships

Students admitted to the School of International Affairs through the IUG with a B.S. in German may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Integrated Undergraduate/Graduate (IUG) Degree Program B.A. in International Politics and Master of International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in International Politics/M.I.A. in International Affairs) provides an opportunity for strong students in International Politics to complete a master's degree with 5 total years of study.

The demand for graduate training in international affairs will grow significantly in the near future along with the burgeoning requirements for international knowledge and professional experience in commerce, humanitarian service, and public affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in politics and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations.

Admission Requirements

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the International Politics B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
5. Must provide written endorsement from the head of the undergraduate program/department.

M.I.A. Requirements for the Integrated B.A./M.I.A.

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in International Politics are listed in the Undergraduate Degree Programs Bulletin. Degree requirements for the M.I.A. degree are listed in the Master's Degree Requirements section above. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 9 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. The following 9 credits may be double-counted toward the B.A. and the M.I.A.: PL SC 415 (3), PL SC 550 (3), PL SC 554 (3). The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships

Students admitted to the School of International Affairs through the IUG with International Politics may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Integrated Undergraduate/Graduate (IUG) Degree Program B.A. in Political Science and Master of International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in Political Science/M.I.A. in International Affairs) provides an opportunity for strong students in Political Science to complete a master's degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in politics and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

The IUG degree in International Affairs and Political Science is both timely and consistent with the tradition of interdisciplinary studies at other schools of international affairs. It will also strengthen the School of International Affairs' existing collaborations and interactions with the College of the Liberal Arts.

Admission Requirements

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Political Science B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application All applicants will submit GRE scores, two letters of recommendation and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade-point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
5. Must provide written endorsement from the head of Political Science.

M.I.A. Requirements for the Integrated B.A./M.I.A.

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in Political Science are listed in the Undergraduate Degree Programs Bulletin. Degree requirements for the M.I.A. degree are listed in the Master's Degree Requirements section above. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 9 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. The following 9 credits may be double-counted toward the B.A. and the M.I.A.: PL SC 415 (3), PL SC 550 (3), PL SC 554 (3). The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships

Students admitted to the School of International Affairs through the IUG with Political Science may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Integrated Undergraduate-Graduate (IUG) Degree Program B.A. in Russian and Master of International Affairs (M.I.A.)

The integrated undergraduate-graduate (IUG) degree program (B.A. in Russian/M.I.A. in International Affairs) provides an opportunity for strong students in these majors to complete a master's degree with 5 total years of study.

An increasingly globalized economy is likely to escalate the demand for graduate training in international affairs. The career choices for graduates with this training will also expand sharply. The integrated degree program prepares students for a variety of careers requiring an interdisciplinary background in Russian and international affairs. Examples of types of entities hiring in these areas are federal, state, and local governments, international organizations, multinational corporations, international banking and financial institutions, media organizations and journalism, consulting firms, policy research centers, and development assistance programs and foundations. The School of International Affairs (SIA) Master of International Affairs (M.I.A.) represents a professional degree designed to prepare students to thrive in these increasingly global career paths.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

The number of openings in the integrated B.A./M.I.A. program is limited. Admission will be selective based on specific criteria set by the School of International Affairs. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Students must be admitted to the program prior to taking the first course they intend to count towards the graduate degree. Specific requirements:

1. Must be enrolled in the Russian B.A. program.
2. Must apply to and be accepted into The Graduate School and the M.I.A. program in the School of International Affairs. Students must complete the Graduate School application All applicants will submit GRE scores, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in international affairs and discussing their plans and goals.
3. Although the program has no fixed minimum grade point average, an applicant is generally expected to have a minimum overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
4. Must include a plan of study identifying undergraduate credits to be applied to the M.I.A. degree elective requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
5. Must provide written endorsement from the head of Germanic and Slavic Languages and Literatures.

M.I.A. Requirements for the Integrated B.A./M.I.A.

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Arts in Russian are listed in the Undergraduate Degree Programs Bulletin. Degree requirements for the M.I.A. degree are listed in the Master's Degree Requirements section above. If students accepted into the IUG program are unable to complete the M.I.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

The list of courses that can double count includes RUS 400, RUS 405, RUS 406, RUS 412, RUS 494, RUS 501, and RUS 525. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. The graduate thesis or other graduate culminating/capstone experience (including any associated credits and/or deliverables) may not be double counted towards any other degree.

Tuition Charges, Grant-in-Aid, and Assistantships

Students admitted to the School of International Affairs through the IUG with Russian may be considered to receive financial assistance. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

INTERNATIONAL AFFAIRS (INTAF) course list

Last Revised by the Department: Summer 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Faculty linked: 6/20/14; school director updated 9/16/15

Accounting (IACCT)

School of Business Administration, Penn State Harrisburg

Dr. Thomas Buttross, Accounting Program Coordinator
School of Business Administration
E355 Olmsted Building
717-948-6145

Degree Conferred: Master of Professional Accounting

Admissions Requirements

In addition to the general Graduate Council admissions requirements listed in the General Information section of the Graduate Bulletin, the following requirements will also be in place.

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

Students who apply for admission should have coursework substantially equivalent to an undergraduate degree in Business (or a business discipline) from Penn State University. If the undergraduate major is not Accounting, an applicant should have completed the following minimum core of accounting coursework (or its equivalent): ACCTG211, ACCTG310, ACCTG340, ACCTG403, ACCTG471, ACCTG472, and FIN 301.

Students should have a grade point average of at least 3.0 (on a 4.0 scale) in their final 60 credits of undergraduate coursework, both overall as well as in Accounting courses. Students must submit scores from the Graduate Management Admissions Test (GMAT) or Graduate Record Examination (GRE).
The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.
International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Degree Requirements

Students must complete a minimum of 30 credit hours of instruction; all credits must be earned in 400 level, 500 level, or 800 level courses. A minimum of 21 credits at the 500- or 800-level is required, of which at least 9 credits must be earned in 500-level courses. Students must complete the following courses:

ACCT 572	Financial Reporting I
PADM 523	Governmental and Nonprofit Accounting
ACCT 550	Professional Responsibilities and Ethics
ACCT 532	Accounting Information and Decision Systems
ACCTG 881	Financial Statement Analysis *or* ACCT 561 Financial Statement Analysis I
ACCTG 806	Advanced Topics in Taxation *or* ACCT 510 Business Tax Planning Theory and Practice
ACCT 504	Auditing Theory and Practice
BLAW 444	Advanced UCC and Commercial Transactions
ACCT 545	Strategic Cost Management
ACCTG 803	Forensic Accounting and Litigation Support

ACCTG 803 will be the capstone course for the program, integrating materials learned in the other program courses.

Courses

Graduate courses carry numbers from 500 to 699 or 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Accreditation and Certification

The Master of Professional Accounting program requirements are designed to allow a student who has completed an undergraduate degree in Accounting (or equivalent) to satisfy the current educational requirements for CPA licensure in Pennsylvania and most if not all other states*.

*note: The degree to which Texas is willing to accept on-line courses is uncertain, and they require applicants to select an ethics course from a pre-approved list. FL, KS, NJ, and WV all require 6 credit hours of Business Law, so students who desire licensure in those states must have a 3 credit undergraduate course in Business Law to complement the graduate course contemplated in this program. Students with an undergraduate degree in business are assumed to meet this requirement.

Business Administration (MBADM)

Program Home Page

Dr. Brian H. Cameron, Associate Dean for Professional Master's Program
The Smeal College of Business
220S Business Building
814-863-1460

Degree Conferred:

M.B.A.

The Graduate Faculty -- Penn State Erie, The Behrend College

- Kerry A. Adzima, Ph.D. (West Virginia University) Assistant Professor of Economics
- Pelin Bicen, Ph.D. (Texas Tech University), Assistant Professor of Marketing
- Brian L. Boscaljon, Ph.D. (Texas Tech University), Associate Professor of Finance
- Charles A. Brown, Ph.D. (Kent State University), Associate Professor of Accounting
- Michael E. Brown, Ph.D. (Pennsylvania State University), Assistant Professor of Management
- Ozgun Caliskan-Demirag, Ph.D. (Georgia Institute of Technology), Assistant Professor of Management
- Ashutosh V. Deshmukh, Ph.D. (Memphis) iMBA Program Chair; Professor of Accounting and Management Information Systems
- James Fairbank, Ph.D. (Pennsylvania State University), Associate Professor of Management
- Michael G. Filbeck, D.B.A. (University of Kentucky), Professor of Finance and Sanuel Patton Black III Chair in Insurance and Risk Management
- John L. Fizel, Ph.D. (Michigan State University), Professor of Economics
- William H.A. Johnson, Ph.D. (York University), Associate Professor of Management
- Kenneth K.T. Louie, Ph.D. (University of Illinois At Urbana-Champaign), Associate Professor of Economics
- Ido Millet, Ph.D. (University of Pennsylvania), Professor of Management Information Systems
- Diane H. Parente, Ph.D. (SUNY, Buffalo) Breene Professor of Management
- Jeffrey K. Pinto, Ph.D. (University of Pittsburgh), Professor of Management and Andrew Morrow and Elizabeth Black Chair of Management Technology
- Mary Beth Pinto, Ph.D. (Pittsburgh) Breene Professor of Marketing
- Matthew Swinarski, Ph.D. (SUNY, Buffalo) Associate Professor of Management Information Systems
- Ray R. Venkataraman, Ph.D. (Illinois Institute of Technology), Associate Professor of Management
- Ryan M. Vogel, Ph.D. (University of Georgia), Assistant Professor of Management
- Alfred G. Warner, Ph.D. (Ohio State University), Associate Professor of Management
- Xin (Jessica) Zhao, Ph.D. (SUNY at Buffalo), Associate Professor of Finance

The Graduate Faculty -- Penn State Great Valley, School of Graduate Professional Studies

- John C. Cameron, J.D., (Widener) Assistant Professor of Management & Organization
- Janice L. Dreachslin, Ph.D. (Wayne State) Professor of Health Policy and Administration
- Karen Duhala, Ph.D. (Penn State) Assistant Professor of Accounting and Finance
- Daniel Indro, Ph.D. (Indiana) Associate Professor of Finance
- Pornsit Jiraporn, Ph.D. (Southern Illinois) Associate Professor of Finance
- Sang Mook Lee, Ph.D., CFA (Temple) Assistant Professor of Finance
- Barrie E. Litzky, Ph.D. (Drexel) Associate Professor of Management and Organization
- Bo Ouyand, Ph.D. (University of Texas - Arlington) Assistant Professor of Accounting
- Simon J. Pak, Ph.D. (University of California - Berkeley) Associate Professor of Finance
- Denise Potosky, Ph.D. (Rutgers) Associate Professor of Management
- Qiang (Patrick) Qiang, Ph.D. (Massachusetts - Amherst) Associate Professor of Operations and Management
- Sagnika Sen, Ph.D. (Arizonia State) Associate Professor of Management Information Systems
- John J. Sosik, Ph.D., CPA, CMA (SUNY at Binghamton) Professor of Management and Organization
- Eric Stein, Ph.D. (Wharton) Associate Professor of Management and Science and Information Systems
- Cynthia (Cyndy) Walton, Ph.D. (University of Florida) Assistant Professor of Management and Organization
- Walter Wang, Ph.D. (Louisiana State) Associate Professor of Marketing

The Graduate Faculty -- Penn State Harrisburg, The Capital College

- Mohammad Ali, Ph.D. (Rutgers, State University of New Jersey), Assistant Professor of Management
- Thomas Amlie, Ph.D. (University of Maryland College Park), Associate Professor of Accounting
- Ozge Aybat, Ph.D. (City College City University of New York), Assistant Professor of Marketing
- Nihial Bayraktar, Ph.D. (University of Maryland College Park), Associate Professor of Economics
- Melvin Blumberg, Ph.D. (Pennsylvania State University) Professor of Management
- Richard Brown, Ph.D. (Temple University) Assistant Professor of Management
- Qiang Bu, Ph.D. (University of Massachusetts In Amherst), Associate Professor of Finance
- David Buehler, Ph.D. (University of North Carolina At Chapel Hill), Assistant Professor of Economics
- Thomas Buttross, Ph.D. (Mississippi) Associate Professor of Accounting
- Refik Culpan, Ph.D. (NYU) Professor of Management and International Business
- Patrick Cusatis, Ph.D. (Penn State) Associate Professor of Finance
- Janet M. Duck, Ph.D. (Penn State) Assistant Professor of Management
- Jeffrey R. Foreman, Ph.D. (Georgia State University), Assistant Professor of Marketing
- Raymond K. Gibney Jr., Ph.D. (University of Pittsburgh), Associate Professor of Management
- Susan F. Havranek, Ph.D. (Arizona State University), Assistant Professor of Accounting
- Indrit Hoxha, Ph.D. (University of Houston, Assistant Professor of Economics
- Meng-Hua Hsieh, Ph.D. (University of Washington), Assistant Professor of Information Systems
- Erdener Kaynak, Ph.D. (Cranfield University), Professor of Marketing
- William A. Kline, Ph.D. (Temple University), Assistant Professor of Management
- Mukund S. Kulkarni, Ph.D. (University of Kentucky), Chancellor; Professor of Finance
- Roderick Lee, Ph.D. (Pennsylvania State University), Associate Professor of Information Systems
- Bruce H. Lubich, Ph.D. (Pennsylvania State University), Assistant Professor of Accounting
- David A. Morand, Ph.D. (Cornell) Professor of Management
- Dinesh Pai, Ph.D. (Rutgers, State University of New Jersey), Assistant Professor of Supply Chain Management
- Parag C. Pendharkar, D.B.A. (Southern Illinois University - Charbondal), Professor of Information Systems
- Robert D. Russell, Ph.D. (University of Pittsburgh), Assistant Professor of Management
- Stephen P. Schappe, Ph.D. (Ohio State University), Director, School of Business Administration; Associate Professor of Management
- Richard Scheib, J.D. (Georgetown University), Instructor of Accounting and Business Law
- Girish H. Subramanian, Ph.D. (Temple University), Professor of Information Systems
- Peter F. Swan, Ph.D. (University of Michigan at Ann Arbor), Associate Professor of Logistics and Operations Management
- Zinaida Taran, Ph.D. (Rutgers, State University of New Jersey), Assistant Professor of Marketing
- Oranee Tawatnuntachai, Ph.D. (University of New Orleans), Associate Professor of Finance
- Premal P. Vora, Ph.D. (Pennsylvania State University), Associate Professor of Finance
- Sabri Yilmaz, Ph.D. (Southern Illinois University of Carbondal), Instructor in Economics
- Richard Young, Ph.D. (Penn State) Professor of Supply Chain Management

The Graduate Faculty -- The Smeal College of Business

- Aydin Alptekinoglu, Ph.D. (University of California Los Angeles), Associate Professor of Supply Chain Management
- Brent W. Ambrose, Ph.D. (University of Georgia) Smeal Professor of Real Estate; Director, Institute for Real Estate Studies, Professor of Insurance and Real Estate
- Orie E. Barron, Ph.D. (University of Oregon), Professor of Accounting and PricewaterhousCoopers, LLP Research Fellow
- Russell R. Barton, Ph.D. (Cornell University), Professor of Supply Chain and Information Systems, and Industrial Engineering; Co-Director, MMM Degree Program; Associate Director, CMTOC
- John Baumgartner, Ph.D. (Stanford University), Professor of Marketing
- Lisa Bolton, Ph.D. (University of Florida), Professor of Marketing
- Forrest S. Briscoe, Ph.D. (Massachusetts Institute of Technology), Associate Professor of Labor Studies and Industrial Relations, and Sociology
- Jonathon Bundy, Ph.D. (University of Georgia), Assistant Professor of Management and Organization
- Daniel R. Cahoy, J.D. (Franklin University), Associate Professor of Business Law
- Brian H. Cameron, Ph.D. (Pennsylvania State University), Associate Dean for Professional Masters, Clinical Professor of Management Information Systems, Smeal College of Business; Affiliate Faculty of Information Sciences and Technology
- Quanwei (Charles) Cao, Ph.D. (Univesity of Chicago), Smeal Chair Professor in Finance
- Jennifer Coupland Chang, Ph.D. (Northwestern University), Clinical Professor in Marketing
- Franis (Frank) L. Chelko, M.M. (Pennsylvania State University), Instructor of Operations and Supply Chain Management
- Dane M. Christensen, Ph.D. (University of Arizona), Assistant Professor of Accounting
- Scott Collins, Ph.D. (Claremont Graduate School and University), Clinical Assistant Professor of Accounting
- Keith J. Crocker, Ph.D. (Carnegie-Mellon University), The William Elliott Professor of Insurance and Risk Management
- Robert P. Crum, D.B.A. (Kentucky) Associate Professor of Accounting
- Wayne S. DeSarbo, Ph.D. (University of Pennsylvania), Smeal Distinguished Chaired Professor of Marketing
- Min Ding, Ph.D. (University of Pennsylvania), Smeal Professor of Marketing & Innovation
- Mark W. Dirsmith, Ph.D. (Northwestern University), Deloitte & Touche Professor of Accounting
- Kai Du, Ph.D. (Yale University), Assistant Professor of Accounting
- D. Lance Ferris, Ph.D. (University Of Waterloo), Associate Professor of Management and Organization
- Laura B. Field, Ph.D. (University Of California Los Angeles), Professor of Finance
- Duncan K. Fong H., Ph.D. (Perdue University West Lafatette), Calvin E. and Pamala T. Zimmerman Endowed Fellow & Professor of Marketing
- Raghu Garud, Ph.D. (University Of Minnesota Minneapolis), Alvin H. Clemens Professor of Entrepreneurial Studies
- Fariborz Ghadar, D.B.A. (Harvard University), Director, Center for Global Business Studies; William A. Schreyer Professor of Global Management, Policies, and Planning
- Dennis A. Gioia, Ph.D. (Florida State University), Chair, Department of Management and Organization; Robert & Judith Auritt Klein Professor of Management
- Gary L. Gittings, Ph.D. (Pennsylvania State University), Instructor of Supply Chain Management
- Dan Givoly, Ph.D. (New York University), Ernst & Young Professor of Accounting
- Guojin Gong, Ph.D. (University Of Iowa), Assistant Professor of Accounting
- Jeremiah Green, Ph.D. (University of North Carolina at Chapel Hill), Assistant Professor of Accounting
- V. Daniel Guide Jr., Ph.D. (University of Georgia), Professor of Operations and Supply Chain Management; Charles & Lillien Binder Faculty Fellow
- Matthew Gustafson, Ph.D. (University of Rochester), Assistant Professor of Finance
- Donald C. Hambrick, Ph.D. (Pennsylvania State University), Smeal Chaired Professor of Management
- Terry Paul Harrison, Ph.D. (University of Tennessee at Knoxville), Professor of Supply Chain and Information Systems; Earl P. Strong Executive Education Professor in Business
- David Haushalter, Ph.D. (Perdue University West Lafayette), Associate Professor of Finance; Academic Director Smeal Trading Room
- John Howell, Ph.D. (Ohio State University), Assistant Professor of Marketing
- Jingzhi (Jay) Huang, Ph.D. (Northwestern University), Professor of Finance; David H. McKinley Professor of Business
- Zan Huang, Ph.D. (University of Arizona), Assistant Professor of Supply Chain and Information Systems
- Steven J. Huddart, Ph.D. (Yale University), Smeal Chair Professor of Accounting
- David J. Huff, Ph.D., Clinical Assistant Professor of Supply Chain Managements
- Stephen E. Humphrey, Ph.D. (Michigan State University), Professor of Management
- Peter Iliev, Ph.D. (Brown University), Assistant Professor of Finance
- Austin J. Jaffe, Ph.D. (University of Illinois at Urbana-Champaign), Chair, Department of Insurance and Real Estate; Philip H. Sieg Professor of Business Administration; Director, International Programs; Associate Director, Institute for Real Estate Studies
- Edward Jenkins, M.S. (Villanova University), Instructor in Accounting
- Pranav Jindal, Ph.D., Assistant Professor of Marketing
- Aparna Joshi, Ph.D. (Rutgers, State University of New Jersey), Professor of Management and Organization
- Eelco Kappe, Ph.D. (Erasmus Universiteit Rotterdam), Assistant Professor of Marketing
- Edward Ketz, Ph.D. (Virginia Tech) Associate Professor of Accounting
- Eunice Kim, Ph.D. (Yale University), Assistant Professor of Marketing
- Jason Kotter, Ph.D. (University of Michigan at Ann Arbor), Assistant Professor of Finance
- William A. Kracaw, Ph.D. (University of Utah), Chair, Department of Finance; Sykes Professor of Finance
- Glen E. Kreiner, Ph.D. (Arizona State University), Associate Professor of Management
- Mirko Kremer, Ph.D. (University Of Mannheim), Assistant Professor of Supply Chain Management
- Akhil Kumar, Ph.D. (University of California at Berkeley), Professor of Information Systems
- Alok Kumar, Ph.D. (University Of Wisconsin-Madison), Assistant Professor of Marketing
- Anthony M. Kwasnica, Ph.D. (California Institute Of Technology), Associate Professor of Business Economics; Laboratory for Economic Management and Auctions
- Benjamin Lansford, Ph.D., Clinical Associate Professor and MACC Director
- Rick Laux, Ph.D. (Arizona State University), Assistant Professor of Accounting
- Anh Le, Ph.D. (New York University), Assistant Professor of Finance
- Stephen Lenkey, Ph.D. (Carnegie-Mellon University), Assistant Professor of Finance
- Flynt Leverett, Ph.D. (Princeton University), Professor of International Affairs
- John Liechty, Ph.D. (Cambridge University), Professor of Marketing and Statistics
- Gary L. Lilien, D.E.S. (Columbia University), Distinguished Research Professor of Management Science; Research Director, Institute for the Study of Business Markets
- Dennis K. Lin J., Ph.D. (University Of Wisconsin-Madison), University Distinguished Professor of Statistics and Supply Chain Management
- Henock Louis, Ph.D. (Ohio State University), Associate Professor of Accounting
- Razvan Lungeanu, Ph.D. (Northwestern University), Assistant Professor in Management and Organization
- Kenneth Lusht, Chair, Department of Insurance and Real Estate; Professor of Business Administration; Zimmerman Endowed University Fellow
- Robert Macy, Ph.D., Clinical Assistant Professor of Entrepreneurship
- Vidya Mani, Ph.D. (University of North Carolina at Chapel Hill), Assistant Professor of Supply Chain Management
- Meg Meloy, Ph.D. (Cornell University), Professor of Marketing
- James A. Miles, Ph.D. (Pennsylvania State University), Professor of Finance; Joseph F. Bradley Fellow of Finance
- Vilmos F. Misangyi, Ph.D. (University of Florida), Associate Professor of Management
- Karl A. Muller, Ph.D. (University of Illinois at Urbana-Champaign), Associate Professor of Accounting and Robert and Sandra Poole Faculty Fellow in Accounting
- Chris J. Muscarella, Ph.D. (Perdue University West Lafatette), Professor of Finance; L.W. "Roy" and Mary Lois Clark Teaching Fellow
- Suresh Muthulingam, Ph.D. (University Of California Los Angeles), Assistant Professor of Supply Chain Management
- Giang Nguyen, Ph.D. (University of North Carolina at Chapel Hill), Assistant Professor of Finance
- Robert A. Novack, Ph.D. (University of Tennessee at Knoxville), Associate Professor of Supply Chain Management and Information Systems
- Ralph A. Oliva, Ph.D. (Rensselaer Polytechnic Institute), Professor of Marketing; Executive Director, Institute for the Study of Business Markets
- Christopher D. Parker, Ph.D. (London Business School), Assistant Professor of Supply Chain Management
- Srikanth Paruchuri, Ph.D. (Columbia University), Associate Professor of Management and Organization
- J. Andrew Petersen, Ph.D. (University of Connecticut), Associate Professor of Marketing
- Nicholas C. Petruzzi, Ph.D. (Purdue University Fort Wayne), Professor of Supply Chain Management
- Timothy Pollock, Ph.D. (University of Illinois at Urbana-Champaign), Farrell Professor of Entrepreneurship
- Lisa L. Posey, Ph.D. (University of Pennsylvania), Associate Professor of Business Administration

- Hong Qu, Ph.D. (Carnegie-Mellon University), Assistant Professor of Accounting
- Arvind Rangaswamy, Ph.D. (Northwestern University), Jonas H. Anchel Professor of Marketing
- Sajay Samuel, Ph.D. (Pennsylvania State University), Clinical Professor of Accounting
- Arnold F. Shapiro, Ph.D. (University of Pennsylvania), Professor of Business Administration and Robert G. Schwartz University Endowed Fellow
- Jeffery M. Sharp, J.D. (University OF Oklahoma), Associate Professor of Business Law
- Dennis P. Sheehan, Ph.D. (University of California at Berkeley), The Virginia and Louis Benzak Professor of Finance
- Jun Shu, Ph.D. (University of California at Berkeley), Assistant Professor of Supply Chain and Information Systems
- Timothy T. Simin, Ph.D. (University of Washington), Associate Professor of Finance
- Johanna Slot, Ph.D. (Universiteit Van Tilburg), Assistant Professor of Marketing
- Charles Snow, Ph.D. (University of California at Berkeley), Professor of Business Administration; Mellon Foundation Faculty Fellow
- Fenghua Song, Ph.D. (Washington University), Associate Professor of Finance
- John C. Spychalski, Professor of Business Logistics
- Shrihari Sridhar, Ph.D. (University Of Missouri, Columbia), Associate Professor of Marketing
- Alan J. Stenger, Ph.D. (University Of Minnesota Minneapolis), Professor of Supply Chain Management
- John M. Stevens, Ph.D., M.B.A. (SUNY Buffalo State), Professor of Management and Organization
- Amy Xue Sun, Ph.D. (Carnegie-Mellon University), Assistant Professor of Accounting
- Peter F. Swan, Ph.D. (University of Michigan at Ann Arbor), Associate Professor of Logistics and Operations Management
- Douglas J. Thomas, Ph.D. (Georgia Institute Of Technology), Associate Professor of Supply Chain and Information Systems
- James B. Thomas, Ph.D. (University Of Texas At Austin), Professor of Information Sciences and Management
- Evelyn A. Thomchick, Ph.D. (Clemson University), Associate Professor of Supply Chain Management
- Linda K. Trevino, Ph.D. (Texas A & M University), Professor of Organizational Behavior and Ethics; Distinguished Professor
- Wenpin Tsai, Ph.D. (University Of London), John Arnold Professor of Management
- John E. Tyworth, Ph.D. (University Of Oregon), Chair, Department of Supply Chain Management and Information Systems; Professor of Supply Chain Management
- Joel Vanden, Ph.D. (University of California at Berkeley), Associate Professor of Finance
- Albert Vicere, D.Ed. (Pennsylvania State University), Professor of Business Administration
- Veronica Villena, Ph.D. (IE Business School), Assistant Professor of Supply Chain Management
- Lei Wang, Ph.D. (University of Connecticut), Assistant Professor of Information Systems
- Hal D. White, Ph.D. (Pennsylvania State University), Associate Professor of Accounting
- Charles Whiteman, Ph.D. (University Of Minnesota Minneapolis), Professor and Dean; John and Becky Surma Dean
- Karen Winterich, Ph.D. (University of Pittsburgh), Frank & Mary Smeal Research Fellow, Associate Professor of Marketing
- J. Randall Woolridge, Ph.D. (University Of Iowa), Professor of Finance and The Goldman Sachs & Co. and Frank P. Smeal Endowed University Fellow; President, Nittany Lion Fund, LLC
- Biqin Xie, Ph.D. (University Of Southern California), Assistant Professor of Accounting
- Jiro Yoshida, Ph.D. (University of California at Berkeley), Assistant Professor of Business
- Alexey Zhdanov, Ph.D. (University of Rochester), Assistant Professor of Finance

The Penn State Online Master of Business Administration is an online degree program of Penn State Erie, The Behrend College; Penn State Great Valley, The School of Graduate Professional Studies; Penn State Harrisburg, the Capital College; and Penn State University Park, the Smeal College of Business. The online M.B.A. curriculum emphasizes cross-functional organizational thinking; focuses on solving business problems; closely follows the quality guidelines for accreditation of AACSB (American Assembly of Collegiate Schools of Business), the accrediting body affiliated with The International Association for Management Education; and uses cutting-edge instructional technology to transcend issues of time and space to support effective teaching and learning.

Within the context of these goals, the online M.B.A. curriculum was developed around core business skills. The skills the program helps to develop include "soft skills" such as managing and leading people and teams, analytical skills such as data analytic decision making, and integrative skills that allow students to understand, analyze, and suggest solutions to significant business problems that cross functional areas of business.

These different skills are integrated at the course level. Students apply knowledge developed in these areas to multidimensional problems and issues throughout the program. The program is offered online but includes a required one-week residential experience at the start of the program.

Admission Requirements

Admission is granted only to candidates who demonstrate high promise of success for graduate work. Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.Applicants apply for admission to the program via the Graduate School application for admission.

Applicants are required to submit scores from the Graduate Management Admission Test (GMAT) or Graduate Record Exam (GRE); the test may be waived for students with extensive experience or advanced degrees at the discretion of the program.

Admissions decisions are based on a review of a complete admission portfolio, including an application, a statement of intent, a current resume, official transcripts from all post-secondary institutions attended, two letters of recommendation, and GMAT or GRE scores.

No specific prior course of study is required to be admitted. Applicants come from a wide range of backgrounds. Students entering the program are required to have a working knowledge of the Microsoft Office suite.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The online M.B.A. degree requires a minimum of 48 credits, including 39 credits of the following core required courses: MBADM 810 (3), MBADM 811 (3), MBADM 812 (3), MBADM 813 (3), MBADM 814 (3), MBADM 815 (3), MBADM 816 (3), MBADM 820 (3), MBADM 821 (3), MBADM 822 (3), MBADM 531 (3), MBADM 571 (3), MBADM 830 (3), and 9 credits of electives. At least 6 credits must be earned at the 500 level.

For students with exceptional credentials, MBADM 811, MBADM 812, and MBADM 813 may be waived. Students must petition the head of the graduate program to obtain a waiver for these courses, and students' credentials will be reviewed to assess their eligibility for a waiver. Obtaining a waiver for MBADM 811, MBADM 812, and MBADM 813 will not reduce the minimum 48 credits required for the degree. Alternate courses may be substituted for the courses waived.

The culminating experience for the Online MBA is MBADM 571, Global Strategic Management. As the course title implies, MBADM 571 gives students a view of the whole firm and helps them understand how finance, marketing, and operations collectively support the strategy and mission of the firm. Students in this course will typically analyze their own firm to give them a comprehensive understanding of how the firm intends to achieve its goals.

Attendance at a one-week Residency Experience at the start of the program is mandatory. Following the online MBA course schedule, which involves completing credits in six consecutive semesters, a student can complete the program in two years.

Other Relevant Information

The online MBA is an online graduate degree program delivered via World Campus. Students must be computer literate and have immediate, ready, and reliable access to a computer and the Internet. Although not all aspects of the course are delivered via electronic media, Internet access is required to successfully complete the course of instruction, as well as participate in online discussion groups. See World Campus Technical Requirements for the most current technical requirements.

Students are required to complete the one-week residency experience. No alternatives and substitutions are possible.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

MASTER OF BUSINESS ADMINISTRATION online course list

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-01-000

Review Date: 8/23/16

Faculty last updated: 8/23/16

Homeland Security

Program Home Page

ALEXANDER SIEDSCHLAG, Ph.D., Chair, Homeland Security Graduate Programs
Professor of Homeland Security and Public Health Preparedness
W160M Olmsted Building
Penn State Harrisburg
777 West Harrisburg Pike
Middletown, PA 17057
Phone: 717-948-4326; Fax: 717-948-6320
Email: aus50@psu.edu

Degree Conferred

M.P.S.

Graduate Faculty

The Program

The intercollege Master of Professional Studies in Homeland Security (*i*MPS-HLS) degree program is designed to prepare professionals and develop leaders for the field of homeland security by providing exceptional graduate education that includes an integrated curriculum, expert faculty, and student interaction. The program is comprised of courses from several Penn State colleges and delivered via distance education through the Penn State World Campus to accommodate the needs and careers of professionals who are already active in homeland security and related fields of civil security, or those interested in transitioning into the field. The program provides select graduate students with an integrated, cross-disciplinary curriculum that is focused on a set of unified educational goals to help them understand and manage the complexities of homeland security in a global environment. Within the degree program and in addition to its common core curriculum, students choose the base program or one of six options that represent main elements, capabilities, and risk-informed priorities of the homeland security mission space: agricultural biosecurity and food defense; counterterrorism; cyber threat analytics and prevention; geospatial intelligence; public health preparedness; and information security and forensics. The participating academic units for this collaborative program are: Penn State Harrisburg; the College of Medicine (in collaboration with the Milton S. Hershey Medical Center); the College of the Liberal Arts; the College of Earth and Mineral Sciences; the College of Agricultural Sciences; and Penn State Great Valley.

General Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

Core Application Packet

- Completed online Graduate School application and payment of nonrefundable application fee
- Statement of purpose
- Vita or résumé
- Three letters of recommendation
- official transcripts from all post-secondary institutions attended

Statement of Purpose and Curriculum Vitae

A statement of professional experience and goals (up to 500 words) and the candidate's vita or résumé must accompany the application.

Letters of Recommendation

- The individuals writing letters should be familiar with you and comfortable discussing your professional and/or academic strengths and accomplishments.
- The Admissions Committee prefers that all letters be written within the last six months and reference the applicant's current career goals and/or ability to perform graduate level study.
- A person choosing to submit a letter of reference will do this through the online application process and either select our pre-formatted template or upload his/her own letter.

GPA Requirements

The candidate grade-point average is interpreted by the Admissions Committee in the context of a completed application.

GRE Requirements

The Graduate Record Examination may be required by some options.

Other Considerations

Special backgrounds, abilities, and interests related to homeland security are desirable.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The Master of Professional Studies in Homeland Security program requires a minimum of 33 credits, 24 of which must be earned at Penn State. Up to 10 graduate credits may be transferred in from a regionally accredited institution (as is permissible by Graduate Council policy); if the full 10 credits are transferred, the minimum total number of credits in the degree program will be 34. At least 18 credits must be courses at the 500 or 800 level, of which 6 credits must be in 500-level courses. Students are expected to maintain a B (3.0) or better average in academic courses to be retained in the program. Graduate Council policyrequires that student must have a GPA of 3.0 or above in order to graduate from the program. Each student will take a 9 credit *core curriculum* consisting of HLS/PADM 801, HLS/PHIL 803, and HLS/PLSC 805, as well as of a non-credit Orientation Course. Students will also take 12 credits of prescribed courses for the specialized option. There are 9 elective credits that are chosen from an approved list in consultation with the student's academic adviser. The list of electives is maintained by the Option Director and is provided to the students in the option. Finally, each degree candidate must complete a capstone project on a topic related to homeland security and defense, in association with HLS/AGBIO/GEOG/INSC/IST/PHP/PLSC 594 - Research Topics.

Time Limitation
All degree requirements for the Master of Professional Studies in Homeland Security must be met within five years of admission to degree status.

Prescribed Courses

Homeland security refers to the unifying core for the vast global network of organizations and institutions that are involved in the efforts to secure society. Regardless of field of specialization, or chosen discipline for graduate study, all professionals in the program will participate in a Unifying Core Curriculum with the following educational goals and objectives:

- Understand major policies and legislation that shapes homeland security in a globalized society.
- Become familiar with organizations that play a key role in the implementation of homeland security policies and administration, and recognize the interactions among them.
- Understand the way in which a person or group responds to a set of conditions so as to prevent and respond to incidents and catastrophic events when needed.
- Recognize the impact that catastrophic events, both natural and man-made, have on society and the domestic and global economy.
- Identify and assess potential threats, vulnerabilities, and consequences.
- Apply leadership skills and principles that are necessary for producing and acting on information of value within a collaborative setting.
- Communicate effectively in the context of particular institutional cultures.
- Use, conduct, and interpret research and data effectively in decision-making.
- Practice ethics and integrity as a foundation for analytical debate and conclusion.
- Develop an appreciation of the cultural, social, psychological, political, and legal aspects of terrorism and counterterrorism.

The Core Curriculum consists of the following four courses:

HLS ORIENTATION: Orientation course (non-credit) Overview of program expectations, parts, academic specialization areas, and mechanics; as well as an essential overview of the field of homeland security and its community of practice. The Options may add content to aspects of homeland security that are specific to their academic specialization area.

HLS/PADM 801: Homeland Security Administration: Policies and Programs (3) Foundation for understanding homeland security history, the development of homeland security policies and organizations, and current management approaches.

HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3) This course examines the social, political, legal, and ethical issues that arise in the context of homeland security.

HLS/PLSC 805: Violence, Threats, Terror, and Insurgency (3) Provides an overview of the domestic and global issues related to homeland security.

Listed below are the courses required/suggested for the Base Program and for the Options:

Homeland Security (Base Program)

Director: Dr. Alexander Siedschlag, Ph.D. (Univ Munich, Germany) Professor of Homeland Security and Public Health Preparedness, School of Public Affairs; Program Chair, iMPS-Homeland Security, W160 Olmsted Building, Penn State Harrisburg; 717-948-4326; aus50@psu.edu

Core Curriculum
HLS ORIENTATION: Orientation course (non-credit)
HLS/PADM 801: Homeland Security Administration: Policies and Programs (3)
HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)
HLS/PLSC 805: Violence, Threats, Terror, and Insurgency (3)

Prescribed Courses
HLS 811: Fundamentals of Homeland Security (3)
HLS/PADM 404: Homeland Security and Defense in Practice (3)
HLS/PADM 802: Collaboration and Integration: Multifaceted Approaches to Homeland Security (3)
HLS 804: Strategic Planning and Organizational Imperatives in Homeland Security and Defense (3)

Electives
Choose 9 credits from an approved elective list in consultation with adviser. The list of electives is maintained by the Base Program Director and is provided to the students in the base program.

Capstone Experience
HLS 594: Research Topics (3)

Agricultural Biosecurity and Food Defense Option

Director: Gretchen Kuldau, Ph.D. (California) Associate Professor of Plant Pathology
0205 Buckout Laboratory, University Park; 814 863 7232; kuldau@psu.edu

Core Curriculum
HLS ORIENTATION: Orientation course (non-credit)
HLS/PADM 801: Homeland Security Administration: Policies and Programs (3)
HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)
HLS/PLSC 805: Violence, Threats, Terror, and Insurgency (3)

Prescribed Courses
AGBIO 520: Agricultural Biosecurity: Protecting a Key Infrastructure (3)
AGBIO 521: Food Defense: Prevention Planning For Food Processors (3)
AGBIO 801: Veterinary Infectious Disease Diagnostic and Surveillance Systems (3)
AGBIO 802: Plant Protection: Responding to Introductions of Threatening Pest and Pathogens (3)

Electives
Choose 9 credits from an approved elective list in consultation with adviser. The list of electives is maintained by the Option Director and is provided to the students in the option.

Capstone Experience
AGBIO 594: Agricultural Biosecurity and Food Defense - Capstone Experience (3)

Counterterrorism Option

Director: James Piazza, Ph.D. (New York University), Professor of Political Science, 330 Pond Lab, University Park; (814) 867-4429; jap45@psu.edu

Core Curriculum
HLS ORIENTATION: Orientation course (non-credit)
HLS/P ADM 801: Homeland Security Administration: Policies and Programs (3)
HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)
HLS/PLSC 805: Violence, Threats, Terror, and Insurgency (3)

Prescribed Courses
PLSC 836: Root Causes of Terrorism (3)
PLSC 569: Counterterrorism (3)
PLSC 838: Tools and Analysis of Terrorism and Counterterrorism (3)
PLSC 837: Radicalization, Counter Radicalization, and De-Radicalization (3)

Electives
Choose 9 credits from an approved elective list in consultation with adviser. The list of electives is maintained by the Option Director and is provided to the students in the option.

Capstone Experience
PLSC 594: Research in Political Science (3)

Cyber Threat Analytics and Prevention Option

Director: Robin Qiu, Ph.D., Professor of Information Science, School of Graduate Professional Studies, Penn State Great Valley; 610-725-5313; robinqiu@psu.edu

Core Curriculum
HLS ORIENTATION: Orientation course (non-credit)
HLS/P ADM 801: Homeland Security Administration: Policies and Programs (3)
HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)
HLS/PLSC 805: Violence, Threats, Terror, and Insurgency (3)

Prescribed courses
SWENG 545: Data Mining (3)
IN SC 561: Web Security and Privacy (3)
IN SC 846: Network and Predictive Analytics for Socio-Technical Systems (3)
IST 564: Crisis, Disaster, and Risk Management (3)

Electives
Choose 9 credits from an approved elective list in consultation with adviser. The list of electives is maintained by the Option Director and is provided to the students in the option.

Capstone Experience
IN SC 594: Research projects (3)

Geospatial Intelligence Option

Director: Gregory Thomas, Ph.D. (Indiana University of PA), Professor of Practice for Geospatial Intelligence, 2217 Earth and Engineering Sciences Building, University Park; (814) 867-1471; gat5@psu.edu

Core Curriculum
HLS ORIENTATION: Orientation course (non-credit)
HLS/PADM 801: Homeland Security Administration: Policies and Programs (3)
HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)
HLS/PLSC 805: Violence, Threats, Terror, and Insurgency (3)

Prescribed Courses
GEOG 882: Geographic Foundations of Geospatial Intelligence (3)
GEOG 483: Problem Solving with GIS (3)
GEOG 480: Exploring Imagery and Elevation Data in GIS Applications (3)
GEOG 885: Advanced Analytic Methods for Geospatial Intelligence (3)

Electives
Choose 9 credits from an approved elective list in consultation with adviser. The list of electives is maintained by the Option Director and is provided to the students in the option.

Capstone Experience
GEOG 594A: Research Topics: Analytic Experience in Geospatial Intelligence (1)
GEOG 594B: Research Topics: Geospatial Intelligence Capstone Experience (2)

Information Security and Forensics Option

Director: Peter Forster, Ph.D. (Penn State) Senior Lecturer of Information Sciences and Technology, and Management Science and Associate Dean 332P Information Sciences and Technology Building, University Park; 814-863-8304; pkf1@psu.edu

Core Curriculum
HLS ORIENTATION: Orientation course (non-credit)
HLS/PADM 801: Homeland Security Administration: Policies and Programs (3)
HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)
HLS/PLSC 805: Violence, Threats, Terror, and Insurgency (3)

Prescribed Courses
IST 454: Computer and Cyber Forensics (3)
IST 456: Information Security Management (3)
IST 815: Information Security and Assurance (3)
IST 554: Network Management and Security (3)

Electives
Choose 9 credits from an approved elective list in consultation with adviser. The list of electives is maintained by the Option Director and is provided to the students in the option.

Capstone Experience
IST 594: Research Topics (3)

Public Health Preparedness Option

Director: Eugene J. Lengerich, V.M.D., M.S., Professor, Public Health Sciences, Penn State College of Medicine, MC H070; 500 University Drive; Hershey, Pennsylvania; 717-531-6066; PHP_Programs@psu.edu

Core Curriculum
HLS ORIENTATION: Orientation course (non-credit)
HLS/PADM 801: Homeland Security Administration: Policies and Programs (3)
HLS/PHIL 803: Homeland Security: Social and Ethical Issues (3)
HLS/PLSC 805: Violence, Threats, Terror, and Insurgency (3)

Prescribed Courses
PHP 410: Public Health Preparedness for Disaster and Bioterrorism Emergencies I (3)
PHP 510: Public Health Preparedness for Disaster and Bioterrorism Emergencies II (3)
PHP 527: Public Health Evaluation of Disasters and Bioterrorism (3)
PHP 530: Critical Infrastructure Protection of Health Care Delivery Systems (3)

Electives
Choose 9 credits from an approved elective list in consultation with adviser. The list of electives is maintained by the Option Director and is provided to the students in the option.

Capstone Experience
PHP 594: Research Topics (3)

Student Aid

World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section of the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer Session 2017

Blue Sheet Item #: 46-01

Review Date: 8/22/2017

Faculty linked: 9/1/15

Information Science (IN SC)

Program Home Page

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610-725-3335

COLIN J. NEILL, *Associate Professor and Director of Engineering Programs*
School of Graduate Professional Studies
Penn State Great Valley, Engineering Division
610-648-3277
www.sgps.psu.edu

Degree Conferred:

M.S. in Information Science

The Graduate Faculty

The Program

The graduate program in Information Science is designed to enable students to contribute to the development, implementation, and utilization of information technologies by providing a balance of theory and practice. Students gain insight in the role and management of emerging information technologies to gain competitive advantage.

Admission Requirements

Students who have a baccalaureate degree in information systems, information science or other quantitative, scientific, or business discipline and those with experience in information technology will be considered for admission to the program. Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Students should have earned at least a 3.00 junior/senior average(on a 4.00 scale) in their baccalaureate program. Although not required, scores from the Graduate Record Examinations (GRE) or the Graduate Management Admissions Test (GMAT) will be considered by the admissions committee if submitted. If the admissions committee determines an area of weakness or insufficient baccalaureate preparation, the student may be required to take one or both pre-program requirement courses (IST 441 and SWENG 400). Pre-program requirements do not count toward the 33-credit program total. Scores from the Test of English as a Foreign Language (TOEFL) are required of international applicants at the time of application. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 119 on the speaking section for the internet-based test. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Program Requirements

The requirement for the degree is 33 credits, consisting of 18 credits of required core courses (IN SC 431, IN SC 521, IN SC 525, IN SC 526, INFSY 560, INFSY 563), 12 credits approved electives, selected with the assistance of a graduate adviser, followed by an integrative capstone course, which includes a master's paper (IN SC 539). A grade-point average of at least 3.0 must be achieved, with at least 18 credits at the 500 level. Students lacking adequate preparation may be required to take one or both of the pre-program requirement courses (IST 441 and SWENG 400). Pre-program requirements do not count toward the 33-credit program total.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

INFORMATION SCIENCE (IN SC) course list

INFORMATION SCIENCES AND TECHNOLOGY (IST) course list

INFORMATION SYSTEMS (INFSY) course list

Last Revised by the Department: Fall Semester 2012

Blue Sheet Item #: 41-03-19

Review Date: 11/13/2012

Faculty linked: 1/13/16

Information Systems (INFSY)

Program Home Page

GIRISH H. SUBRAMANIAN, *Program Director*
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MSIShbg@psu.edu

Degree Conferred

M.S.

The Graduate Faculty

The Program

Operating under the auspices of the School of Business Administration, Penn State Harrisburg's master's degree program in information systems is designed to meet the rapidly increasing need for technically grounded, upper-level information resources managers within business organizations. With the exception of a small percentage of students who are full-time, the students served by the M.S.I.S. program are employees of area businesses, state and local governments, and not-for-profit organizations who study on a part-time basis. In order to accommodate both full- and part-time students, courses are primarily offered in the evening.

The two-fold nature of the program requires a manager to have competence both in information technology and in management theory; therefore, the curriculum combines the highly technical content of information science with the managerial emphasis of information systems. Unlike computer science programs, which tend to focus on computer hardware and architecture, this program is organized around applied computer-based activities, the development of communication skills, and managerial principles.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission.

Admission decisions are based primarily on undergraduate junior-senior grade-point average and the Graduate Management Admissions Test (GMAT) scores or Graduate Record Exam (GRE) scores. Post-baccalaureate course work, professional experience, and the statements provided in the application are also taken into account.

Students are also required to submit the following:

- a completed Graduate School application with application fee
- official transcripts from all post-secondary institutions attended;
- official scores from the GMAT test or GRE test (the test must have been taken within the past five years); and
- letters of recommendation (optional)

Application Dates

Candidates may enter the program at the beginning of the fall, spring, or summer session. To allow time for applications to be processed, all information, including GMAT or GRE score, must be received by Graduate Enrollment Services no later than July 18 for admission to the fall semester, November 18 for admission to the spring semester, and April 18 for admission to the summer session.

Applicants from outside the United States must follow the early admission dates in order to allow the necessary clearances and paperwork to be processed in time. International application deadline dates are:

- Fall Semester--May 31
- Spring Semester--September 30
- Summer Session--February 28

To be considered for a graduate assistantship, applicants must submit a complete application by March 1.

Entry Requirements

Credits obtained to fulfill entry and pre-program requirements cannot be applied towards the requirements for the degree.

Analytic Skills Requirement: Prior to enrolling in their M.S.I.S. course work, students are required to demonstrate competence in Analytic skills. This requirement may be demonstrated by: (1) satisfactory completion of college-level mathematics course or (2) successful completion of a mathematics proficiency examination approved by the M.S.I.S. program. This requirement must be taken either during the first semester or summer session before the student's matriculation and completed with a grade of C or better.

Computer Skills Requirement: Students are required to demonstrate proficiency in the use of computer applications. This requirement can be satisfied through completion of a college-level computer applications or information systems course within the past five years with a grade of B or higher or by documented significant computer-related work experience. If this requirement has not been met prior to admission, a college-level computer-based information systems course such as MIS 204 is required. Course work must be taken either during the first semester or summer session before the student's matriculation and completed with a grade of B or higher.

Communication Skills Requirement: Successful completion of the M.S.I.S. program requires the ability to think clearly and to write and speak persuasively. Part of this requirement can be met by obtaining a score of "4" or more on the Graduate Management Admission Test (GMAT) or Graduate Record Exam (GRE) Analytical Writing Assessment (AWA). If this score is not achieved, students must satisfy this requirement through additional course work in writing skills or other work developed in consultation with the M.S.I.S. Program. This requirement must be satisfied during the first semester or summer session before the student's matriculation and completed with a grade of B or higher. The speech component of this requirement is satisfied through individual and group presentations in courses in the M.S.I.S. Program.

Pre-Program Requirement: The Pre-program requirement provides a basic foundation in theory, tools and techniques required for the management of profit and non-profit organizations. It also provides a basic understanding of applications of financial accounting, the creation and distribution of goods and services, business and how people relate to others in various organizations, helping to merge two related disciplines: business and information systems. Students who have completed the appropriate pre-program courses previously must have completed the courses with a grade of B or higher within seven years prior to admission, or through equivalent graduate course work completed with a B or higher within seven years prior to admission or college level

course work validated by recent work experience. Students who have not met these tests of relevancy, grade or currency, prior to admission to the program must take these courses at the graduate level and early in program.

Pre-Program Requirement: 9 credits
BUS 505 and select 6 credits from: ACCT 501, MGMT 511, BUSEC 502

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The M.S.I.S. degree program requires, excluding pre-program requirements, 30 credits of course work at the 500 or 800 level, with a minimum of 18 credits at the 500 level. The M.S.I.S. degree requires 9 credits of prescribed courses: INFSY 535 Object-Oriented Design and Program Development in Business (3), INFSY 540 Information Technology and Knowledge Management (3), and INFSY 554 Master's Project (3). Students are also required to take 15 credits of Information Systems courses from an approved list available in the program office. Students also must take 6 credits of electives from the 500-level courses offered by Penn State Harrisburg's School of Business Administration. The INFSY 554 Master's Project course involves development of an original master's project in the student's field of interest and preparation of a scholarly paper.

Data Analytics Track: The objective of this Track is to provide the student with data analytical skills that enable them to gain data insights and transform data into strategic decisions.

In consultation with their adviser, a student shall select 9 credits from the following:

BUS 510 Business Analytics and Decision Modeling (3)
INFSY 555 Data Management Systems (3)
INFSY 556 Data Warehousing (3)
INFSY 565 Intelligent Systems in Business (3)
INFSY 566 Data Mining and Knowledge Discovery (3)
INFSY 547 Web Enabled Technologies (3)

Transfer Credits

Penn State allows a maximum of 10 transfer credits of high-quality graduate work to be applied toward the requirements for a graduate degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin*. It must be the opinion of the reviewing faculty that these courses are equivalent in quality to those offered at Penn State Harrisburg. Credit will not be given for any class used to complete a previous degree.

Course Substitutions

Because some students enter the Program with advanced knowledge in one or more subject areas, up to six credits in prescribed or additional courses may be replaced with more advanced undergraduate or graduate courses in the same subject area. Except for INFSY 554, which must be taken at the College, INFSY prescribed and additional courses, in cases where there is equivalent knowledge, must be replaced with more advanced courses in the same field. Substitutions are based on a minimum of six credits of advanced undergraduate course work in an area of concentration or credits earned in an equivalent graduate-level program at a regionally accredited, college-level institution. These courses must have been completed within the past five years and have earned a grade of B or better. Substituted courses must be replaced with other advanced graduate courses in the field for which the substitute is the foundation/prerequisite. Substitutions are based on past academic performance. An examination cannot be used for earned graduate course credit.

Integrated B.S. in Information Systems/M.S.I.S Program

The School of Business Administration offers a limited number of academically superior Bachelor of Science in Information Systems candidates the opportunity to enroll in an integrated, continuous program of study leading to both the Bachelor of Science in Information Systems and the Master of Science in Information Systems. The ability to coordinate as well as concurrently pursue the two degree programs enables the students to earn both degrees in five years. Specifically, as many as twelve of the credits required for the master's degree may be applied to both undergraduate and graduate degree programs.

If for any reason students admitted to the IUG program are unable to complete the requirements for the Master of Science in Information Systems degree, the students will be permitted to receive the Bachelor of Science in Information Systems degree assuming all the undergraduate degree requirements have been satisfactorily completed.

ADMISSION REQUIREMENTS

Students apply to the program via the Graduate School application for admission, and must meet the admission requirements of the Graduate School, as well as the admission requirements for the Master of Science degree in Information Systems, listed above. Students should mention in the notes section that the application is for the IUG program in Information Systems.

Students must submit a resume, a personal statement including career goals and how the M.S.I.S. will enhance their career goals, official transcripts of all post-secondary courses taken outside Penn State, two letters of recommendation, with at least one from the School of Business Administration faculty, and a plan of study that integrates both undergraduate and graduate requirements. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program. A graduate faculty adviser in collaboration with the Director of M.S.I.S. Program will help undergraduate candidates determine a sequence of courses that will prepare them for acceptance into the Integrated Undergraduate-Graduate (IUG) degree program.

The Graduate Management Admission Test (GMAT) or Graduate Record Examination (GRE) is not required for admission into the program; however, if students are interested in a graduate assistantship, GMAT or GRE scores must be submitted by the end of the eighth semester.

The number of openings in the IUG program is limited. Applicants to the IUG program must have completed a minimum of 60 credits. Students must be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. In addition, the applicants must earn a minimum of cumulative grade point average of 3.5 and complete the following Entry to Major courses or equivalent: ACCTG 211 [4], ECON 102 [3], ENGL 015 or 030 [3], FIN 301 [3], MATH 110 or 140 [4], MGMT 301 [3], MKTG 301 [3] and STAT 200 [4] c SCM 200 [4].

Student applications will be evaluated based on their overall portfolio, in addition to the above requirements. In all cases, admission to the program will be at the discretion of the Graduate Admissions Committee in Information Systems.

DEGREE REQUIREMENTS

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Information Systems are listed in theUndergraduate Bulletin. Degree requirements for the Master of Science in Information Systems degree are listed above. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count towards the graduate degree.

Up to 12 credits may be double-counted towards the degree requirements for both undergraduate and graduate degrees. All courses counted for both degrees must be at the 500- or 800-level. Credits associated with the culminating experience for the graduate degree cannot be double-counted.

The courses that will double count for both degrees include: INFSY 535, INFSY 540, INFSY 555, INFSY 560, INFSY 547, INFSY 543 and INFSY 570.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. There are a limited number of scholarships, fellowships, and research grants available, as well as several graduate assistantships. For more information on these, contact Penn State Harrisburg's School of Business Administration.
Many students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To

find other options available to you, contact one of the following offices: Financial Aid Office, 717-948-6307 or Admissions, 717-948-6250.

Graduate School Assistantships

Full time graduate students who are interested in an assistantship should contact the graduate program coordinator. Students must be nominated for an assistantship by their program coordinator. Students applying for an assistantship should submit scores from the Graduate Management Admissions Test (GMAT), Graduate Record Exam (GRE) or similar examinations by January 30. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

BUSINESS ADMINISTRATION (BUSAD) course list

INFORMATION SYSTEMS (INFSY) course list

Last Revised by the Department: Spring 2017

Blue Sheet Item #: 45-06-000

Review Date: 4/25/17

Faculty linked: 8/14/14

Learning, Design, and Technology (LDT)

Program Home Page

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814-863-5990
L-ldtup@lists.psu.edu

Degrees Conferred:

Ph.D., M.S., M.Ed.

The Graduate Faculty

The Program

This program provides advanced professional preparation in the development of effective, efficient instructional materials and the use of technology to support learning in a variety of educational settings. The program of study applies skill and knowledge from the fields of the learning sciences, instructional design, computer technologies, and research methodologies to study educational designs and their effect on learning. Graduates are employed as instructional designers by corporate, agency, and military training departments; entrepreneurial consulting companies; public school districts; museums, nature centers, and other informal learning settings; community college learning resource centers; and colleges and universities.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) (for master's or doctorate) or Miller Analogies Test (for master's), transcripts, letters of reference, application letter, and writing assignment are required for admission.

Requests to waive the GRE requirement may be submitted by applicants for the M.Ed. who have successfully completed coursework for the Postbaccalaureate Certificate in Educational Technology Integration with a GPA greater than 3.5. However, GRE scores will be required to apply to the doctoral program.

Master's Degree Requirements

Students in the M.S. degree program are required to complete a minimum of 36 approved credits including: 9 credits of LDT core (LDT 415, LDT 467, and LDT 527, or equivalent) as well as 12 credits of courses chosen in consultation with an adviser. These courses can be chosen from, but are not limited to, LDT 401, LDT 433, LDT 440, LDT 449, LDT 505, LDT 550, LDT 561, LDT 566, LDT 581, and LDT 832. In addition, M.S. students will take 6 credits of research methods courses with adviser approval, which can include, but are not limited to, STAT 500, STAT 800, ADTED 550, LDT 574, LDT 575, LDT 576, LDT 545, EDPSY 406, EDPSY 475, and EDPSY 505. M.S. students will also be required to enroll in 3 credits of LDT 594 to conduct their research project, and 6 credits of LDT 600/610 to write and produce a master's thesis.

Students in the M.Ed. program are required to complete a program of a minimum of 30 approved credits including the 9-credit LDT core (LDT 415, LDT 467, and LDT 527, or equivalent) as well as 21 credits of professional application courses chosen in consultation with an adviser. These courses can be chosen from, but are not limited to, LDT 401, LDT 433, LDT 440, LDT 449, LDT 505, LDT 550, LDT 561, LDT 566, LDT 581, and LDT 832. All students will compile a portfolio as they move through the courses, and this portfolio will be presented to the adviser as the capstone experience (students do not need to enroll in any additional courses to complete the capstone experience).

For both M.S. and M.Ed. students, at least 18 credits must be taken at the 500 level or above, with at least 6 credits at the 500 level.

Doctoral Degree Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Credit and course requirements: Candidates for the Ph.D. in LDT must complete a set of core competencies in instructional design, learning sciences and technology, research methodology, and research apprenticeship. Doctoral candidates must complete a minimum of 30 LDT credits to include 9 credits of LDT doctoral core courses, 9 credits of LDT 594, and at least 12 credits of 500-level graduate LDT courses based on competency selection. LDT doctoral core courses include LDT 527, LDT 581, and LDT 583. Core competencies are represented by a number of courses including (but not limited to) LDT 505, LDT 550, LDT LDT 551, LDT 586, LDT 544, LDT 545, LDT 549, LDT 574, LDT 575, LDT 576, and LDT 832. As an example, a doctoral candidate interested in the instructional design core competency might be advised to take LDT 550, LDT 551, LDT 549, and LDT 832, while a candidate interested in learning sciences and technology might be advised into LDT 505, LDT 574, LDT 576, and LDT 544. The 12 credits of core competencies referenced earlier plus additional coursework for the doctoral program will be determined in consultation with the doctoral committee. All Ph.D. candidates must also complete a communication requirement consisting of one course in applied statistics, and either one course in advanced statistics or one course in advanced qualitative analysis. Coursework offered by outside departments may be scheduled as part of the student's program with approval of the student's doctoral committee and the Director of Graduate Studies.

To complete the residency requirements as defined by Graduate Council , the Ph.D candidate must spend at least two consecutive semesters enrolled as a full-time student at the University Park campus.

Doctoral exams and committees: The candidacy exam is recommended to be taken early in a student's program, after a minimum of 18 credits of post-baccalaureate work, and within three semesters (not including summers and assuming full-time study) of entry into the doctoral program. Students must submit an application to take the candidacy e xam, and the LDT faculty must approve the application . In order to complete the c andidacy exam, students must be registered either full- or part -time during the semester in which it is completed and show no deferred or failing grades in courses related to the degree program on their graduate transcript.

Prior to the comprehensive exam, the student, in consultation with his or her adviser, will convene a doctoral committee that consists of at least four members of the graduate faculty. The committee must comprise at least two LDT faculty members (including the thesis adviser), one outside field member, and one outside unit member. In cases where the outside field member and outside unit member are the same person, the fourth member may be either a minor adviser or a third LDT faculty member. Additional information about doctoral committees is available in the Graduate Bulletin.

After the completion of all coursework, the doctoral student must complete a comprehensive examination . All doctoral candidates must produce and write a doctoral dissertation and hold a final oral examination in defense of the dissertation.

Student Aid

A limited number of graduate assistantships are available to students in this program. These and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in

order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

INSTRUCTIONAL SYSTEMS (INSYS) course list

EDUCATIONAL TECHNOLOGY (EDTEC) course list

LEARNING, DESIGN, AND TECHNOLOGY (LDT) course list

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06

Review Date: 4/14/2015

Faculty linked: 6/27/14; LDT course link added: 7/28/15

International Agriculture and Development (INTAD)

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Degrees Conferred

Students electing this degree program through participating programs will earn a degree with a dual-title at the Master's or Ph.D. level. Students receive a degree that lists their major program and International Agriculture and Development (INTAD).

The International Agriculture and Development (INTAD) program is offered through the Departments of Agricultural Economics, Sociology, and Education, Entomology, Forest Resources, Environmental Systems Management , Plant Pathology and Environmental Microbiology, and Plant Sciences. The dual-title degree enables qualified students from the College of Agricultural Sciences (CAS) and other select programs at Penn State to combine their major degree with an internationally focused program of study to gain global competency skills and techniques for application of their discipline in a global environment.

The following graduate programs offer the dual-title in INTAD: M.S. and Ph.D. in Agricultural and Biological Engineering, M.S. and Ph.D. in Agricultural and Extension Education (AEE), M.S. and Ph.D. in Agronomy (AGRO), M.S. and Ph.D. in Entomology (ENT), M.S. and Ph.D. in Food Science (FDSC), M.S. and Ph.D. in Forest Resources (FORR), M.S. and Ph.D. in Plant Pathology (PPATH), M.S. and Ph.D. in Rural Sociology (RSOC), and M.S. and Ph.D. in Soil Sciences (SOILS).

The Graduate Faculty

The Program

The INTAD dual-title graduate degree program is administered by the INTAD- Academic Program Management Committee. The committee maintains the curriculum, identifies courses appropriate for the program, and develops and recommends policy and procedures for the program's operation to the dean of the College of Agricultural Sciences and the dean of the Graduate School. Members of the Graduate Faculty in INTAD also serve on master's and doctoral committees for students who are accepted into the dual-title program. This dual-title program enables students to learn about international agriculture while maintaining a close association with their primary area of interest in their home department.

Admission Requirements

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the INTAD dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of INTAD dual-title program. The student will submit an application to the INTAD Academic Program Committee. The application will include a written personal statement indicating the career goals they hope to accomplish by earning a dual-title degree. Doctoral students must be admitted into the dual-title degree program in INTAD prior to obtaining candidacy in their primary graduate program.

Degree Requirements

To qualify for the INTAD dual-title degree, students must satisfy the requirements of the primary graduate program in which they are enrolled. In addition, they must satisfy the minimum requirements of the INTAD dual-title degree specified here.

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

Master's Degree

Course Requirements

Students are required to complete a minimum of 12 INTAD course credits (400, 500, or 800) for a dual-title Master's degree. Nine credits will form the core curriculum: INTAD 820(3 cr.), AEE 450 (3 cr.), and CEDEV 505 (3 cr.). The remaining three credits must be taken as an internship or applied course/independent study with international development content.

Final course selection is determined by the students, their major program advisers and their INTAD advisers. These advisers will discuss with the student a program of study that meets the student's career goals and that is in accord with the policies of the Graduate Council and the INTAD dual-title program. Some courses may satisfy both the major graduate program requirements and those of the INTAD dual-title program.

Thesis

Students pursuing a M.S. degree that requires a master's thesis, in addition to the 12 credits specified above, must write the thesis on a topic that reflects both their primary graduate program and the dual-title in INTAD. At least 6 thesis research credits (600 or 610) must be taken in the student's primary graduate program.

All members of the student's committee for the dual-title master's degree will be members of the Graduate Faculty. The committee must include at least one Graduate Faculty member from INTAD.

Ph.D. Degree

Students admitted to the doctoral INTAD dual-title offering must exhibit high research competence, including ability to identify, conceptualize, and execute a significant research project that makes a significant addition to the body of knowledge in the field. Students also must be fluent in reading, writing, and speaking English.

Course Requirements

Students are required to complete a minimum of 18 INTAD credits for a dual-title Ph.D. degree. The 18 required credits must be at the 500 or 800 level. Nine credits will form the core curriculum: INTAD 820 (3 cr.), R SOC 517 (3 cr.), and either R SOC 508 (3 cr.) or R SOC 555 (3 cr.). The remaining 9 credits must be taken from among INTAD electives. In addition, they will be encouraged to pursue proficiency in a language other than English, as appropriate.

Final course selection is determined by the students and their doctoral committees. The doctoral committee will discuss with the student a program of study that meets the student's career goals and that is in accord with the policies of the Graduate Council and the INTAD dual-title program. Some courses may satisfy both the major graduate program requirements and those of the INTAD dual-title program. Permission from a student's doctoral committee, in consultation with the program chair, is required to substitute a 400-level course for a 500-level course.

Candidacy

The candidacy examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both the primary graduate degree program and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of an INTAD dual-title doctoral degree student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair.

Comprehensive Exam

At the end of their course work, students must pass a comprehensive examination that follows the guidelines established by the primary program and reflects both their primary program and the dual-title degree curriculum. International agriculture must be one of the key areas of the exam and the INTAD representative on the student's doctoral committee must have input into the development of and participate in the evaluation of the comprehensive evaluation.

Dissertation and Dissertation Defense

Doctoral students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects their original research and education in both their primary program and the INTAD dual-title program. The dissertation should contribute to the body of knowledge in international agriculture. A public oral presentation of the dissertation is required. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree.

Student Aid

Graduate Assistantships and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. A limited number of Research Assistantships are also available through the CAS. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students but courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up for deficiencies or to fill in gaps in previous education but may do not meet requirements for an advanced degree.

Last Revised by the Department: Summer 2018

Review Date: 6/26/2018

Faculty linked: 6/20/14

Information Sciences and Technology (IST)

Program Home Page

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MARY BETH ROSSON, *Associate Dean for Graduate and Undergraduate Studies*

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Degree Conferred

M.S.
Integrated B.S. in Information Sciences and Technology and M.S. in Information Sciences and Technology
Integrated B.S. in Security and Risk Analysis and M.S. in Information Sciences and Technology

The Graduate Faculty

Program Description

The Master of Science in Information Sciences and Technology is an interdisciplinary degree program that focuses on the theoretical, application-oriented, and educational issues facing a digital, global economy. The program is designed to build an understanding of how information and technology fundamentally impact (and are impacted by) people, organizations, and the world community. Topical areas within IST span a broad range including: human computer interaction, computational techniques, applications (e.g., bio-informatics and geographical information systems), societal issues (such as digital divide issues), user issues (e.g., computer-aided cognition), and information systems design and development providing exposure and grounding in many of the aspects of the information sciences. The program is especially attractive to students interested in gaining state-of-the-art understanding of information technology and its use as a solution in multiple venues.

Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants to the M.S. program are required to submit scores from the general portions of the Graduate Record Examinations (GRE), three letters of reference, a current resume (including present position and any publications), 1 to 3 page statement of goals related to pursuing an advanced degree and career in IST and provide a sample of the applicant's writing (e.g. technical paper, etc.).

Because the program is multidisciplinary in nature, students from many different disciplines may be accepted for entry into the program. A bachelor's degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics, as well as computer and information technology. Related work experience can be used to demonstrate such competency. A student may be accepted into the program with provisional status for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study and/or graduate-level study. However, accomplishments demonstrated through work experience and recommendation letters from the applicant's academic adviser or employer will also play an important role in the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

DEGREE REQUIREMENTS

M.S. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The M.S. in Information Sciences and Technology requires a minimum of 30 credits at the 400, 500, 600, or 800 level, with at least 18 credits at the 500 or 600 series combined; 27 of the 30 credits must be earned at Penn State. These 30 credits are distributed among the following requirements:

Core Courses (3-6 credits). All candidates are expected to develop a broad understanding of the core constructs of people, information, technology, and the significant interactions among those elements by taking IST 504. Candidates may also take IST 505 to gain a deeper understanding of research design.

Specialization Courses (12-18 credits). In consultation with his/her adviser, a candidate is expected to choose courses in one or more areas customized to support the thesis or scholarly paper. In addition to advanced courses in IST, a support area could be in cybersecurity, data science, law, business, education, engineering, the liberal arts, science, or any area that is linked to the information sciences. A list of suggested specialization courses is maintained by the graduate program office.

Research Methods (6 credits). All candidates must develop a basic understanding of the research methods utilized in the information sciences, by taking at least two research methods courses offered in IST or elsewhere. The focus of the course must be on the methods being learned rather than application of some method to a research topic. A list of courses that will satisfy this requirement is maintained by the graduate program office.

Thesis or Scholarly paper (3-6 credits). Students may choose a thesis or scholarly paper option. Students who choose the thesis option must register for 6 credits of IST 600 or 610, write a satisfactory thesis accepted by the master's committee, the head of the graduate program, and the Graduate School, and pass a thesis defense. The thesis should focus on a well-defined problem relevant to the information sciences. Students who choose the thesis option must also complete IST 505. Students who choose the scholarly paper option must register for 3 credits of IST 594 and complete the scholarly paper. The scholarly paper will be a focused piece of technical work that applies the student's expertise and knowledge base, and that is documented and presented as a scholarly paper report. Students who choose the scholarly paper option must write a scholarly paper that is accepted by their M.S. committee. An oral presentation may be required at the discretion of the student's adviser.

IUG Degree Requirements

The Integrated Undergraduate Graduate (IUG) program is available for strong undergraduate students who wish to pursue a bachelor's and master's degree in a shorter period of time than would be necessary if the degrees were pursued separately. There are two approved IUG programs: an Integrated B.S. in Information Sciences and Technology and M.S. in Information Sciences and Technology, and an Integrated B.S. in Security and Risk Analysis and M.S. in Information Sciences and Technology.

The first two to three years of undergraduate coursework follow the same undergraduate curriculum that other students follow in the Information Sciences and Technology major. Information Sciences and Technology undergraduates may apply for admission to the IUG program no earlier than February 15th of their sophomore year and no later than February 15 of their junior year after completing a minimum of 60 credits, if they meet the following admission requirements:

1. Must be enrolled in a College of IST undergraduate degree program.
2. Must have completed 60 credits of an IST undergraduate degree program.
3. Must apply to the IUG program by February 15 of their junior year.
4. Must apply to and be accepted without reservation into the Graduate School and M.S. program in IST. Students must complete the Graduate School application. Admission requirements for the M.S. in IST are listed in the Admission Requirements section above.
5. Must have an overall GPA of 3.5 (on a 4.0 scale) in undergraduate coursework and a minimum GPA of 3.5 in all coursework completed for the major.
6. Must present an approved plan of study. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser.
7. Must present two letters of recommendation from faculty members.
8. Must meet with both the Director of Undergraduate Academic Affairs and the Graduate Program Coordinator to declare interest and receive information about the IUG program.

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Information Sciences and Technology and the Bachelor of Science in Security and Risk Analysis are listed in the Undergraduate Bulletin. Degree requirements for the Master of Science in Information Sciences and Technology degree are listed above. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. If students accepted into the IUG program are unable to complete the M.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. The required 3 credits of IST 504 will apply to both the graduate program and the undergraduate program. Students may choose an additional 9 credits to double-count for both the undergraduate and graduate degrees from the following: IST 411, IST 412, IST 413, IST 420, IST 421, IST 431, IST 432, IST 505.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

INFORMATION SCIENCES AND TECHNOLOGY (IST) course list

Last Revised by the Department: Summer 2018

Review Date: 6/26/2018

Faculty linked: 6/20/14; Deans updated: 7/1/15; Program home page link: 7/16/15

Kinesiology (KINES)

Program Home Page

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Degrees Conferred:

Ph.D., M.S.
Dual Title Ph.D. in Kinesiology and Clinical and Translational Sciences

The Graduate Faculty

The Programs

The graduate programs in Kinesiology are research oriented and are designed to meet the specific goals and interests of the student. The primary goal of the overall program is to provide students the opportunity to study in depth one area of specialization and to develop necessary research skills to enhance their professional competence. The master's program is designed to prepare students for future graduate study, while the doctoral program is directed toward careers in research and in teaching at the advanced undergraduate and graduate levels in colleges and universities. Six areas of study are available at both the master's and doctoral levels: (1) athletic training and sports medicine, (2) biomechanics, (3) exercise physiology, (4) history and philosophy of sport, (5) motor control, and (6) psychology of physical activity. Several well-equipped research facilities are available to support graduate study, including the Biomechanics Laboratory, Motor Behavior Laboratory, and Noll Physiological Research Center.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants must complete the online Graduate School application and pay a nonrefundable application fee.

Scores from the Graduate Record Examinations (GRE) are required for admission. The minimum requirements for admission to the master's program include a 3.00 junior/senior grade-point average (on a 4.00 scale), satisfactory recommendations, a total of 1000 or higher on the verbal and quantitative sections of the GRE, and appropriate background courses in physical, biological, behavioral, and/or social science, depending on the intended area of specialization. Candidates from majors other than exercise and sport science/physical education are welcome to apply. In addition, doctoral applicants are expected to meet more stringent admission standards, including documented research capabilities (e.g., from an M.S. degree). Experience is highly desirable. Admission is highly competitive and the best-qualified students will be admitted subject to space availability and compatibility of the student with the department's research mission.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The M.S. program of study in the Department of Kinesiology requires a minimum of 30 credits, including:

- 6 credits selected from the six Department of Kinesiology areas of graduate study, for all of which the student must receive a quality letter grade;
- 6 credits selected from classes offered outside of the Department of Kinesiology, for all of which the student must receive a quality letter grade.;
- KINES 590 - Graduate Colloquium, for two semesters (2 credits);
- KINES 600 - Thesis Research: (6 credits);
- 10 credits of electives.

Each specialization may require additional, specific courses. At least 18 credits in the 500 and 600 series combined must be included in the program. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major.

M.S. degree students must complete Scholarship and Research Integrity (SARI) Training (10 hours) and demonstrate proficiency in the English language.

The M.S. degree also requires the formation of a master's committee, the writing of a satisfactory thesis accepted by the master's committee, the head of the graduate program, and the Graduate School, and the passing of a thesis defense. The final public oral examination, conducted by the candidate's committee members, must be scheduled and passed after all other work, including the M.S. thesis, has been completed.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A program to meet the individual needs of each student is planned with the adviser in consultation with the doctoral committee members. Regardless of the area of study, the following are required of all Kinesiology doctoral degree candidates:

- 15 credits selected from the six Department of Kinesiology areas of graduate study, for all of which the student must receive a quality letter grade;
- 6 credits selected from classes offered outside of the Department of Kinesiology, for all of which the student must receive a quality letter grade;
- KINES 590 - Graduate Colloquium, all semesters until after the comprehensive exam has been passed; and
- Scholarship and Research Integrity (SARI) training (10 hours).

Beyond this minimum of 21 credits, the student's adviser, and dissertation committee in consultation with the student set the structure and content of the doctoral program. A maximum of six (6) credits only from Independent Studies may count toward the 15 departmental credits required for the degree.

All doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.]

Dual-Title Ph.D. Degree in Kinesiology and Clinical and Translational Sciences (CTS)

Doctoral students with research and educational interests in clinical and translational science may apply for the Dual-Title Ph.D. Degree in Kinesiology and Clinical and Translational Sciences following admission to the Graduate School and Kinesiology and prior to taking the candidacy examination in Kinesiology. An admissions committee comprised of faculty affiliated with the dual-title program will evaluate applicants. Applicants must have a graduate GPA of at least 3.5 in a research area related to human health. Prospective dual-title program students will write a statement of purpose that addresses the ways in which their research and professional goals will be enhanced by an interdisciplinary course of study in clinical and translational sciences.

This dual-title degree program emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences, and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary mentor in the Graduate Program in Kinesiology and another individual serving as the secondary mentor in an area covered by the dual-title program who is a member of the Clinical and Translational Sciences faculty.

To qualify for the dual-title degree in Kinesiology and Clinical and Translational Sciences, students must satisfy the Kinesiology Ph.D. degree requirements listed in the “Doctoral Degree Requirements” section above. In addition, the Dual-Title Ph.D. Degree in Kinesiology and Clinical and Translational Sciences requires the completion of 18 credits of course work from an approved list of courses. Students must select three credits in each of the following six areas: epidemiology, bioinformatics, experimental design and interpretation, statistics, regulatory environment, and scientific communication. At least half of the 18 credits must be at the 500 level or above. Up to 12 credits of course work may overlap with required elective courses of the Graduate Program in Kinesiology.

For students in the dual-title program, the candidacy examination will include content from both Kinesiology and Clinical and Translational Sciences, and must be completed within four semesters (summer sessions do not count) of entry into the Kinesiology graduate program. The candidacy committee must include at least one member of the Clinical and Translational Sciences graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role.

The doctoral committee of a Kinesiology and Clinical and Translational Sciences dual-title Ph.D. student must include at least one member of the CTS graduate faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the graduate faculty in Clinical and Translational Sciences, the member of the committee representing Clinical and Translational Sciences must be appointed as co-chair. The fields of Kinesiology and CTS will be integrated in the student’s comprehensive exam, and the doctoral committee member representing CTS is responsible for constructing and grading the parts of the comprehensive exam that cover the CTS field of study.

Ph.D. candidates must complete a dissertation on a topic that reflects their original research and education in both Kinesiology and Clinical and Translational Sciences. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Student Aid

Graduate assistantships that are available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

KINESIOLOGY (KINES) course list

Last Revised by the Department: Summer 2016

Blue Sheet Item #: 44-07-000

Review Date: 6/28/2016

Faculty linked: 6/9/14

Laboratory Animal Medicine (L A M)

Program Home Page

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Degree Conferred:

M.S.

The Graduate Faculty

The Program

All students entering the program must have completed a professional degree program in veterinary medicine and must hold the degree of D.V.M., V.M.D., or equivalent. This program is only offered at the Penn State College of Medicine, Milton S. Hershey Medical Center.

The Department of Comparative Medicine is a basic science, academic department of the College of Medicine. It is concerned with the range of variation of normal and abnormal structure, function, and behavior in a variety of species of animals used for teaching, testing, and research. Its faculty, staff, and students work in a multidisciplinary and collaborative fashion with all other departments in the college to advance the research mission.

Graduate study in laboratory animal medicine consists of advanced training in biology, medicine and methodology pertinent to animal-based research, and the development of scholarship and research capabilities within the specialty. The general plan is one that provides a broad, basic foundation upon which the individual can build a career in teaching and research and/or in the professional direction of research animal facilities. To earn the Master's degree, each student must complete at least 30 credits of courswork at the 500 or 600 levels.

The curriculum of this training program includes:

First Year:

COMPARATIVE MEDICINE (C MED)
501. Biology and Care of Laboratory Animals (3)
503. * Laboratory Animal Genetics (3)
507. * Techniques of Laboratory Animal Experimentation (3)
515. Experimental Surgery of Laboratory Animals (3)
530. Diseases of Laboratory Animals I (3)
531. Diseases of Laboratory Animals II (3)
535.* Comparative Pathology (3)
590. Colloquium (1 credit per semester)
596. Independent Studies (1-3)
600. (3)

BIOMEDICAL SCIENCES (BMS)
591. Ethics in the Life Sciences (1)

*Courses offered every other year on an alternating basis; thus students entering program on even numbered years will take during second year.

Second Year:

COMPARATIVE MEDICINE (C MED)
590. Colloquium (1 credit/semester)
596. Independent Studies (up to 9 credits) for non-thesis option
600. Research project for M.S. thesis (6-9)

Students may, with the approval of the Program Director, enroll in graduate level courses offered at the Penn State College of Medicine, Penn State Harrisburg, University Park, or Penn State's World Campus.

Thesis Research: The submission and defense of a thesis based on an original hypothesis-driven research project is required. A minimum of 9 credits of thesis research (CMED 600) are required (a maximum of 6 credits may receive a quality grade).

Non-thesis Option: A non-thesis option may be elected by the student but must be approved in writing by the Program Director. A scholarly paper on a topic relevant to the fields of laboratory animal medicine or laboratory animal science must be written and presented. Up to 9 credits of independent study (CMED 596) may be earned for this work.

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-022

Review Date: 06/12/2012

Faculty linked: 8/14/14

Language Science

Program in Linguistics
323 Weaver Building
814-863-7891

Degrees Conferred

Students electing this degree program through participating programs earn a degree with a dual-title at the Ph.D. level, i.e., Ph.D. in (graduate program name) and Language Science.
The following graduate programs offer dual degrees in Language Science: German and Psychology.

The Graduate Faculty

Program Objectives of the Dual-Title Degree in Language Science

A dual-title degree program in participating programs and Language Science will prepare students to combine the theoretical and methodological approaches of several disciplines in order to contribute to research in the rapidly growing area of Language Science. This inherently interdisciplinary field draws on linguistics, psychology, speech-language pathology, and cognitive neuroscience, as well as other disciplines, to address both basic and applied research questions in such areas as first and second language acquisition, developmental and acquired language disorders, literacy, and language pedagogy.
Dual-title degree students will receive interdisciplinary training that will enable them to communicate and collaborate productively with a wide range of colleagues across traditional discipline boundaries. Such training will open up new employment opportunities for students and give them the tools to foster a thriving interdisciplinary culture in their own future students. The dual-title program will facilitate the formation of a cross-disciplinary network of peers for participating students as part of their professional development.

The dual-title degree program will not duplicate other degree programs in the University.

Admission Requirements

To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted through one of the participating graduate degree programs (see Appendix E for admissions requirements of potential participating programs). Upon admission to one of the above programs and with a recommendation from a Language Science program faculty member in that department, the student's application will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third elected faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science.

Doctoral Degree Requirements

The dual-title Ph.D. degree in Language Science will have the following requirements.

Course work (21 credits of 500-level courses)
6 credits, Proseminar in the Language Science of Bilingualism (LING 521), Proseminar in Professional Issues in Language Science (LING 522)
3 credits, Research methods/statistics in Language Science (such as LING 525, PSY 507, PSY 508)
3 credits in theoretical linguistics (students will choose between LING 500 or LING 504)
3 credits, Cognitive Neuroscience or Psycholinguistics (such as PSY/LING 520, PSY 511)
6 credits, Research internships (students will choose one course among the following: CSD 596, GER 596, LING 596, PSY 596, SPAN 596)

Language Science Research Meetings

Students must participate in weekly Language Science Research meetings each semester in residence.

Foreign Language and English Competency Requirements

The student will fulfill the language requirement specified by the participating department through which the student is admitted to the dual-title degree program.

Candidacy Examination

In order to be admitted to doctoral candidacy in the dual-title degree program, students will take a candidacy examination that is administered by the primary program. However, the dual-title degree student may require an additional semester or more to fulfill requirements for the primary program and dual-title program; therefore, the candidacy examination may be delayed. In addition, the student will be required to present a portfolio of work in Language Science to their committee. Such a portfolio would include a statement of the student's interdisciplinary research interests, a plan of future study, and samples of writing that indicate the student's work in Language Science. The candidacy examination committee will be composed of faculty from the primary program, as well as at least one faculty member affiliated with Language Science. The designated Language Science faculty member may be appointed in the student's primary program, but he or she may also hold a formal appointment with Linguistics. The Language Science member will participate in constructing and grading candidacy examination questions in the area of Language Science.

Doctoral Committee Composition

A doctoral committee consisting of at least four members of the Graduate Faculty must be appointed and will include a representative of the Language Science dual-title program. In addition, an official "outside member" must be appointed as one of the four members. The student's doctoral committee will include faculty from the primary program as well as faculty from Language Science. Faculty members who hold appointments in both the primary program and Language Science may serve in a combined role.

Comprehensive Examination

The student's doctoral committee will include faculty from the primary program as well as faculty from Language Science. Faculty members who hold appointments in both the primary program and Language Science may serve in a combined role. The Language Science representative(s) will help to insure that the field of Language Science is integrated into the comprehensive examination.

Dissertation

A dissertation on a topic related to Language Science is required for a dual-title Ph.D. degree in Language Science.

Linguistics Minor

The doctoral minor provides interested students with an opportunity to complete a program of scientific study focused on the nature, structure, and use of human language. The minor is designed to cover the foundations of the discipline of linguistics by reviewing fundamental core areas such as phonology and

syntax. Course work is also available in many additional areas of linguistics such as semantics, morphology, language variation, historical linguistics, and discourse analysis.

The minor requires a minimum of 15 credits, 6 of which must be at the 500 level. Nine credits are prescribed in syntax (LING 402), phonology (LING 404), and a general introduction to linguistics (LING 401), although a linguistics course at the 500 level may be substituted for LING 401 with the approval of the director of the program in Linguistics.

Student Aid

Most students will be funded through their primary departments, and will be considered for graduate assistantships according to the procedures of those departments. The Center for Language Science currently has two graduate assistantships for which dual-title degree students will be eligible.

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item #: 37-07-033

Review Date: 6/16/09

Faculty linked: 6/27/14

Landscape Architecture (LARCH)

Program Home Page

ELIZA PENNYPACKER, Professor, *Department Head*
121 Stuckeman Family Building
814-865-9511

Degrees Conferred:

- Master of Landscape Architecture M.L.A.
- M.S. in Landscape Architecture
- Integrated B.L.A./M.S. in Landscape Architecture
- Dual-title M.S. in Landscape Architecture and Human Dimensions of Natural Resources and the Environment (HDNRE)

The Graduate Faculty

The Programs

Landscape Architecture is the art of design, planning, or management of the land and of the natural and built elements upon it. As an academic discipline, it embodies creative, cultural, philosophical, and scientific knowledge bases. As a professional endeavor, the practice of landscape architecture includes site design, urban design, master planning, community planning, regional planning, resource conservation, and environmental and social stewardship.

Master of Landscape Architecture (M.L.A.)

The M.L.A. program is an accredited professional degree program focused on preparation to practice Landscape Architecture for students who hold a bachelor's degree in another field. The Master of Landscape Architecture program prepares students to enter the profession of Landscape Architecture. It provides individuals who do not already have a practice-oriented design degree with a professionally accredited education in landscape architecture. The program prepares graduates for entry into professional offices or further study in Landscape Architecture or related disciplines.

M.S. in Landscape Architecture

The M.S. in Landscape Architecture program is a research-focused degree program designed to offer students graduate-level research inquiry into Landscape Architecture for students who hold a bachelor's degree.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

To be admitted to the program, applicants must meet the following requirements:

- For admission to the M.L.A. program, applicants must have completed a bachelor's degree from any discipline prior to entry into the M.L.A. program.
- For admission to the M.S. in Landscape Architecture, applicants must have completed a bachelor's degree in Landscape Architecture or a closely related discipline (e.g., architecture, geography, ecology, and anthropology).

All applications for admission must include:

1. Evidence of creativity (portfolio or other), evidence of analytical ability (research paper or other), and an essay explaining why the individual seeks to study landscape architecture at Penn State
2. Official transcripts from all post-secondary institutions attended.
3. GRE scores
4. 3 letters of recommendation

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, are required for admission.

Students with a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests, at the discretion of the program.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Master of Landscape Architecture Degree Requirements

The M.L.A. curriculum develops creative insight and the knowledge, skills, and abilities essential to professional practice, fulfilling the education requirement needed in all states to be eligible to take the Landscape Architecture licensing examination. Students in the M.L.A. degree program must also develop research understanding characteristic of graduate education, undertaking a research-based design project as a final cumulative experience to demonstrate their understanding and application of appropriate and professional research and design expertise.

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The M.L.A. curriculum requires completion of 57 credits of graduate work at the 400, 500, or 800 level, including a minimum of 47 credits at the 500 or 800 level, with at least 6 credits at the 500 level. In addition, to fulfill the requirements of professional accreditation, students must undertake 15 credits of prerequisite courses that do not count towards the M.L.A degree requirements.

Requirements for Professional Accreditation (Prerequisites):

LANDSCAPE ARCHITECTURE (LARCH)
60. History of Design on the Land (3)
145. Ecology of Plants I (3)
276. Human Dimensions of Design: HIstory & Theory (3)
365. Contemporary Trends in Landscape Architecture (3)
386. Professional Practice (3)

Core Requirements for the M.L.A:

LANDSCAPE ARCHITECTURE (LARCH)
414. Design and Theory V: Depth Studio (10)
815. Grad Design I (6)
816. Grad Design II (6)

817. Grad Design III (6)
835. Design Implementation I - Grading (3)
836. Design Implementation II - Materials (3)
837. Design Implementation III - Plants (3)
838. Design Implementation IV - Stormwater (3)
501. Research Writing in Landscape Architecture (3)
502. Intellectual History and Theory of Landscape Architecture (3)
510. Graduate Seminar in Landscape Architecture (3)
551. Final Culminating Experience: Proposal (1)
552. Final Culminating Experience: Production (4)
553. Final Culminating Experience: Presentation & Documentation (2)
590. Colloquium (1)

The final culminating experience for the M.L.A. is a capstone project completed while enrolled in LARCH 551(1), LARCH 552(4), and LARCH 553(2).

M.S. in Landscape Architecture Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The core curriculum is a two-year research-focused program requiring a minimum of 40 credits including a minimum of 18 credits at the 500 or 600 level. Students are required to take graduate level coursework, including 12 credits of Graduate Seminar, 4 credits of Graduate Colloquium, 3 credits of Research Writing in Landscape Architecture, 3 credits in Intellectual History and Theory of Landscape Architecture, 3 credits in quantitative/qualitative analysis at the 500 level (which must be approved in advance by the student's adviser and/or the graduate program professor-in-charge), and at least 6 credits in thesis research (600 and 610). The thesis must be accepted by the adviser(s) and/or committee members, the head of the graduate program, and the Graduate school, and the student must pass a thesis defense.

Core graduate requirements:

A 500-level course in quantitative/qualitative analysis (3 credit minimum)
501. Research Writing in Landscape Architecture (3)
502. Intellectual History and Theory of Landscape Architecture (3)
510. Graduate Seminar (12)
590. Graduate Colloquium (4)
600. Thesis Research (6)

The remaining elective credits may be chosen from a list of approved electives maintained by the program office. The student and the student's adviser, subject to the approval of the departmental Graduate Program Committee, determine specific course requirements.

Dual-Title M.S. Degree in Landscape Architecture and Human Dimensions of Natural Resources and the Environment (HDNRE)

Graduate students with research and educational interests in landscape architecture or a closely related discipline (e.g., architecture, geography, ecology, anthropology, etc.) may apply to the dual-title M.S. degree in Landscape Architecture and Human Dimensions of Natural Resources and the Environment Program. The goal of the dual-title M.S. degree Landscape Architecture and Human Dimensions of Natural Resources and the Environment is to enable graduate students from Landscape Architecture to acquire the knowledge and skills of their major area of specialization in Landscape Architecture, while at the same time gaining the perspective and methods of Human Dimensions of Natural Resources and the Environment.

Admission Requirements

Students must apply and be admitted to the graduate program in Landscape Architecture and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the HDNRE dual-title program. Refer to the Admission Requirements section of theHDNRE Bulletin page.

Degree Requirements

To qualify for this dual-title degree, students must satisfy the requirements of the Landscape Architecture Master of Science degree program, listed above under “M.S. in Landscape Architecture Degree Requirements." In addition, they must satisfy the HDNRE program requirements for the dual-title master’s degree. Refer to the Master’s Degree Requirements section of the HDNRE Bulletin page. Some courses may satisfy both the graduate primary program requirements and those of the HDNRE program. Final course selection is determined by the student after consulting, in advance, with their Landscape Architecture and HDNRE advisers.

For the dual-title M.S. degree in Landscape Architecture and HDNRE, the thesis must reflect the student’s education and interest in both Landscape Architecture and HDNRE. All members of the student’s committee must be members of the Graduate Faculty. The master’s committee must include at least one Graduate Faculty member from HDNRE. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

LANDSCAPE ARCHITECTURE (LARCH) course list

Last Revised by the Department: Spring Semester 2018

Blue Sheet Item #: 46-06-000

Review Date: 4/10/2018

Faculty linked: 6/20/14

Leadership Development (LEAD)

JAMES A. NEMES, *Interim Chancellor*
School of Graduate Professional Studies
Penn State Great Valley
30 East Swedesford Road
Malvern, PA 19355-1443
610-648-3335

KAREN DUHALA, *Director of Management Programs*
School of Graduate Professional Studies
Penn State Great Valley, Management Division
610-648-3229
Online: www.sgps.psu.edu

Degree Conferred:

M.L.D.

The Graduate Faculty

The Program

The Penn State Great Valley Master of Leadership Development (MLD) program is a 36-credit interdisciplinary professional program that blends the social and behavioral sciences with ethical studies to develop outstanding organizational and community leaders. As part of the School's Management Division, the program is accredited under the specialized accreditation received from the Association to Advance Collegiate Schools of Business International (AACSB).The program is designed to meet the educational needs of professionals at the middle to senior levels of management. Note that the focus of this program is different from that of the MBA offered by the School: While the MBA program provides an overview of leadership, the purpose of the MLD program is to provide an in-depth analysis of the theory and practice of authentic transformational leadersthip by providing an environment in which faculty and students can have a complete and open collaboration on what constitutes exemplary leadership. The MLD curriculum emphasizes strategic leadership and the creation of wealth in organizations, balancing financial measure of performance with learning and growth, and customer and external process perspectives. The program builds on the mid- and high-level managerial and administrative experience of students in order to achieve its goal of promoting positive change in individuals, teams, organizations, and communities.

The program provides training in leadership-relevant research, and some students continue on to pursue a doctoral degree. Required research may be conducted in Penn State Great Valley's Library and Computer Center, which provide local research support as well as access to the library and computer resources of the entire Penn State system.

The MLD program is geared primarily toward the needs of part-time students who are employed full-time. Courses in the program, which are offered at Great Valley, are scheduled for the convenience of adult learners, mainly in the evening or on Saturdays.

Admission Requirements

Admission is granted only to candidates who demonstrate high promise of success for graduate work. Requirements listed here are in addition to the Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

An undergraduate and/or graduate GPA of at least 3.0 on a 4.0 scale is required for admission. It is strongly preferred that applicants present at least five years of related professional work experience.

All international applicants whose first language is not English or who have not received baccalaureate or master's degrees from an institution in which the language of instruction is English must take the TOEFL (Test of English as a Foreign Language) and receive a minimum of 570 (paper score), or 230 (electronic score), or 80 points on the new Internet-based test with a minimum of 23 points on the speaking portion; or the International English Language Testing System (IELTS) with a minimum composite score of 6.5 for admission and submit the results of that test with the application for admission.

Admission decisions are based on a review of the applicant's professional and academic accomplishments as presented in the Admissions Dossier and the quality of the applicant's credentials in relation to those of other applicants who meet the requirements for admission. A complete Admissions Dossier includes the following:

- Online application and non-refundable application fee;
- current resume, preferably indicating at least five years of related work experience;
- two official transcripts from each regionally-accredited college or university attended, (both undergraduate and graduate),with credit conditions equivalent to those required by Penn State; or a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution.
- completion of two 300-word leadership essay questions developed by the faculty to assess an applicant's logical reasoning and writing skills;
- two confidential evaluation forms/letters of endorsement from executives or community leaders detailing their evaluation of the applicant's leadership ability and potential.

Application Filing Dates: Penn State Great Valley's MLD program has a rolling admissions policy. Students may be admitted and enroll in classes in early September or early January. More detailed information about the program may be found at http://www.sgps.psu.edu/prospective/academicprograms/leadership/mld.ashx More detailed information about the application process and the application requirements may be found athttp://www.sgps.psu.edu/prospective/academicprograms/leadership/mld/admission.ashx.

Degree Requirements

Thirty-six (36) credits are required to complete the MLD degree. A series of leadership cornerstone (12 credits) and leadership competency courses (9 credits) are required to provide all MLD students with a common body of knowledge. Leadership Context courses (12 credits) and a Capstone course (3 credits) round out the program.

Leadership Cornerstone courses (12 credits) provide a foundation for leadership development studies. They include: LEAD 501 (Leadership Across the Lifespan), BUSAD 555/LEAD 555 (Full-Range Leadership Development), BUSAD 556/LEAD 556 (Diversity Leadership***),*** and LEAD 557 (Leadership Models and Methods).

Leadership Competency courses (9 credits) build a foundation for effective leadership communication, creativity/innovation, and moral development. They include: LEAD 561 (Dynamic Communication in Leadership Contexts), [MGMT 573 (Corporate Innovation Strategies or SYSEN 550 (Creativity, Innovation, and Change) or BUSAD/LEAD 519 (Developing Creative High Performance Organizations)], and [BUSAD 534 (Ethical Dimensions of Management in the Biotechnology and Health Industry) or PHIL 597 (Ethical Dimensions of Leadership) or BUSAD 576 (Ethical Issues in Information Technology)].

Leadership Context courses (12 credits) provide an overview of the situations in which leadership processes are embedded. They include: LEAD 562 (Strategic

Leadership), [BUSAD 551 (Business Environment) or BUSAD 530 (Biotechnology and Health Industry Overview)], and a choice of 2 context-specific electives (6 credits).

All students must complete a capstone course that provides students with an opportunity to enact what they have learned in their course work in the context of promoting positive change in their community, LEAD 582 (Social Entrepreneurship and Community Leadership).

Student Aid

There are a limited number of scholarships, fellowships, and graduate assistantships available. For more information on these, contact the Financial Aid Office at Penn State Great Valley.

Most students work full-time and take classes part-time. In many cases, employers have a tuition-reimbursement plan paying for partial or full tuition. To learn more about payment options for students who receive employer tuition reimbursement benefits, or for more information on other payment options that may be available to you, contact the Great Valley Financial Aid Office, 610-648-3311.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

BUSINESS ADMINISTRATION (BUSAD) courses

INTERNATIONAL BUSINESS (I B) courses

LEADERSHIP (LEAD) courses

MANAGEMENT (MGMT) courses

SYSTEMS ENGINEERING (SYSEN) courses

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-06-138

Review Date: 04/13/2010

Faculty linked: 8/14/14

Literacy Education (LEDUC)

Program Home Page

MARY NAPOLI, *Program Coordinator*
Penn State Harrisburg
Middletown, PA 17057
717-948-6213

Degree Conferred:

M.Ed.

The Graduate Faculty

The Program

The Master of Education in Literacy Education at Penn State Harrisburg is designed to provide full-time and part-time graduate students with a focused program of study in the field of literacy education. This advanced degree provides students with a comprehensive approach to literacy research, instructional practice, assessment, and leadership to meet the varied and diverse needs of preK-12 learners. Grounded in sociocultural and critical literacy approaches, the program affords literacy professionals: (1) specialized, in-depth knowledge about the teaching of literacy; (2) diagnostic and clinical skills necessary to support and plan instruction for a diverse range of students; (3) the ability to interpret, evaluate, and use literacy research to inform practice; (4) opportunities to use both digital and traditional texts to teach literacy across the curriculum; (5) knowledge about the role of social context in supporting preK-12 learners' acquisition of language and literacy; and (6) the literacy leadership skills necessary to support and inform professional practice in preK-12 settings. Students also participate in a final capstone course that provides the opportunity to work closely with preK-12 learners in a faculty-supervised, clinical, or on-site setting. Throughout the program, students work closely with faculty and cultivate strong peer support networks.

The Literacy Education program is aligned with the Pennsylvania Department of Education (PDE), the International Reading Association (IRA), the National Council for Teachers of English (NCTE), and the Council for Accreditation of Educator Preparation (CAEP) (formerly known as NCATE) standards.

Following successful completion of the program, students are eligible to take the Praxis examination for certification as a Pennsylvania Reading Specialist (K-12). A Literacy Leadership certificate and fellowship opportunities in the National Writing Project (NWP) are also available.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Students must have achieved an overall junior/senior grade point average of 3.00 or higher on a 4.0 scale. For students applying for admission who have completed credits beyond the baccalaureate degree, we will evaluate the last (approximately) 60 credits completed.

- Two letters of recommendation
- A brief (200-300 words) personal statement describing your interest in pursuing a master's degree in Literacy Education
- A valid Pennsylvania Teaching Certificate*
- GRE, Miller Analogies Test, or educator certification exams, such as PECT or Praxis

* Pennsylvania Teaching Certificate must be with an evidence of a course in the methods of teaching reading, such as EDUC 320 (Methods in Teaching Beginning Readers) or 321 (Methods in Teaching Intermediate and Advanced Readers) with a grade of C or better.

Retention

Students must maintain a minimum 3.00 grade-point average, satisfactorily complete all required key assessments, and attain a grade of "C" or better in all required core courses. Students who do not make satisfactory progress will be notified in writing noting the specific deficiencies and requesting that they meet with the program coordinator to develop a remediation plan. Failure to meet or to satisfactorily complete the remediation plan will result in termination from the program.

All persons enrolled in Teacher Education Programs at Penn State Harrisburg are expected to demonstrate the professional dispositions that are aligned with the unit's vision statement. The faculty shall evaluate the approved dispositions demonstrated by the students in class and during field experiences. Students may be rated as exemplary, acceptable, or unacceptable. Students are expected to attain acceptable or exemplary ratings in order to graduate.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The Master of Education degree in Literacy Education consists of 33 credits that prepare students for the Pennsylvania Reading Specialist Certification (K-12). The degree requirements for the Master of Education in Literacy Education include 21 credits in foundational, pedagogical, and advanced theoretical work in reading, writing and educational research design, two courses that make up the capstone clinical practicum (6 credits), and 6 additional credits of electives for a total of 33 credits. At least 18 credits must be taken at the 500 or 800 level, with at least 6 credits at the 500 level. A minimum grade-point average of 3.00 for work done at the University and acceptable or higher ratings on the professional dispositions are required for graduation.

Courses

Prescribed Course Requirements (27 Credits):
EDUC 452. Teaching Writing (3)
EDUC 477. Teaching Struggling Readers and Writers (3)
LLED 445. Teaching English in Bilingual/Dialectal Education (or an equivalent ELL course approved by the program coordinator) (3)
EDUC 561. Psychology of Reading (3)
EDUC 562. Diagnostic Evaluation of Reading Problems (3)
EDUC 563. Methods in Teaching Reading (3)
EDUC 564. Reading Clinic (3)
EDUC 565. Literacy and Leadership (3)
LLED 594. Research in Language and Literacy Education (3)

Students must enroll in EDUC 563 and EDUC 564 consecutively in the fall and spring during the same academic year. These courses serve as the culminating experience for the degree. In these courses, students complete a case study inquiry project designed to address the needs of a literacy-learner, engage in professional development and mentorship, and present their research findings to peers. In EDUC 563, students engage in observation and design of their case study inquiry project. In EDUC 564, under the supervision of faculty, students collect data, implement change, analyze results, and present their findings to colleagues. Students engage in ongoing professional development and mentorship in both courses.

Electives (6 credits):
Students may choose to take EDUC 422 Literature for Children and Adolescents (3), EDUC 432: Children's Literature in Teaching Writing (3), or EDUC 472:

Teaching Reading through the Content Areas (3).

Transfer Credits

Penn State allows a maximum of 10 transfer credits of high-quality graduate work to be applied toward the requirements for a graduate degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin*.

A maximum of 15 graduate credits taken as a non-degree student prior to admission to a graduate degree program may be applied to a graduate program, with departmental approval. The credits must have been earned within five years preceding entry into the degree program.

Forms for transfer of credit can be obtained from the graduate program office.

Accreditation and Licensure

This program is accredited by the Council for Accreditation of Educator Preparation (CAEP), formerly known as the National Council for Accreditation of Teacher Education (NCATE), whose “performance-based system of accreditation fosters competent classroom teachers and other educators who work to improve the education of all P-12 students. CAEP believes every student deserves a caring, competent, and highly qualified teacher.”

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit courses below the 400 level in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-03

Review Date: 11/15/16

Faculty linked: 8/14/14

Labor and Global Workers' Rights

MARK S. ANNER, Professor in charge

Degree Conferred:

- Master of Professional Studies (M.P.S.)

The Graduate Faculty

- Mark S. Anner, Ph.D. (Cornell) Associate Professor of Labor and Employment Relations, and Political Science
- Paul F. Clark, Ph.D. (Pittsburgh) Professor of Labor and Employment Relations
- Sarah Damaske, Ph.D. (NYU) Assistant Professor of Labor and Employment Relations
- Alan Derickson, Ph.D. (California, San Francisco) Professor of Labor and Employment Relations, and History
- Niki Dickerson von Lockette, Ph.D. (Michigan) Associate Professor of Labor and Employment Relations, and Sociology.
- Ryan Lamare, Ph.D. (Cornell) Assistant Professor of Labor and Employment Relations
- Helen Liu, Ph.D. (Cornell) Assistant Professor of Labor and Employment Relations
- Paul Whitehead, J.D. (Harvard) Professor of Practice of Labor and Employment Relations

Labor and Global Workers' Rights is a 30-credit Master of Professional Studies (M.P.S.) program of study for professionals working in the area of global labor and workers' rights issues who would like to continue or pursue a career working on global labor and worker rights with a national or international labor union or a related organization, such as a labor research institute.

Admission Requirements:

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Students who do not have a GPA of 3.0 or higher will be considered on a case-by-case basis depending on the quality of their overall application. Applicants who are still completing their baccalaureate/postsecondary requirements at the time of application may be admitted to the Graduate School provisionally based on the awarding of the baccalaureate degree. Students are also expected to have a minimum of three years of full-time work experience in some area related to labor unions or worker-oriented research/employment for admission. Exceptions may be made by the program chair.

Admissions decisions for the program are based on the quality of the applicant's credentials as determined by a review of the complete application portfolio. During the admission process, students who seem better suited for a different graduate program will be encouraged to apply to the appropriate program. Applicants to the MPS in LGWR must submit the following materials:

- Completed online Penn State Graduate School graduate degree application and payment of the application fee;
- A 2-3 page essay articulating career and educational goals that demonstrates the applicant's written communication skills. Documentation of a minimum of three years of full-time work and a resume should be attached as a supplement;
- Three letters of recommendation that attest to the applicant's readiness for graduate study and document the requisite minimum of three years of work experience;
- Two official transcript(s) of all institutions attended;
- Because the language of instruction at Penn State is English, international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.
- International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following countries: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Graduate Record Examination (GRE) scores are not required.

Degree Requirements

Total Required Credits for the MPS: 30 credits at the 400-level or higher; at least 18 credits must be at the 500 or 800 level, with at least 6 credits at the 500 level. A culminating experience is required (3 credits of LGWR 894 are included in the 30 total required credits).

Prescribed Courses: 21 credits
HRER 500. Topics in Comparative Industrial Relations (3)
HRER 513. Research Methods in Human Resources and Employment Relations II (3)
LER 475H. Labor in the Global Economy: U.S. and South African Perspectives (3)
LGWR 510. International Labor Law (3)
LGWR 520. Global Workers' Rights (3)
LGWR 895. Internship (3) [strongly recommended]; or LGWR 596: Individual Studies (3) or other 3 credit course approved in advance by the program chair.
LGWR 894. Capstone Experience (3)

Elective Courses: Take 9 credits from the following list.
HIST 556. Social Movements in the Twentieth-Century US (3)
HRER 504. Seminar in Employment Relations (3)
HRER 512. Research Methods in Human Resources and Employment Relations I (3)
HRER 516. Labor Market Analysis (3)
HRER 536. Diversity in the Workplace (3)
LER 435. Labor Relations in the Public Sector (3)
LER 437. Workplace Dispute Resolution (3)
LER 458Y. History of Work in America (3)

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Lasted Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-06

Review Date: 04/08/2014

Mechanical Engineering (M E)

KAREN A. THOLE, *Head of the Department of Mechanical and Nuclear Engineering*
137 Reber Building
814-865-2519

Degrees Conferred:

- Ph.D., M.S.
- Integrated B.S. and M.S. in Mechanical Engineering

The Graduate Faculty

The Programs

Graduate programs and research facilities are available in combustion, heat transfer, fluid mechanics, energy storage, dynamic system analysis, robotics, mechanical design, energy systems, biomedical applications, and micro-nano applications. Air pollution control, automotive safety, tribology, designing for noise control and for reliability also provide many research and design opportunities.

Admission Requirements

To maintain a high quality program, it is important that our students are also of a caliber to succeed. As such, the admission requirements for the students enrolling in the online program will not differ from those of our resident students. Online students will only be accepted into the program with approval from the Department's Admissions Committee. Within the Department, the ME Admissions Committee (made up of ME Graduate Faculty) will provide recommendations to the Professor-in-Charge of Graduate Studies on accepting students to the MSME degree program. It is expected that students have a Bachelor of Science degree in a suitable engineering field from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution. Admission decisions will also be based upon relevant work experience and recommendation letters.

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

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

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

Degree Requirements

The M.S. degree program is designed for students to gain advanced knowledge for research, analysis, and design in mechanical engineering. Resident students pursuing an M.S. degree may choose one of two options: completion of 24 course credits and the submission of a thesis (6 credits) to the Graduate School, or 30 course credits and the submission of a scholarly paper to the department. The M.S. degree program is also offered on-line in which only the 30 course credits and the submission of a scholarly paper is permitted. The requirements for the M.S. M E degree program are:

1. Minimum of 30 course credits at the 400 level or higher, of which 20 course credits must be earned at Penn State. Note that 2 additional credits are required by enrolling in the M E 590 Colloquium but these 2 additional credits do not count toward the 30 course credits. The required course credits must be completed with a grade point average of 3.00 or higher.

2. All students must successfully complete two credits of M E 590 Colloquium preferably in their first two semesters in the program. These two colloquium credits do not count toward the 30 course credits in Requirement 1 above.

3. At least 18 credits in 500- and 600-level courses.

4. A minimum of 12 credits in 400- and 500-level courses in Mechanical Engineering, excluding M E 410, 440W, 441W, 442W, 443W, 450, and any other required undergraduate courses. M E 596 cannot be used to fulfill this requirement.

5. The MSME requires three credits of mathematics. These credits must be taken from the following group of courses:
E MCH 524A, E MCH 524B, M E 512, M E 550, and all 400- and 500-level MATH courses (MATH 4XX, MATH 5XX) except MATH 419, 427, 428, 435, 451, 455, 456, 461, 470, 471, 475, 475W, 482 and 484. Courses with a specific focus on numerical analysis will not count toward the mathematics requirement.

6. A thesis or paper must be presented to meet the specific requirement of the culminating experience type selected; the paper may take the form of a doctoral research proposal if agreed upon in advance by the student and the graduate adviser. Online students seeking an MSME degree will only be permitted to write a paper.

7. Preparatory course(s) required for teaching assistants (such as ENGR 888), remedial courses, and any courses required in our undergraduate program are not counted toward degree requirements.

CULMINATING EXPERIENCE OPTION A - M.S. THESIS
Candidate registers for a minimum of six credits of M E 600 or M E 610 and submits a thesis following the procedures specified by the Graduate School. This program will consist of at least 24 course credits of which 18 credits must be at the 500 level (not including M E 596), and six thesis credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses.

CULMINATING EXPERIENCE OPTION B - M.S. PAPER
Candidate registers for 30 course credits of which 18 credits must be at the 500 level. A maximum of three credits of M E 596 can be counted in the total of 30 credits. At least 12 credits must be 400- or 500-level Mechanical Engineering courses. Candidates write a paper on a topic mutually agreed upon by the adviser suitable for publication in a professional journal or presentation at a national or international conference.

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. Students are admitted to candidacy after passing written and oral examinations. The Ph.D. program is quite flexible, with minimal formal requirements. The Ph.D. is awarded upon completion of a program of advanced study that includes a minimum period of residence, a satisfactory dissertation, and the passing of comprehensive and final oral examinations as determined by the student's doctoral committee.

Generally, a Ph.D. student must have 30 credits above a master's degree before taking the comprehensive examination.

Integrated B.S. and M.S. in Mechanical Engineering

A limited number of undergraduate students in the B.S M E program will be considered for admission to the integrated undergraduate/graduate program leading to the B.S. M E and the M.S. M E degrees. Students with a junior standing in the B.S. M E degree program may be admitted to the integrated B.S.M.E./M.S.M.E. program, following a positive review of an application specific to this program by the faculty committee on graduate admissions. Students must have attained a GPA of at least 3.0. Students admitted to the integrated program must maintain a GPA in all classes used toward the M.S. M E degree of at least 3.0.

Student Aid

Graduate students are supported by a variety of government and industry fellowships, traineeships, and research and teaching assistantships. Stipends vary depending on the source. Competition for support is extremely keen; however, outstanding students are considered for attractive offers of support, including various fellowships specifically for new students in the College of Engineering. By completing the department's application for financial assistance, you will automatically be considered for a graduate assistantship. To receive full consideration for financial aid, all application materials should be submitted by December 15.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

MECHANICAL ENGINEERING (M E) course list

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-07-005

Review Date: 8/8/2013

Faculty linked: 6/27/14

Mass Communications (MASSC)

Program Home Page

Associate Dean for Undergraduate and Graduate Education
College of Communications
201 Carnegie Building
814-865-3070; commgpo@psu.edu

Degree Conferred:

Ph.D.

The Graduate Faculty

Doctoral Degree Requirements

The Ph.D. Program in Mass Communications is administered by the College of Communications. All students seeking admission to the program are required to submit Graduate Record Examination scores, transcripts of all previous undergraduate and graduate work, and three letters of recommendation from individuals qualified to comment on their ability to perform successfully at the doctoral level. Students whose native language is not English must present a minimum TOEFL score of 600 to be considered for admission. In most cases, a completed master's degree is required for admission to the program. In addition, applicants are required to submit a formal statement indicating what they expect to achieve and how their educational background qualifies them for doctoral-level study in mass communications. Admission decisions are made by the college admissions committee.

Requirements listed above are in addition to general Graduate School requirements listed in the GENERAL INFORMATION section of the *Graduate Bulletin*. Students admitted to the doctoral program must complete a candidacy examination. For students with a master's degree or equivalent, this examination ordinarily will occur before the student has completed 10 credits of doctoral-level work. For individuals admitted with only a baccalaureate degree and no graduate-level work, the candidacy examination will be administered after 30 credits and before 40 credits of graduate-level work, have been completed. The committee designated to conduct the examination will determine whether the student's knowledge of mass communications is adequate for doctoral-level study, specify what deficiencies, if any, must be removed, and pass judgment on a proposed plan of study.

The program requirements include both semesters of the Mass Communications Proseminar (COMM 501.1 and COMM 501.2), a foundation course and other courses selected by the student, with committee approval, that collectively constitute a coherent sequence appropriate to the advanced study of mass communications. Students are expected to take a minimum of 20 credits in communications-related courses. No more than 6 credits can be taken as independent study credits. Students also are required to take at least one course in research methods approved by the doctoral committee. Upon completion of the course work approved for the plan of study, the candidate will take a comprehensive examination. Following the comprehensive examination, doctoral candidates schedule a dissertation proposal meeting at which the research plan for their dissertation is reviewed and approved by their committee. Upon completion of the dissertation, doctoral candidates present a final oral defense of their dissertations before their committees.

The communication and foreign language requirement for the Ph.D. degree may be satisfied by intermediate knowledge of one foreign language or by an equivalent research skill relevant to the student's field of study.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMMUNICATIONS (COMM) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 4/12/04

Faculty linked: 6/27/14

Mathematics (MATH)

Program Home Page

SVETLANA KATOK, *In Charge of Graduate Programs in Mathematics*
104D McAllister Building
814-865-7529
gradstudies@math.psu.edu

Degrees Conferred:

Ph.D., D.Ed., M.A., M.Ed.

The Graduate Faculty

Graduate courses in all the principal branches of mathematics are offered regularly each year. The department is prepared to direct research in a variety of fields, including various branches of analysis, algebra, topology, number theory, applied analysis, and mathematical logic and foundations.

Admission Requirements

Scores from the Graduate Record Examinations Aptitude Test (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

To be admitted to the Ph.D., D.Ed., or M.A. program without undergraduate deficiency, an applicant should have completed at least 18 credits in mathematics at the advanced undergraduate level (400 series or their equivalents). The undergraduate student is urged to take at least 6 credits in foundations of analysis (MATH 401), 6 in modern algebra (MATH 435 and MATH 436), and 3 in topology (MATH 429) or their equivalents. These courses are essential preparation for the graduate program, and if they are taken after admission, a maximum of 6 credits may be counted toward an advanced degree.

Students with a 3.00 junior/senior average and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students.

Students applying to the graduate program in mathematics for whom English is not their native language are required to have a score of at least 550 (paper-based test), 213 (computer-based test), or a total score of 80, with a score of 19 on the speaking section (Internet-based test), on the Test of English as a Foreign Language (TOEFL) examination. The results of this examination must be submitted along with other requested items before the application deadline date.

Master's Degree Requirements

For the M.A. degree the department offers two options: (1) the thesis option requires 12 credits of approved 500-series course in mathematics, 6 to 9 credits of thesis, sufficient credits in approved 400- or 500-series courses to make a total of 30 credits, and a final oral examination based on the thesis and general course material; and (2) the nonthesis option requires 18 credits of 500-series courses in mathematics, sufficient credits in approved 400- or 500-series courses to make a total of 30 credits, and a term paper on an approved topic in mathematics. No final examination is given in this option. Under this option a student may also elect to take a minor in applied mathematics (9 credits with at least 6 at the 500 level) and may use these credits toward the necessary 30 credits. For both options, a grade of A or B is required in all courses.

To be admitted to the M.Ed. program without undergraduate deficiency, an applicant should have completed at least 15 credits in mathematics at the intermediate level beyond calculus. The M.Ed. program does not require any 500-series courses, but the student is encouraged to select some at this level. Special courses have been instituted for the training of teachers. Among these are MATH 470 and MATH 471. These are acceptable to satisfy credit requirements only for the M.Ed. degree.

Doctoral Degree Requirements

All doctoral students are required to take three qualifying examinations. Two of these examinations must be completed prior to the beginning of the student's second year of graduate study, and the third prior to the beginning of the third year. The qualifying examinations are in the areas of analysis, algebra, and topology/geometry.

The qualifying examinations are given twice a year--after the end of the spring semester and before the beginning of the fall semester. Basic, one-year sequences are offered in each subject annually to help students prepare for the examinations. Typically, an entering Ph.D. student takes two of the basic sequences in the first year and the third basic sequence in the second year of study, and takes the qualifying examinations in the spring after completing the corresponding courses. If an examination is failed, the student must take it again. Students who fail a qualifying examination in a given subject twice may not continue in the Ph.D. program.

Entering Ph.D. students may take one or more of the qualifying examinations on arrival in August without penalty. If they fail a pre-entrance exam, they still have two more opportunities to pass it. Entering Ph.D. students are advised to take at least two basic sequences (in the subjects they did not pass qualifying exams in on arrival) and the subsequent qualifying exams in the first year of graduate study.

After passing all three qualifying exams, students are expected to select a thesis adviser and form a doctoral committee. The committee administers the comprehensive exam (no later than the end of the seventh semester of study) and offers counsel of the student as his research progresses.

Other Relevant Information

Students in this program may elect the dual-title degree program in Operations Research for the Ph.D. degree. (*See also* Operations Research.)

Further information about the graduate program in Mathematics may be found at the following website: www.math.psu.edu/grad.

Student Aid

Graduate assistantships available through this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

MATHEMATICS (MATH) course list

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 40-01-088

Review Date: 08/16/2011

Faculty linked: 6/27/14

Materials Science and Engineering (MATSC)

Program Home Page

Susan B. Sinnott
Department Head
Professor of Materials Science and Engineering
111 Research Unit A
814-863-3117

SUZANNE MOHNEY
Chair of the Intercollege Graduate Degree Program in Materials Science and Engineering
Professor of Materials Science and Engineering and Electrical Engineering
N-209 Millennium Science Complex
814-863-0744

Degrees Conferred:

- Ph.D in Materials Science and Engineering
- M.S. in Materials Science and Engineering

The Graduate Faculty

The Program

The Intercollege Graduate Degree Program in Materials Science and Engineering offers comprehensive graduate education in the fundamentals of materials science (synthesis-structure-property-performance relationships). Faculty have interests in many research areas including biomaterials, ceramics, composites and hybrids, computational materials science, electronic and photonic materials, materials chemistry and physics, metals, nanostructured and nanoscale materials, piezoelectrics and ferroelectrics, polymers and soft materials. Students may choose to study across the major themes of materials today including materials in energy applications, nanotechnology, materials in medicine, materials in communications, materials for sensor applications, structural materials, etc., by using a combination of MATSE courses and a myriad of materials-related courses offered in the science and engineering departments at Penn State.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants with baccalaureate degrees in the physical sciences and engineering with a Junior/Senior grade point average of 3.2/4.0 or higher will be considered for admission.

Scores for the Graduate Record Examinations (GRE) are required for admission. Applicants with verbal and quantitative GRE scores 303 or higher will be considered.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits is required for the completion of the M.S. degree. At least 18 credits must be at the 500 or 600 level, and the remaining credits may be at the 400 or 800 level. There are 12 credits required in the following core courses: MATSE 501 (3 cr.), MATSE 512 (3 cr.), either MATSE 542 or MATSE 503 (3 cr.), MATSE 582 (1 cr.), and MATSE 590 (2 cr.). Depending on the culminating experience chosen, either 6 credits of thesis research or 6 credits of non-thesis research is required. The remaining elective credits may be chosen from a list of approved electives maintained by the program office.

As a culminating experience for the M.S. degree, students may choose to complete either a thesis or a scholarly paper. Students who choose to complete a thesis must take at least 6 credits of thesis research (MATSE 600). A thesis describing independent research performed by the student must be written and defended at an oral examination. Bound copies will be made available for the University Libraries and the thesis adviser. A thesis committee will administer the final oral examination of the thesis. The committee must consist of at least three Graduate Faculty members. The thesis must be accepted by the committee members, the head of the graduate program, and the Graduate School, and the student must pass the thesis defense.

The non-thesis track is designed to be completed in 3 semesters, or one calendar year (fall, spring, and summer). Students in this program will be required to begin in the fall semester and be registered continuously until the culminating research experience is completed at the end of the summer. A research adviser will be assigned to students in their first semester. Students in the non-thesis option must write a satisfactory scholarly paper while enrolled in MATSE 596 Individual Studies. A total of 6 credits of MATSE 596 will be taken, 1 credit each in the fall and spring, and 4 credits in the summer. It is expected that the scholarly paper will be submitted and approved at the end of the summer semester. Students who need more time to complete the final paper will be allowed to complete the paper, and have it reviewed and approved after the third semester has ended. Students are not required to remain in residence while they complete the final paper. However, extensions granted to students in this program must comply with the Graduate Council policy on deferred grades.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A doctoral program consists of a combination of courses, seminars, and research that fulfills the minimum requirements of Graduate Council and is approved by the doctoral committee for each individual student. A master's degree is not a prerequisite for the doctorate. However, the first year of graduate study leading to the Ph.D. may be the same as that provided for the M. S. degree. Acceptance into the Ph.D. program is based on the student's performance on the Ph.D. candidacy exam, which is administered by a graduate candidacy exam committee of the department.

A minimum of 18 credits of 500-level courses is required for completing a Ph.D. degree in Materials Science and Engineering, including 9 credits in required core courses: MATSE 501 Thermodynamics of Materials (3 cr.), MATSE 503 Kinetics of Materials Processes (3 cr.), and MATSE 512 Principles of Crystal Chemistry (3 cr.). Ph.D. students are also required to take 2 credits of MATSE 590 Colloquium each year, and complete MATSE 582 Materials Science and Engineering Professional Development (1 cr.); credits for MATSE 582 and MATSE 590 will not count towards the minimum 18 credits required. Additional specific course requirements are determined by the student and the adviser in consultation with the student's doctoral committee. A student with an M. S. degree from Penn State can use credits earned during his or her M. S. study to fulfill the Ph.D. course requirements. Upon approval by the doctoral committee and the graduate program coordinator, some or all of the course requirements may be waived for students holding an M. S. degree from another institution.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*. Graduate assistantships will not be available to students in the non-thesis MatSE M.S. track.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

MATERIALS SCIENCE AND ENGINEERING (MATSE) course list

Last Revised by the Department: Spring Semester 2017

Blue Sheet Item #: 45-04

Review Date: 1/10/2017

Faculty linked: 6/27/14; chair updated: 7/30/14

Mechanical Engineering

School of Science, Engineering, and Technology
Penn State Harrisburg – W239 Olmsted Building
777 West Harrisburg Pike, Middletown, PA 17057
(717) 948-6116

Degree Conferred

M.S.

The Program

Penn State Harrisburg (PSH) is located within a short commute from York, Lancaster, Carlisle, Reading, and Harrisburg industrial centers concentrated on manufacturing, engineering consulting, product design, and development. The Master of Science in Mechanical Engineering degree program is designed to provide support for industrial research needs, as well as offer an avenue for Penn State Harrisburg B.S. ME graduates to continue their education in the south central Pennsylvania region. The program is accessible to engineering professionals who wish to pursue advanced studies without giving up their current employment. The program may be completed on a full-time or part-time basis. Classes are scheduled weekly in three-hour evening sessions, offering a convenient format for career professionals seeking to enroll part time. Whenever possible, the program will take advantage of the specialized equipment and research facilities available in the local industries to enhance the training of M.S. ME students.

ADMISSION REQUIREMENTS

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

Admission into the Master of Science (M.S.) Mechanical Engineering program will be granted only to candidates who demonstrate high potential for success in graduate studies. Applicants should have undergraduate degrees in engineering or technology fields from an accredited university and must meet the admission requirements as set by Penn State's Graduate School.

An undergraduate cumulative grade-point average of 3.0 or better on a 4.0 scale, and scores from the GRE are required for admission.

Applicants should submit the following:

- a completed Graduate School online application with the application fee;
- official transcripts from all post-secondary institutions attended;
- three (3) letters of professional recommendations from individuals who can evaluate the applicant's potential;
- a personal statement of professional interest, goals, and experience;
- test scores from the Graduate Record Examination (GRE);
- statement of interest in graduate assistantship, if desired.

English Proficiency

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

A minimum of 31 credits at the 400, 500, 600, or 800 level is required, including 24 course credits with at least 15 credits at the 500 level, 1 credit of ME 590 Colloquium, and 6 credits of thesis research (ME 600 or 610). The 24 course credits consist of:

- EMCH 524A Mathematical Methods in Engineering (3 cr.)
- Concentration Area (9 cr.): Students take 9 credits in one of the following concentrations: Thermo-Fluids Science, Mechanical Science, or Materials Science. A list of courses that will count towards these concentrations is maintained by the program office.
- Electives (12 cr.): Students take 12 credits of electives from a list of approved electives maintained by the program office. To incorporate breadth into the program, students are required to take at least one elective course in a Concentration Area other than the one they complete.
- A maximum of 3 400-level courses (9 credits) can be counted towards the degree requirements for the M.S. A minimum of 12 credits must be earned in 400- and 500-level courses in Mechanical Engineering.

Students who have deficiencies in the use of spoken or written English may be required to take courses in these areas in addition to the specified degree requirements. Credits earned to remediate deficiencies cannot be applied towards requirements for the M.S. degree.

Degree requirements must be completed within six years of admission to degree status.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Molecular, Cellular and Integrative Biosciences (MCIBS)

Program Home Page

MELISSA ROLLS, *Chair*
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Degrees Conferred:

Ph.D., MD/Ph.D, M.S.

The Graduate Faculty

The Program

The Intercollege Graduate Degree Program (IGDP) in Molecular, Cellular, and Integrative Biosciences (MCIBS) is designed to prepare researchers across an array of specializations in the biological sciences that share an emphasis on trans-disciplinary training, an approach that considers the whole organism and spans the continuum of understanding from fundamental mechanisms of action at the molecular/cellular level of discovery, to the function of the organism in its environment, with applications that enhance health and well-being. To achieve this goal, the IGDP in MCIBS serves as an umbrella portal for the entry and subsequent training of the next generation of researchers for academic, industrial, non-profit foundation, government, and other research entities in the biomedical sciences. Researchers will be trained across a wide range of specializations in the biological sciences that share the goal to elucidate mechanisms of action at the molecular, cellular, and organismal level, including disease.

The program currently offers educational and research emphasis areas in Cell and Developmental Biology; Immunology and Infectious Disease; Molecular and Evolutionary Genetics; Molecular Medicine; and Molecular Toxicology and Neurobiology, but is structured to remain contemporary with evolving or emerging fields within the biological/health sciences. Incoming students enroll in core courses of instruction covering basic biochemistry and molecular biology of cellular processes; ethics; and current research topics related to the diverse pathological mechanisms that underlie disease etiologies in humans and animals. In addition, students take specialized courses associated with one of the above programmatic emphasis areas or the option, as well as elective courses that complement and support their research interests and foci.

Calling upon the expertise of an extensive list of life science research faculty members representing an array of different departments across multiple colleges, the IGDP in MCIBS offers a unique opportunity to learn about and work in multiple bioscience disciplines. The MCIBS graduate program is supported by modern telecommunications facilities and equipment, and students not only explore new conceptual connections at the frontiers of research, but also engage in active group learning experiences and explore a variety of potential career opportunities before graduation.

General Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Review of completed applications begins December 1 of each year. Applicants to the Ph.D. program are considered for admission; the program does not admit applicants for the terminal master's degree. Required application materials include:

1. Completed official Penn State Graduate School application.
2. Paid, nonrefundable application fee (see Requirements for Graduate Admission for current fee).
3. Official transcripts from all post-secondary institutions attended.
4. Application for a U.S. visa (international applicants only).
5. Graduate Record Examination (GRE) General Test; successful applicants generally have scores above the 75th percentile for each of the verbal, quantitative, and analytical writing sections.
6. Names and contact information, including business email addresses, for three references.
7. Statement of goals that pertain to the life sciences including motivation for pursuing a research doctorate; research experience and interests; and professional goals. The statement should include biological problems that are of interest to the applicant and how the applicant's past experiences have prepared him or her to pursue this research.
8. The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information. Applicants to the MCIBS graduate program must have a minimum TOEFL score of 575 for the paper-based test, or a total score of 90 with a 21 on the speaking section for the Internet-based test (iBT). Successful applicants generally have a minimum score of 100 (with a 23 on the speaking section) on the Internet-based test.
9. Successful applicants generally will have completed coursework in biochemistry, molecular and/or cell biology, physics, chemistry (organic and inorganic), and calculus have a minimum 3.5/4.0 Jr./Sr. undergraduate grade point average.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

All students in the MCIBS graduate program are required to complete a minimum of 24 credits consisting of the following:

1. **Core Required Courses (12 cr.):**

A minimum of 12 credits in the following core courses is required: MCIBS 590 Colloquium (2 cr.), MCIBS 591 Ethics in the Life Sciences (1 cr.), BIOL 593 Experiential Teaching in Biology (2 cr.), MCIBS 596 Individual Studies (for Research Rotations) (1 cr.), MCIBS/BIOL/BMMB/VB SC 503 Critical Elements of Genetics and Molecular and Cellular Biology (4 cr.), and MCIBS 592 Current Research Seminars (2 cr.).

2. **Emphasis Areas (9 cr.):**

MCIBS offers curricular/research specializations in the following Emphasis Areas:

- Cell and Developmental Biology
- Immunology and Infectious Disease
- Molecular and Evolutionary Genetics
- Molecular Medicine
- Molecular Toxicology
- Neurobiology

Specialized Courses and Research for Emphasis Areas: To complete an emphasis in any of the areas listed above, students take a minimum of 9 credits of specialized coursework and conduct original research associated with the respective Emphasis Area. The list of specialized courses that will count towards each Emphasis Area is maintained by the program office.

3. **Additional Course Requirements (3 cr.):**

Quantitative Foundation Course (> 3 credits): 400- or 500-level courses in a quantitative area such as statistics, genetics, bioinformatics, etc. (e.g., STAT 501 Regression Methods; STAT 502 Analysis of Variance and Design of Experiments; STAT 503 Design of Experiments; Population Genetics; etc. The list of

courses that will count towards the Quantitative Foundation requirement is maintained by the program office.

Teaching Experience – In addition, all graduate students in MCIBS are required to have one semester of teaching experience by serving as a teaching assistant (TA) in an undergraduate course (400-level or lower) in a bioscience-related field. Teaching assistant opportunities are arranged in consultation with the adviser and program chair.

M.S.-specific Degree Requirements

Master's students must take a minimum of 30 credits (the 24 credits described above, plus at least 6 credits of MCIBS 600 Thesis Research). At least 18 credits in 500- and 600-level courses combined must be included in the program. A minimum of 24 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program.

Master's students must complete at least 6 credits of thesis research (MCIBS 600), and up to 6 of the MCIBS 600 credits may be assigned a quality grade (A-F).In consultation with the adviser, the student must select a thesis committee of at least three members (including the adviser), write a thesis, and defend the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass the thesis defense. If all course credits and requirements are met, a student does not have to be registered for classes while writing and/or defending the thesis. Students must present their thesis in accordance with Graduate Council and Graduate School guidelines as described in the THESIS GUIDE: Requirements for the Preparation of Master's Theses and Doctoral Dissertations.

Ph.D.-specific Degree Requirements

Course Work:

Ph.D. students must take a minimum of 24 credits, as described above. At least 18 credits in 500- and 600-level courses combined must be included in the program. A minimum of 24 credits in course work (400, 500, and 800 series), as contrasted with research (MCIBS 600), must be completed in the major program. A student's doctoral committee can require additional course work depending on the student's background and research plans.

English Competence:

Candidates for all doctoral degrees are required to demonstrate high-level competence in the use of the English language, including reading, writing, and speaking, as part of the language and communication requirements for the doctorate. This will be assessed for both domestic and international students as part of the candidacy exam, which includes a reading and original writing component. Should deficiencies be identified at the candidacy examination, students will be directed into appropriate remedial activities, including additional English and communication courses. Competence must be formally attested by the program before the doctoral candidate's comprehensive examination is scheduled. (Note: Passage of the minimal TOEFL or IELTS requirement does not demonstrate the level of competence expected of a doctoral degree candidate and for conferral of a doctorate from Penn State.)

Candidacy Exam:

All Ph.D. students in the IGDP in MCIBS must take a candidacy exam no later than the fall semester of the second year. The purpose of the exam is to ensure that students have mastered the core concepts necessary to proceed further towards the Ph.D. The exam consists of both written and oral components, and is based primarily on the students' ability to critically read, understand, and communicate the key findings of a current research paper selected from the literature. Official entrance into the Ph.D. program occurs upon successful completion of the candidacy examination.

Doctoral Committee:

Upon successful completion of the Candidacy Examination, the student in consultation with his/her adviser will, as soon as possible, select a doctoral committee. The committee must meet Graduate Council guidelines for the composition of doctoral committees. This committee is responsible for supervising the academic program and monitoring the progress of the student towards his/her degree. It is the charge of this committee to assure that the student carries out a substantial piece of independent research and presents it as a dissertation.

Comprehensive Examination:

The Comprehensive Examination is administered and evaluated by the entire Doctoral Committee when the student has completed substantially all required coursework, and is intended to determine the feasibility of the student's proposed research and the preparedness of the student to embark on his/her dissertation research. Students must be registered for classes (typically MCIBS 600) the semester they take this exam. The examination will consist of a written research proposal using an NRSA or NSF format, based upon the student's proposed dissertation research, and an oral presentation of the proposed research. The proposal must include a timeline for the completion of the work that will be considered in the feasibility of the work.

Dissertation:

All Ph.D. candidates must conduct original research and prepare a dissertation that makes a significant contribution of new knowledge, is presented in a scholarly manner, and demonstrates an ability on the part of the candidate to do independent research of high quality. The contents and conclusions of the dissertation must be defended at the time of the final oral examination. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Students must present their dissertation in accordance with Graduate Council and Graduate School guidelines as described in the THESIS GUIDE: Requirements for the Preparation of Master's Theses and Doctoral Dissertations.

Final Oral Examination:

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

Additional Requirements:

All MCIBS graduate students must maintain a cumulative grade-point average of ≥ 3.0 to remain in good academic standing. Furthermore, the Ph.D. student must have a 3.0 GPA to take the doctoral candidacy, the comprehensive and the final oral examinations. One or more failing grades (F) or a cumulative grade-point average below 3.0 will be considered evidence of unsatisfactory scholarship and may be grounds for dismissal from the program.

M.D./Ph.D. Admissions Requirements

Students interested in simultaneously pursuing an M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint degree program. Admissions requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program section of the Penn State College of Medicine website. The College of Medicine M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the M.D. and Ph.D. program. Students not accepted into the joint degree program can be referred to either the M.D. or Ph.D. program, depending on their qualifications and interests.

After the review committee has accepted an applicant to the joint degree program, s/he must apply and be admitted to the Graduate School for admission to the graduate program. The general admission requirements for the Ph.D. degree are listed in the General Admission Requirements section above. Additional admission requirements for the joint degree are listed below:

- Academic Achievement - Applicants to our program generally have very strong grades and MCAT scores. In recent years, successful applicants have an average GPA of 3.75 and MCAT scores of 33-34. Applicants are not required to take the GREs.
- Research Experience - We are especially interested in students with a strong and sustained background in research. Students who have spent 1-2 years after graduation conducting research are strongly encouraged to apply. Alternatively, in-depth research experience as an undergraduate can suffice.
- Recommendations - We are especially interested in receiving letters of recommendation from faculty with whom you conducted research and who can comment on your passion and potential for research.
- Goals - Applicants must be able to clearly articulate the reasons for pursuing the joint degree.
- International Students - All qualified students are eligible to apply regardless of citizenship.

M.D./Ph.D. Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on theM.D. Program section of the Penn State College of Medicine website. Degree requirements for the Ph.D. degree are listed in the Ph.D.-specific Degree Requirements section above.

During the first two years of medical school, the student conducts at least three research rotations. After successful completion of the first two years of medical school the candidate joins their dissertation lab in the MCIBS Graduate Program.

During the summer after the second year of medical school M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves in lieu of the knowledge-based part of the Candidacy Examination for the MCIBS program. Successful completion of BMS 506 A and B, which is taken in the second year of medical school, with a grade of B or higher, meets the critical thinking and paper analysis requirement of the candidacy exam.

The doctoral committee of an M.D./Ph.D. student in the MCIBS program is formed upon entry into the dissertation laboratory. In addition to the general Graduate Council requirements for doctoral committees, the committee must include at least two members of the MCIBS program Graduate Faculty and one M.D./Ph.D. steering committee member.

The MCIBS program will accept passing grades in the medical school courses SPM 711 Scientific Principles of Medicine (15 cr.) in lieu of 11 required credits for the MCIBS Core Required and Elective courses. The 11 required credits include 5 credits of MCIBS Core Required Courses (MCIBS 503 (4 cr.) and MCIBS 596 (1 cr.)), and 6 credits of elective courses (BMMB 541 (3 cr.) and BMMB 542 (3 cr.)). Because students in the M.D./Ph.D. program are being trained to combine research and medicine, most likely in medical schools, the MCIBS requirement for exposure to undergraduate teaching is waived. M.D./Ph.D. candidates are not required to take BIOL 593 Experiential Teaching in Biology (2 credits) or to be teaching assistants. The Emphasis Area requirement and the Quantitative Foundation Course requirement are also waived.

In addition to taking the required courses MCIBS 590 Colloquium (2 cr.), MCIBS 591 Ethics in the Life Sciences (1 cr.), and MCIBS 592 Current Research Seminars (2 cr.), elective courses are selected in consultation with the student's dissertation adviser and doctoral committee, with guidance from the MCIBS emphasis area course lists and program chair. 6 credits of elective courses will be selected.

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their doctoral committee.

A dissertation must be prepared and defended by each M.D./Ph.D. candidate, as described above in Ph.D.-specific Degree Requirements. In addition, M.D./Ph.D. students must have *submitted* a first-author manuscript before defending their dissertation. Before returning to medical school, the doctoral dissertation must be accepted by the Graduate School.

The M.D./Ph.D. Program requires that students have one first author peer-reviewed paper published based on their research accepted prior to completing medical school, and preferably accepted for publication prior to returning to the third year of medical school. At the discretion of the College of Medicine Vice Dean for Research and Graduate Studies, in consultation with the MCIBS Program Chair, the requirement for a first author publication prior to completing medical school may be waived. Examples of conditions that might warrant exemptions include: (a) prolonged illness, (b) mentor's relocation, (c) mentor's reluctance to submit the student's work for publication, (d) the student's project is published by another research group, or (e) delays or challenges in the publication review process beyond the control of the student or dissertation advisor.

If a student decides not to return to medical school, or for some other reason is not able to complete the last two years of medical school, but they have successfully completed their Ph.D. dissertation and final oral examination and met all other degree requirements for the Ph.D. in MCIBS, they will eligible to receive the Ph.D. The latter will be conferred after the student notifies the program that she/he wishes to withdraw from the M.D. program and completes all requirements for conferral of the Ph.D. degree.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2017

Blue Sheet Item #: 45-06

Review Date: 4/4/2017

Faculty linked: 8/21/2015

Media Studies (MEDIA)

Program Home Page

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Degree Conferred:

- M.A.
- Integrated B.A/M.A. in Media Studies
- Joint Degree Offering with Penn State Law (J.D./M.A.)

The Graduate Faculty

The Program

The master's degree in Media Studies is an academic program that involves students in the systematic study of media. The objective of the course of study is to enable students to achieve a comprehensive understanding of the systems, networks, cultures, and information associated with media. The program prepares students for doctoral study in communications and for professional positions in business and government requiring a comprehensive understanding of the historical, social, and political implications of the media. This program helps prepare students to organize research projects, critically evaluate research reports, and directly influence media practices by the application of research findings.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE) are required for admission. Students with a 3.00 junior/senior grade-point average are eligible for admission. Three letters of recommendation are required. Applicants must also submit an autobiographical statement of about 1,000 words indicating the nature of the applicant's interest in Media Studies, reasons for wanting to do graduate work, and future aspirations relating to the field of mass communications. Experience shows that most applicants hold a bachelor's degree in a field of the liberal arts or the social and behavioral sciences, including journalism and mass communications. However, this does not preclude applicants with other backgrounds, abilities, and interests such as those whose undergraduate training may have been in a scientific or technical field. In every case, the applicant should explain in the autobiographical statement how his or her undergraduate education relates to the decision to seek admission to graduate study in mass communications.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information. Applicants to the Media Studies program must have a score of 24 or higher on the speaking section of the TOEFL Internet-based test.

Program of Study

The M.A. program seeks to integrate two areas of inquiry and analysis. The "Critical Studies" area centers on the expressive, creative, and linguistic dimensions of media as cultural processes. The "Political Studies" area focuses primarily on the political and economic dimensions of national and international communications systems and processes. The student is encouraged to combine courses from these and possibly other areas into a coherent package of course work culminating in either a thesis or a master's paper.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 36 credits is required for the completion of the M.A. degree. Students in the thesis track must complete at least 18 credits at the 500 or 600 level, and the remaining credits may be at the 400 or 800 level. Students in the non-thesis track must complete 18 credits at the 500 level, and the remaining credits may be at the 400 or 800 level. There are 7 credits required in the following core courses: either COMM 506 or 511 (3 cr.), COMM 515 (3 cr.), and COMM 590 (1 cr.). If the student chooses to write a thesis, at least 6 credits in thesis research (COMM 600 or 610) must be taken. Students in the non-thesis track must write a satisfactory master's paper, while enrolled in COMM 596 (3 cr.). Additional courses that will count as electives towards this degree can be chosen from a list of approved elective courses maintained by the graduate program office. Course work offered by departments outside the College of Communications may be scheduled as part of the student's program with prior approval of the student's academic committee. In some cases, students may be required to take additional credits in order to make up deficiencies in undergraduate course work.

Students are required to schedule three separate, formal meetings with their advisers and the academic committees for (1) discussion and approval of the general program plan, (2) the thesis or master's paper proposal, and (3) the defense of the thesis or paper. In most cases, satisfactory completion of course work and thesis requires two years. A thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. A master's paper must be accepted by the advisers, committee members and the graduate programs chair, and the students must pass a master's paper defense.

Integrated B.A/M.A. in Media Studies

The Donald P. Bellisario College of Communications offers academically qualified students enrolled in a Bachelor of Arts program in the College of Communications the opportunity to earn both the B.A and the M.A. upon completion of five years of study. The Integrated Undergraduate-Graduate Program in Media Studies facilitates the advanced study of communications research and thesis development through a carefully organized selection of undergraduate courses, graduate seminars and directed research projects. The program accelerates and enhances undergraduate students' appreciation for graduate level scholarship by involving them in the seminars, research activities, and the scholarly discourse of the college's community of master's- and doctoral-level scholars.

The Integrated B.A./M.A. degree in Media Studies is an academic program that involves students in the systematic study of media. The objective of the course of study is to enable students to achieve a comprehensive understanding of the systems, networks, cultures, and information associated with media. The program prepares students for doctoral study in communications and for professional positions in business and government requiring a comprehensive understanding of the historical, social, and political implications of the media, and research methods for studying the media. This program helps prepare students to organize research projects, critically evaluate research reports, and directly influence media practices by the application of research findings. The program is specifically not intended for advanced professional education.

Application Process and Admission Requirements

Students must apply to the program via the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the Media Studies graduate program for the Master of Arts degree, listed above.

Applicants must have a minimum GPA of 3.5 in order to be admitted; 3 credits from COMM's General Education courses (COMM 100, COMM 150, COMM 180, COMM 320, or COMM 370); and 3 credits from the COMM 200 level and above. Admission to the program is based on the evaluation of the student's transcript, examples of completed writing and research projects, a narrative statement of objectives, and two letters of support from faculty with whom they have worked. One faculty member must be from the College of Communications. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester proceeding the semester of expected conferral of the undergraduate degree. Candidates are expected to present records of outstanding scholarly achievement to qualify.

Applicants to the Integrated program

1. Must be enrolled in a B.A. program in the College of Communications.
2. Must apply no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester proceeding the semester of expected conferral of the undergraduate degree.
3. Must provide a narrative statement of objectives and two letters of endorsement from faculty with whom they have worked. One faculty member must be from the College of Communications.
4. In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program. Students must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the B.A. in Media Studies are listed in theUndergraduate Bulletin. Degree requirements for the M.A. degree are listed in the Master's Degree Requirements section above. Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. Students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count towards the graduate degree.

The following credits are eligible to be double-counted towards both the undergraduate and the graduate degrees:
Graduate Credits: COMM 504, COMM 506, COMM 507, COMM 510, COMM 511, COMM 512, COMM 513, COMM 514, COMM 515, COMM 516, COMM 517, COMM 518, COMM 520, COMM 521, COMM 522, COMM 550, COMM 553, COMM 556, COMM 580, COMM 582, COMM 584, COMM 585, COMM 594, COMM 595, COMM 596, COMM 597X

Undergraduate Credits:
Advertising: COMM 410, COMM 411, COMM 417, COMM 420, COMM 421W, COMM 424;
Journalism: COMM 403, COMM 405, COMM 409, COMM 410, COMM 411
Film Video: COMM 411, COMM 438, COMM 440, COMM 451, COMM 452
Media Studies: COMM 405, COMM 411, COMM 413W, COMM 418
Public Relations: COMM 403, COMM 409, COMM 417, COMM 420, COMM 471
Telecommunications: COMM 403, COMM 405, COMM 410, COMM 484, COMM 486(W), COMM 487(W)

If students accepted into the IUG program are unable to complete the M.A. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Joint Degree Offering with Penn State Law

Degrees Conferred:
J.D. (Penn State Law)
M.A. (Donald P. Bellisario College of Communications, Media Studies)

Joint Degree Program: Penn State Law (PSL) and the Donald P. Bellisario College of Communications (COMM) offer a joint degree program leading to a Juris Doctor (J.D.) and a Master of Arts (M.A.) in Media Studies.

Admission Requirements

Students applying to the joint degree program must be admitted separately into both PSL and COMM. Admissions requirements and applications for admission for Penn State Law are listed in the J.D. Admissions section of the Penn State Law website. The admission requirements for the Media Studies graduate program are listed above. Students must first be admitted to the law school and must complete the required first-year curriculum in the J.D. program before commencing the Media Studies M.A. component. Application to the M.A. program must take place through the Graduate School Application. Formal admission to the M.A. program would normally take place during the student's first year of law, but COMM may extend admission to the M.A. program at the time an applicant applies to PSL particularly where an applicant's law school choice depends upon admission to the J.D./M.A. joint degree program. At the student's request, the LSAT may replace the GRE for joint degree admission purposes.

Residency: A typical J.D./M.A. joint degree student will be in residence at PSL for six semesters and at COMM for two semesters.

Liaisons: The department and faculty liaisons for PSL shall be the Associate Dean for Academic Affairs and the student adviser shall be the Associate Dean for Academic Affairs or such other faculty member(s) as may be designated by the Dean. The liaison for COMM shall be the Joint Degree J.D./M.A. Program Faculty Adviser.

Inter-Program Transfer of Credits

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on the Penn State Law website. Degree requirements for the M.A. degree are listed in the Degree Requirements section above.

Penn State Law: A maximum of twelve (12) 500-level credits for Media Studies M.A. course work may be transferred for credit toward the J.D. degree at PSL. Students must obtain a grade satisfactory to PSL for the course work to be credited toward the J.D. degree. The following COMM courses may qualify for credit toward the PSL J.D.: COMM 504, COMM 505, COMM 506, COMM 511, COMM 513, COMM 516, COMM 517, COMM 518, COMM 580, COMM 582, COMM 585, and COMM 587.

Donald P. Bellisario College of Communication: A maximum of twelve (12) credits of PSL course work will be counted for credit for the minimum requirements for a master's degree. These courses must be approved by the student's advisery committee and Joint Degree Program Faculty Adviser in COMM, normally during the Program Proposal Meeting.

The J.D. seminar requirement and the Media Studies thesis requirement must be fulfilled separately, using unique research topics.

Course Sequencing: The sequence of courses will be determined by the student and their adviser(s). However, students must successfully complete the first-year curriculum with PSL before beginning the M.A. Media Studies program. In compliance with ABA Standards and Rules law students may not enroll for more than 17 credits per semester at Penn State as a law student; the maximum credit load for graduate students is 15 credits per semester. It is expected that most joint degree students will complete the first two semesters of the M.A. consecutively in either the first or second year after completion of the first-year curriculum with the Law School.

Recommended Program of Study and Advising

All students in the program will have two advisers, one from PSL and one from COMM; the adviser from COMM may be any member of the Graduate Faculty in

the College. Periodic interaction between the two advisers is encouraged. A program of study is developed for each student, taking into account the fact that some courses at both locations are offered on a rotating or intermittent basis. Many courses are offered every year but some are offered every two or three years. Advisers will have available a list of projected relevant courses or educational experiences in order to work with the student on an individualized program of study. The standard committee structure will apply to the COMM M.A. program.

Tuition

Students will be charged the applicable PSL tuition to cover the J.D. program and the applicable graduate tuition to cover the M.A. degree program. PSL tuition will be paid for the semesters in which the student is registered for PSL courses, and graduate tuition will be paid for the semesters in which the student is registered for graduate courses in the M.A. program. A student may take up to one course (3 credit hours) per semester in the program where the student is not primarily registered without any change in tuition, but must pay additional tuition to the program that the student is not primarily registered if he or she wishes to take additional course work pursuant to that program during the semester.

Financial Aid and Assistantships

Decisions on financial aid and assistantships will be made by each school according to that school's procedures. Students on graduate assistantships must adhere to the course load policy listed in the Bulletin.

Fulfillment of Degree Requirements and Graduation

A student in the program may complete the requirements for one of the degrees and be awarded that degree prior to completing all the requirements for the other degree; provided, however, that the student shall have successfully completed at least two semesters of work towards the other degree. All courses in one program that will count towards meeting the requirements of the other must be completed before the awarding of either degree. Students will be required to fulfill all requirements for each degree in order to be awarded that degree, subject to the inter-program transfer of credits. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.A. degree if all M.A. degree requirements have been satisfied.

Important Note: If the joint degree student is using law (900-level) credits toward the graduate degree during their last semester of enrollment, they should be prepared to extend their graduate degree graduation to a subsequent semester (the following semester at a minimum). This is due to the graduate degree approval deadline falling before the law (900-level) course grading processes are complete. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.A. degree if all M.A. degree requirements have been satisfied.

Student Aid

Graduate assistantships and other forms of student aid available to students in this program are described in the STUDENT AID section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMMUNICATIONS (COMM) course list

Last Revised by the Department: Summer 2018

Blue Sheet Item #:46-07

Review Date: 6/26/2018

Faculty linked: 6/27/14

Meteorology and Atmospheric Science (METEO)

Program Home Page

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Degrees Conferred:

- Ph.D., M.S.
- Integrated B.S./M.S. Program in Meteorology and Atmospheric Science
- Dual-Title Graduate Degree (Ph.D.) in Climate Science
- Dual-Title Graduate Degree (Ph.D.) in Astrobiology

The Graduate Faculty

The graduate program embraces topics that span atmospheric processes from those of the planetary boundary layer to those of the upper atmosphere, that encompass phenomena from weather to climate with molecular to planetary dimensions, and that range from practical to theoretical significance. The program develops and integrates approaches based on observational, computational and analytical techniques, and seeks to advance both fundamental understanding and predictive skill.

The major interests of the faculty and graduate students include (1) mesoscale- and synoptic- scale weather systems; (2) climate and earth system dynamics; (3) atmospheric physics including radiative transfer and cloud physics; (4) atmospheric chemistry, air quality and the earth's biogeochemical cycles; (5) atmospheric turbulence, boundary layers, land-atmosphere interactions, ocean-atmosphere interactions, and ocean-ice-atmosphere interactions; (6) geophysical fluid dynamics, (7) physical oceanography, and (8) climate and weather risk. Methodological approaches include numerical modeling, data assimilation, atmospheric remote sensing, field observations, atmospheric data analysis, and laboratory studies.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. Applicants apply for admission to the program via the Graduate School application for admission.

The Meteorology and Atmospheric Science program is open to all students with a baccalaureate degree and a strong interest in the atmospheric sciences. A degree in science (including, but not limited to, meteorology or atmospheric science), mathematics, or engineering provides a particularly good background, although the department has had some students with arts and humanities degrees who have done well. The minimum course requirements for admission are mathematics at least through differential equations and at least one year of calculus-based physics. Scores from the Graduate Record Examinations (GRE) are required for the evaluation of all applicants.

For admission to the program, the departmental admission committee considers courses taken, grade-point average, three letters of recommendation, GRE scores, professional experience, and English proficiency. Rather than setting rigid standards in each category, the committee examines the overall record as a whole. The best-qualified applicants are accepted up to the number of spaces that are available for new students.

Generally, additional mathematics and physics beyond the minimum requirements listed above, as well as courses in statistics, chemistry, and computer programming, will strengthen the student's application. Courses in meteorology and atmospheric science are not required for admission. Most students admitted to the graduate program have undergraduate grade-point averages of 3.50 or higher. Three recommendations are solicited from persons familiar with the student's academic competence, and the student is required to write a letter summarizing interests and goals. A verbal and quantitative combined GRE score of 315 or greater is typical for the department's students.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Note: All international students required to take the English proficiency test must take the American English Oral Communicative Proficiency Test (AEOCPT) upon first enrollment. If the student does not meet the minimum score requirements on the AEOCPT, the student must complete additional course work in English in order to be eligible to receive a teaching assistantship.

Master of Science (M.S.) Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The M.S. degree is offered with thesis or research paper options, both requiring 35 credits.

A minimum of 35 credits at the 400, 500, 600, or 800 level is required, with at least 29 credits at the 500, 600 and 800 level combined. The required core curriculum consists of 23 credits, including 12 credits in four distinct courses, two each from two prescribed lists for dynamic meteorology and physical meteorology. The dynamic meteorology list consists of METEO 520 (3 credits), METEO 521 (3 credits), METEO 554 (3 credits), METEO 551 (3 credits), and METEO 570 (3 credits). The physical meteorology list consists of METEO 532 (3 credits), METEO 533 (3 credits), METEO 535 (3 credits), METEO 556 (3 credits), and METEO 570 (3 credits). In addition, students must complete at least 2 credits of METEO 880 or METEO 596, at least 2 credits of METEO 590, 1 credit of METEO 591, and 6 elective credits from 500-level Meteorology and Atmospheric Science courses or 500-level courses in related disciplines from a list of approved electives maintained by the program office.

Students can choose to complete either a thesis or a scholarly paper as the culminating experience for the degree. Students who choose the thesis track must select METEO 880 and 6 additional elective credits from 400- and 500-level course work in Meteorology and Atmospheric Science or related disciplines from a list of approved electives maintained by the program office. In addition, students must complete 6 quality-graded credits in thesis research (600 or 610) in conjunction with completing the thesis (quality-graded credits count toward the grade-point average). The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Students in the scholarly paper track must select 2 credits of METEO 596, 6 additional elective credits from 400- and 500-level course work in Meteorology and Atmospheric Science, and 6 additional credits from 400- and 500-level course work in Meteorology and Atmospheric Science or related disciplines from a list of approved electives maintained by the program office. Students in the scholarly paper track cannot count METEO 600 credits towards degree requirements. Students will complete the scholarly paper while registered for 2 credits of METEO 596 in their final semester. M.S. students in the scholarly paper track must defend their scholarly paper in a public presentation that is evaluated by, and must be approved by, the students' committee.

Master's Minor

Requirements listed here are in addition to requirements stated in the Graduate Minors section of the *Graduate Bulletin*.

For a master's minor in Meteorology and Atmospheric Science, a student must select 6 credits of Meteorology and Atmospheric Science courses, 3 of which have to be at the 500-level, in a course plan approved by the Meteorology and Atmospheric Science graduate program.

Doctor of Philosophy (Ph.D.) Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Studies for the Ph.D. degree are designed to accommodate the interests and capabilities of the candidate, and they are overseen by a doctoral committee, which also administers comprehensive and final oral examinations. Before being admitted to Ph.D. candidacy, a student must have the academic support of a faculty member and the student must pass the Ph.D. candidacy examination. The exam must be taken within three semesters (excluding summer sessions) of entry into the doctoral program. If a student does not pass the exam on their first attempt, then a second attempt may be allowed at the discretion of the graduate faculty members of the department.

In addition, Ph.D. degree requirements include successful completion of the following: approved graduate course work, English Competence requirements, a comprehensive examination, and a final oral examination (the dissertation defense). The student must pass the English competency exam before scheduling the comprehensive exam. To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School. For the Ph.D. program, a minimum of 21 credits is required, including a core curriculum of 12 credits in four distinct courses, two each from two prescribed lists for dynamic meteorology and physical meteorology. The dynamic meteorology list consists of METEO 520 (3 credits), METEO 521 (3 credits), METEO 554 (3 credits), METEO 551 (3 credits), and METEO 570 (3 credits). The physical meteorology list consists of METEO 532 (3 credits), METEO 533 (3 credits), METEO 535 (3 credits), METEO 556 (3 credits), and METEO 570 (3 credits). The student will be tested for mastery of the selected core in the candidacy exam. In addition, a student must take METEO 591 (1 credit) the first semester it is available upon matriculating in the program. METEO 880 (2 credits) must be taken prior to the department's competency exam in written and spoken technical English. The 12 credits of core curriculum courses, METEO 880, and METEO 591 may be waived as required courses at the discretion of the program if the student has already taken them or equivalent courses, and the total required credits will be reduced accordingly. A minimum of 6 elective credits from METEO 500-level or related discipline 400- or 500-level courses must be taken that do not count toward any other degree requirement and finished by the semester in which the comprehensive exam is passed. In addition to the 21 minimum required credits, one credit of METEO 590 is required each semester until the comprehensive exam is passed. A student must pass the department's competency exam in written and spoken technical English before being admitted to the comprehensive exam. There are no minimum quality-graded credit (research credits whose grades count toward the grade-point average)requirements for METEO 600; students may earn up to a maximum of 12 quality-graded METEO 600 credits.

Doctoral Minor

Requirements listed here are in addition to requirements stated in the Graduate Minors section of the Graduate Bulletin.

For a minor in Meteorology and Atmospheric Science, doctoral students should select 15 credits of Meteorology and Atmospheric Science courses, 9 credits of which have to be 500-level, in a course plan approved by the department.

Dual-Title Ph.D. in Climate Science (CLSCI)

Students interested in the field of Climate Science may wish to obtain a Dual-Title Doctoral Degree in Climate Science and Meteorology and Atmospheric Science. The pursuit of this dual title entails additional course work beyond the degree requirements set forth here (see the Graduate Bulletin, Climate Science, for further details concerning these course and other program requirements), as well as the participation of at least one Climate Science program faculty member on the dissertation committee. The Climate Science representative, who assists with the selection of courses, may be the adviser and have an appointment in Meteorology and Atmospheric Science. The Ph.D. candidacy exam for dual-title students will be administered by Meteorology and Atmospheric Science but with a component of it from the Climate Science representative, that assesses their potential in the field of Climate Science. The field of Climate Science will also be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of Climate Science is required. A public oral presentation of the dissertation is required.

Admissions Requirements

Students must apply and be admitted to the graduate program in Meteorology and Atmospheric Science and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Climate Science dual-title program. Refer to the Admission Requirements section of the Climate Science Bulletin page. Doctoral students must be admitted into the dual-title degree program in Climate Science prior to taking the candidacy examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Meteorology and Atmospheric Science, listed above. In addition, students must complete the degree requirements for the dual-title in Climate Science, listed on the Climate Science Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Meteorology and Atmospheric Science and must include at least one Graduate Faculty member from the Climate Science program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Meteorology and Atmospheric Science and Climate Science. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Meteorology and Atmospheric Science and Climate Science dual-title Ph.D. student must include at least one member of the Climate Science Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Climate Science, the member of the committee representing Climate Science must be appointed as co-chair. The Climate Science representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Meteorology and Atmospheric Science and Climate Science. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Astrobiology (ABIOL)

Students interested in the emerging field of Astrobiology may wish to obtain a Dual-Title Graduate Degree in Astrobiology and Meteorology and Atmospheric Science . The pursuit of this dual title entails additional course work beyond the degree requirements set forth here (see the Graduate Bulletin, Astrobiology, for further details concerning these course and other program requirements), as well as the participation of at least one Astrobiology program faculty member on the dissertation committee. The Astrobiology representative, who assists with the selection of courses, may be the adviser and have an appointment in Meteorology and Atmospheric Science. The Ph.D. candidacy exam for dual-title students will be administered by Meteorology and Atmospheric Science but with a component of it from the Astrobiology representative, or others related to this dual-title graduate degree, that assesses their potential in the field of Astrobiology. The field of Astrobiology will also be integrated into the comprehensive examination. A Ph.D. dissertation that contributes fundamentally to the field of Astrobiology is required. A public oral presentation of the dissertation is required.

Admissions Requirements

Students must apply and be admitted to the graduate program in Meteorology and Atmospheric Science and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Astrobiology dual-title program. Refer to the Admission Requirements section of theAstrobiology Bulletin page. Doctoral students must be admitted into the dual-title degree program in Astrobiology prior to taking the candidacy examination in their primary graduate program.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Meteorology and Atmospheric Science, listed above. In addition, students must complete the degree requirements for the dual-title in Astrobiology, listed on the Astrobiology Bulletin page.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Meteorology and Atmospheric Science and must include at least one Graduate Faculty member from the Astrobiology program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Meteorology and Atmospheric Science and Astrobiology. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees , the doctoral committee of a Meteorology and Atmospheric Science and Astrobiology dual-title Ph.D. student must include at least one member of the Astrobiology Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Astrobiology, the member of the committee representing Astrobiology must be appointed as co-chair. The Astrobiology representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Meteorology and Atmospheric Science and Astrobiology. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Integrated B.S./M.S. Program in Meteorology and Atmospheric Science

The Department of Meteorology and Atmospheric Science offers an integrated B.S./M.S. program, also called the Integrated Undergraduate-Graduate (IUG) program, that is designed to allow academically superior students to obtain both the B.S. and the M.S. degree in Meteorology and Atmospheric Science in five years of study. In order to complete the program in five years, students interested in the IUG program in Meteorology and Atmospheric Science must apply for admission to the Graduate School and the IUG program no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree.

During the first three years, the student will follow the course scheduling of one of the options in the B.S. degree, normally the Atmospheric Sciences or the General Option (see the *Undergraduate Bulletin*). Students who intend to enter the IUG program are encouraged to take upper level classes during their first three years whenever appropriate. However, students must sequence their courses so all undergraduate degree requirements are fulfilled before taking courses to count solely towards the graduate degree. By the end of the junior year, students normally apply for admission to both the IUG Program and to the Graduate School. Acceptance decisions will be made prior to the beginning of the senior year and M.S. advising committees appointed for successful applicants. During the senior year, IUG students follow the scheduling of the selected B.S. Meteorology and Atmospheric Science Option, with an emphasis on completing 500-level course work as appropriate. During the senior year, IUG students will start work on their theses or papers that are designed to meet the requirements of the M.S. degree in Meteorology and Atmospheric Science. During the fifth year, IUG students take courses fulfilling the departmental M.S. degree requirements and complete their M.S. theses or papers. Typical scheduling plans for students pursuing the General or Atmospheric Sciences Options are given on the departmental website. If a plan similar to one of these plans is followed, then the student will have completed all requirements for the B.S. in Meteorology and Atmospheric Science by the end of the fourth year.If a student cannot continue in the integrated program, then this student will be able to receive the undergraduate degree upon completion of all of the B.S. requirements.

IUG Program Admission Requirements

Students must apply to the program via the Graduate School application for admission, and must meet all the admission requirements of the Graduate School and the Meteorology and Atmospheric Science graduate program for the Master of Science degree, listed above. In consultation with an adviser, students must prepare a plan of study appropriate to this integrated program, and must present their plan of study in person to the head of the graduate program or the appropriate committee overseeing the integrated program prior to being admitted to the program. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.

Students who wish to complete the IUG program in Meteorology and Atmospheric Science must be admitted to the program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree. Admission to the program will be at the discretion of the Associate Head of the Department of Meteorology and Atmospheric Science graduate program, who will determine the necessary criteria for all applicants. These criteria include the setting of the minimum required scores on the GRE and minimum cumulative GPA for consideration, the receipt of recommendation letters from three faculty and a letter of support from the department head, and the identification of an adviser who is willing to oversee the student's research project. Evidence of significant research potential must be provided in the application.

IUG Program Degree Requirements

Students must fulfill all degree requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the Bachelor of Science in Information Systems are listed in theUndergraduate Bulletin. Degree requirements for the Master of Science in Meteorology and Atmospheric Science degree are listed above. All IUG students must defend their theses or papers, as do all M.S. students, in a public presentation toward the end of their graduate program.

Up to 12 credits may be double-counted towards the degree requirements for both the graduate and undergraduate degrees; a minimum of 50% of the double-counted courses must be at the 500 or 800 level. Credits associated with the culminating experience for the graduate degree cannot be double-counted. The courses that are eligible to double count for both degrees are: METEO 520, METEO 521, METEO 532, METEO 533, METEO 535, METEO 554, METEO 551, METEO 556, and METEO 570

Other Relevant Information

The program differentiates between instruction and research topics appropriate for M.S. students seeking positions of advanced responsibility in government or industry, those appropriate for M.S. students anticipating further study, and those appropriate for Ph.D. candidates who will work in advanced research laboratories or academic institutions.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin. Most graduate students are supported with teaching or research assistantships. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

METEOROLOGY (METEO) course list

NOTE: Courses in the use of X-ray diffraction, electron microscopy, and spectroscopy in meteorological studies are listed under MATERIALS SCIENCE.

Last Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07-000

Review Date: 6/26/2018

Faculty linked: 6/20/14

Music (MUSIC and MU ED)

Program Home Page

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Degrees Conferred:

- M.A., M.Mus., M.M.E.
- Ph.D.
- D.M.A.
- Music: Integrated Undergraduate-Graduate Degrees

The Graduate Faculty

Music

Music Education

Music, Composition and Theory

Music, Conducting

Music, Pedagogy and Performance

Music, Performance

Admission Requirements

In addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin, the School of Music requires the completion of a recognized baccalaureate degree in music or music education, with a junior/senior grade-point average of 2.80 or higher (on a 4.00 scale), but admission to the Doctor of Musical Arts (D.M.A.) requires a grade point average of 3.00. Admission to the M.Mus. program requires an audition or the submission of compositions, or a list of works studied in preparation for conducting (depending on the specific degree); admission to the M.M.E. program requires the completion of 12-15 credits in music education methods at the undergraduate level and successful teaching or student teaching experience; admission to the Ph.D. requires an interview, submission of videotapes of teaching or conducting, scores from the Miller Analogies Test, and a portfolio of requested documents; admission to the M.A. program requires scores from the Graduate Record Examinations (GRE General Test), and evidence of scholarly writing on a musical topic. Information on additional requirements for entrance to the various degree programs can be obtained from the School of Music office. Admission to the D.M.A. (major in piano performance) requires an audition in person or by video recording of an extensive memorized program; students admitted to this program must perform musically at least at the level required to complete the degree Master of Music at Penn State, and must show potential ability to perform professionally. Additional requirements include an interview in person or by interactive video to assess language skills in addition to the University's requirement of specific performance on the TOEFL (550 on the paper test, 213 on the computer-based test, or 80 points on the new Internet test with a minimum of 20 on the new speaking portion) or alternatively, the International English Language Testing System (IELTS) with a minimum of 6.5.

Master's Degree Requirements

The School of Music offers three master's degrees; the Master of Arts, the Master of Music Education, and the Master of Music.

The Master of Arts in Music offers three tracks, in Music Theory (32 credits), Musicology (32 credits), and Music Theory and History (34 credits). All three tracks provide an interdisciplinary approach to the field of music scholarship, a hallmark of our program, and all tracks require a thesis. The track in Music Theory offers preparation in current modes of research and analysis from a music theoretical perspective. The track in Musicology emphasizes the development of a broad knowledge of music of all periods and, at the same time, cultivates one or more areas of specialization. The track in Music Theory and History provides greater breadth by integrating theoretical analytical, and historical approaches to musical styles and works. A reading knowledge of German or another appropriate language must be demonstrated before thesis credit may be scheduled. In the Master of Arts degree program, at least 18 credits must be at the 500 level or higher, and a comprehensive examination is required.

The Master of Music Education degree provides the opportunity for advanced study in music, music learning and teaching, and teaching as reflective practice. The program requires one full-time year of residency at the University Park campus, and is designed to be completed in one academic year plus two summer semesters. Fulfillment of degree requirements includes successful completion of 30 credits of course work that includes a final action research project and resultant substantial article-length paper, followed by an oral presentation focusing on the candidate's projects and course work. This presentation, including questions posed by the faculty committee, serves as the final comprehensive examination. (Twenty credits must be earned at the University Park campus and 18 credits must be at the 500-level or higher, with at least 6 credits at the 500 level.)

The Master of Music degree (36 credits) offers four majors: Performance, Composition/Theory, Conducting, Pedagogy and Performance (piano and voice tracks). The M.Mus. in Performance offers three separate curricula with areas of emphasis in Voice, Keyboard, or Orchestral Instruments. Depending on the area of emphasis, a recital, a composition project, or a conducting project is required. For the M.Mus. in Performance with emphasis in voice or keyboard, a master's recital is required, in addition to either a master's paper or lecture-recital. For the M.Mus. in Performance (orchestral instruments), a master's recital is required. For the M.Mus. in Composition/Theory, a composition project and a master's paper are required. The M.Mus. in Conducting offers three areas of emphasis: Orchestral, Choral, or Band/Wind Ensemble. A performance project and a master's paper are required. For the M.Mus. in Pedagogy and Performance, a master's recital is required, in addition to either a master's paper or lecture-recital. In the Master of Music degree program, at least 18 credits must be at the 500 level or higher, with at least 6 credits at the 500 level, and a comprehensive examination is required.

Doctoral Degree Requirements: Ph.D. in Music Education

The Ph.D. in Music Education is designed to provide opportunities for the highest level of scholarly study in the processes of teaching and learning music. Candidates are expected to develop and test new knowledge in the field of music education while preparing themselves for positions in higher education or other leadership roles within the profession. A candidacy exam, a doctoral thesis, and comprehensive written and oral examinations are required.

Doctoral Degree Requirements: D.M.A. major in Piano Performance

The Doctor of Musical Arts is offered with a major in Piano Performance. Four semesters in residence are required. The degree is designed to provide students with a thorough background of preparation and experience in professional-level performance and in the literature of the instrument, while becoming sufficiently knowledgeable about the discipline of music as a whole, in order to teach at the collegiate or university level. This background knowledge would include, but not be limited to, music theory, analysis, and history. Sixty credits are required beyond the Master of Music; if an exceptional student is admitted before completion of a prior Master of Music degree, the student will complete a total of 30 credits in categories equivalent to those required for the M.Mus., in addition to the 60 required for the D.M.A. A candidacy examination will follow upon two semesters completed in residence. Minimum course requirements (post-Master's degree) include sixteen credits (four semesters at 4 credits/semester) of Keyboard 580J applied music instruction; four credits of advanced ensembles; 10 credits of literature and pedagogy in the major area; and 18 credits in the broader discipline of music. the comprehensive examination will occur upon the completion of course work, before the final recital. The culminating experience of the D.M.A. degree is public performance: three memorized solo recitals are required (the final recital is prepared independently), and two recitals of chamber music. Although no written thesis is required, a lecture-recital is required, with a pre-approved monograph text.

Other Relevant Information

The School of Music sponsors many musical ensembles, and candidates for performance degrees are required to participate in positions of responsibility. All candidates for degrees are expected to be in residence for a minimum of two semesters, except that D.M.A. candidates must be in residence for at least four semesters.

The School of Music is an accredited institutional member of the National Association of Schools of Music.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin.

Music: Integrated Undergraduate-Graduate Degrees

The School of Music offers two Integrated Undergraduate-Graduate degree programs: one that combine the B.A. in Music with the M.A. in Music, and one that combines the B.M. in performance with the M.A. in Music. This enables a select number of students to further their research interests at the undergraduate and graduate levels. By the end of the five-year program students receive two degrees, a B.A. in Music and an M.A. in Music, or a B.M. in Performance and an M.A. in Music.

Candidates for these Integrated Undergraduate-Graduate degrees must demonstrate a high level of aptitude and achievement in academic core courses and be highly motivated to pursue research projects with faculty.

Modeled after a similar program in the Schreyer Honors College, this IUG program enables gifted music students to double count credits in two degree programs. As a result they will have developed a research focus during their fourth and fifth years, which will help them prepare for entry into doctoral programs at other institutions.
For further information about the two Integrated Undergraduate-Graduate degree programs, including application procedures and degree requirements, see the
School of Music website
and click on the "Prospective Students" link.

MUSIC COURSES
Individualized instruction is offered in six categories covering eighteen instruments:

Brass (BRASS)	Trumpet, french horn, trombone, euphonium, tuba
Keyboard (KEYBD)	Piano, organ
Strings (STRNG)	Violin, viola, violoncello, double bass
Woodwinds (WWNDS)	Flute, oboe, clarinet, bassoon, saxophone
Percussion (PERCN)	
Voice (VOICE)	

Instruction is offered for each instrument in three different modes: Secondary for 1 credit, Secondary for 2 credits, and Performance for 4 credits.

The Performance mode is available only to M.Mus. (Performance) students in their major areas. All other students take Secondary for 1 or 2 credits.

Applied music fees are required for individual instruction: $175 per instrument for a 1-credit course, $250 per instrument for a 2-, 3-, or 4-credit course. A complete list can be obtained from the School of Music office.

MUSIC (MUSIC)
*503. CONCERT CHOIR (1 per semester, maximum of 4)
*504. CHAMBER SINGERS (1 per semester, maximum of 4)
*505. SYMPHONIC WIND ENSEMBLE (1 per semester, maximum of 4)
*506. SYMPHONIC BAND (1 per semester, maximum of 4)
*507. PHILHARMONIC ORCHESTRA (1 per semester, maximum of 4)
*508. CHAMBER ORCHESTRA (1 per semester, maximum of 4)
*509. CENTRE DIMENSIONS (1 per semester, maximum of 4)
*510. BRASS CHOIR (1 per semester, maximum of 4)
*511. PERCUSSION ENSEMBLE (1 per semester, maximum of 4)
*520. CHAMBER MUSIC FOR STRINGS (1-4)
*521. CHAMBER MUSIC FOR WOODWINDS (1-4)
*522. CHAMBER MUSIC FOR BRASS (1-4)
*523. SONATA DUOS (1)
560. CHORAL CONDUCTING (2-4 per semester, maximum of 16)
561. ORCHESTRAL CONDUCTING (2-4 per semester, maximum of 8)
562. BAND/WIND ENSEMBLE CONDUCTING (2-4 per semester, maximum of 16)
**565. STUDIO AND RECITAL ACCOMPANIMENT (1)

*Admission by audition.
**Course may be scheduled only after consultation with the director of the School of Music.

Course Descriptions

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

MUSIC (MUSIC) course list

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 40-07-025

Review Date: 06/12/2012

Faculty linked: 7/11/14

Engineering at the Nano-scale

Program Home Page

Osama Osman Awadelkarim, Director, Center for Nanotechnology Education and Utilization
407D Earth and Engineering Sciences Building
814-863-1773

Wook Jun Nam, Program Director
303 Earth and Engineering Sciences Building
814-865-9081

Degrees Conferred

M.S. in Engineering at the Nano-scale

The Graduate Faculty

The Program

The Master of Science (M.S.) in Engineering at the Nano-scale is an intensive one-year, 30-credit program requiring completion of a scholarly paper. This interdisciplinary program is ideal for individuals with a bachelor's degree in science, engineering, mathematics, or related fields who wishes to gain an expanded knowledge and hands-on practices of nanotechnology that can be applied across a broad range of applications.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Scores from the Graduate Record Examination (GRE) are necessary for admission. Graduates in engineering, physical sciences, and mathematics who present a 3.00 grade-point average will be considered for admission.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The non-thesis residence-based Master of Science (M.S.) degree in Engineering at the Nano-scale is a one-year program. Students are required to start the program in the fall semester and complete their degree requirements, including all required course work and three credits of research resulting in a scholarly paper, and graduate by the end of summer following the second semester. The plan of study is as follows:

- Fall semester: 12 credits of course work+ 1 credit of E SC 596 Individual Study
- Spring semester: 12 credits of course work + 1 credit of E SC 596 Individual Study
- Summer semester: 3 credits of course work + 1 credit of E SC 596 Individual Study

At least 30 graduate credits must be earned, of which 18 must be from 500-level lecture/laboratory courses approved by the department. There are 5 required core courses: E SC 412, E SC 520, E SC 521, E SC 522, and E SC 523. No more than 9 credits may be earned from 400-level courses including the required core course E SC 412. As the culminating experience, students must write a scholarly paper incorporating at least one area represented in the course work, upon successful completion of which 3 total credits of E SC 596 will be earned. The scholarly paper must demonstrate the student's capability to integrate and apply concepts and techniques learned in the courses and thereby demonstrate the technical, environmental, ethical, and safety knowledge needed to practice engineering at the nano-scale. This scholarly paper should reflect the high quality of research required to meet the Engineering Science and Mechanics M.S. degree standards, as determined by the ESM Graduate Officer and the ESM Graduate Curriculum Committee. Students who need more time to complete the final paper may extend the submission due date after the third semester (summer). The degree will be granted after the paper has been reviewed and approved, and all degree requirements have been met. Students are not required to remain in residence while they complete the final paper.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall 2016

Blue Sheet Item #: 45-01-000

Review Date: 8/23/2016

Neuroscience (NEURS)

Program Home Page

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Degrees Conferred:

Ph.D., M.S.
Dual-Title Ph.D. in Neuroscience and Clinical and Translational Sciences
M.D./Ph.D.

The Graduate Faculty

The Program

The Neuroscience (NEURS) Graduate Program provides students curricular training with a broad focus on neuroscience, and the opportunity for concentrated research in a variety of disciplinary approaches to neuroscience such as biochemistry, cell biology, embryology, genetics, immunology, neuroscience, pharmacology, physiology, structural biology, and virology. Students receive rigorous training that provides the skills necessary to be leaders in biomedical research and other endeavors that benefit from a rigorous scientific background, including education, law, journalism, and public policy.

The first-year Fall curriculum provides 6 credits of Biomedical Sciences that encompasses 6 modules providing underlying principles of basic cellular processes of medical sciences as well as an introduction to Cellular and Molecular Neuroscience (3 credits). In addition, the Fall curriculum includes a one-credit Colloquium which introduces the student to professionalism, scientific communication, and addresses manuscript evaluation and writing, as well as scientific methodology and techniques that will be discussed in subsequent coursework. The first Spring curriculum includes one 3-credit course focusing on neuroanatomical studies (NEURO 511) followed by a systems neuroscience course (NEURO 521). During the first year, students complete three research rotations that expose them to the wide range of research interests of The Pennsylvania State University graduate faculty from both basic and clinical science departments at the College of Medicine in Hershey. These rotations serve to inform the students with regard to choosing a thesis or dissertation adviser and forming a master's or doctoral committee. In addition, students are advised to take ethics, statistics and electives. The doctoral students also complete their candidacy examination which entails an oral presentation and a written examination on anatomical coursework. Successful completion of the Program results in conferral of the master's or doctoral degree in Neuroscience.

The Neuroscience Graduate Program is an interdepartmental program that engages faculty from multiple basic science and clinical science departments. This broad-reaching Program provides students a wide ranging understanding of multiple disciplines with specific expertise in a chosen area, and encourages interdisciplinary research that is the hallmark of biomedical sciences in the 21st century.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Ph.D., M.S.

Prospective applicants should have a bachelor's degree in a biological, physical, or behavioral science and are expected to have taken undergraduate courses in biology, chemistry, physics, and mathematics. Candidates are expected to have a 3.0 (B) grade-point average or better. Neuroscience courses are desirable but not essential and research experience is an advantage. The General Test of the Graduate Record Examinations (GRE), or a comparable substitute examination accepted by the Neuroscience graduate program, is required for all applicants.

A complete application includes: completed online application with personal statement of purpose; GRE scores; official transcripts from all post-secondary institutions attended ; three letters of recommendation; and TOEFL scores (if applicable).

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

The application deadline is December 15 for admission in the following fall.

Qualified applicants generally will be requested to visit the College of Medicine in Hershey, PA for an interview. Admission is based on evaluation of the undergraduate transcript, GRE scores, personal statement of purpose, letters of recommendation, and performance at the interview.

Dual-Title Ph.D. Degree in Neuroscience and Clinical and Translational Sciences

Potential dual-title students can express an interest in the CTS dual-title as early as during the recruitment process for the Neuroscience Graduate Program. Students must apply and be admitted to the graduate program in Neuroscience and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the CTS dual-title program. Refer to the Admission Requirements section of theCTS Bulletin page. Doctoral students must be admitted into the dual-title degree program in CTS prior to obtaining candidacy in Neuroscience.

Students interested in the Dual-Title Degree will be considered for admission to the Clinical and Translational Sciences Program by a committee consisting of the Clinical and Translational Sciences Program co-directors and faculty affiliated with the Clinical and Translational Sciences Dual-Title Program. To apply, the student must submit the following documentation to the Clinical and Translational Sciences Dual-title Program:

1. A statement of interest, including the applicant's reasons for pursuing a career that includes clinical/translational science.
2. A letter from the applicant's research adviser which endorses the applicant's participation in the Clinical and Translational Sciences Dual-title Program.
3. A letter of support from the head of Neuroscience. If the applicant has not yet selected a research adviser, the program head's letter should describe the program's support of the applicant's desire to incorporate clinical/translational research in the applicant's training plans.
4. A description of the applicant's academic performance to date.

M.D./Ph.D.

Applicants to the joint M.D./Ph.D. degree program must apply and be admitted to both the Neuroscience graduate program and the College of Medicine.

Students interested in simultaneously pursuing an M.D. and Ph.D. degree must apply to the College of Medicine M.D. program using the national American Medical College Application Service (AMCAS) application system and indicate their intent to pursue the joint degree program. Admissions requirements and applications for admission for Penn State College of Medicine are available at the M.D. Program section of the Penn State College of Medicine website. The College of Medicine M.D./Ph.D. Admissions Committee reviews applications and evaluates candidates for acceptance into both the M.D. and Ph.D. program. Students not accepted into the joint degree program can be referred to either the M.D. or Ph.D. program, depending on their qualifications and interests.

After the review committee has accepted an applicant to the joint degree program, s/he must apply and be admitted to the Graduate School for admission to the graduate program. The general admission requirements for the Ph.D. degree are listed above. Additional requirements for the joint degree are listed below.

- **Academic Achievement**. Applicants to our program generally have very strong grades and MCAT scores. In recent years, successful applicants have an average GPA of 3.75 and total MCAT scores of >85 percentile. Applicants are not required to take the GREs.
- **Research Experience**. We are especially interested in students with a strong and sustained background in research. Students who have spent 1-2 years after graduation conducting research are strongly encouraged to apply. Alternatively, in-depth research experience as an undergraduate can suffice.
- **Recommendations**. We are especially interested in receiving letters of recommendation from faculty with whom you conducted research and who can comment on your passion and potential for research.
- **Goals**. Applicants must be able to clearly articulate the reasons for pursuing the joint degree.
- **International Students**. All qualified students are eligible to apply regardless of citizenship.

Degree Requirements

Ph.D. Degree in Neuroscience

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 32 credits is required for the Ph.D. degree: 15 credits of core requirements, 11 credits of program requirements, and 6 credits of electives. The 15 credits of core requirements are: BMS 502 (3 cr.), BMS 503 (3 cr.), NEURO 511 (3 cr.), NEURO 520 (3 cr.), and NEURO 521 (3 cr.). The 11 credits of program requirements are: PHS 520 (3 cr.), NEURO 522 (2 cr.), NEURO 523 (2 cr.), NEURO 530 (1 cr.), NEURO 590 (2 cr.), and BMS 591 (1 cr.). In addition, Ph.D. students are required to complete 1 credit of Supervised Experience in College Teaching (NEURO 602); however, this 1 credit cannot be counted towards the minimum 32 credits required. A minimum of 6 elective credits is required. A student's doctoral committee can require additional course work depending on the student's background and research plans.

Official entrance into the Ph.D. program occurs upon successful completion of the candidacy examination. Ph.D. degree requirements include successful completion of the following: approved graduate course work, English Competence requirements, a comprehensive examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral candidates must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

M.S. Degree in Neuroscience

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 30 credits at the 400, 500, 600, or 800 level is required for the M.S., with least 18 credits at the 500 and 600 level, combined. There are 15 credits required in the following core courses: NEURO 511 (3 cr.), NEURO 520 (3 cr.), NEURO 521 (3 cr.), NEURO 522 (2 cr.), NEURO 523 (2 cr.), NEURO 530 (1 cr.), and BMS 591 (1 cr.). A thesis is required, and a minimum of six (6) thesis research credits (SUBJ 600 or 610) must be taken in Neuroscience. The remaining elective credits may be chosen from a list of approved electives maintained by the program office. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Dual-Title Ph.D. in Neuroscience and CTS Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Neuroscience, listed above. In addition, students must complete the degree requirements for the dual-title in CTS, listed on the CTS Bulletin page. Up to 7 credits of course work may be used to satisfy both Neuroscience and CTS degree requirements. In addition, a student may request to double count additional credits up to a maximum of 12. An increase in double-counted credits will be determined by the CTS Program on a case-by-case basis.

Neuroscience graduate students accepted to the Clinical and Translational Sciences Dual-Title Program will take the candidacy exam by the end of the fourth semester of the graduate program: 1) to allow exposure to the Clinical and Translational Sciences Curriculum in the Spring semester of the first year and Fall semester of the second year, which will prepare the students for the integrated content of the dual-title candidacy exam, and 2) to allow sufficient time to identify and assure commitment of an appropriate dissertation adviser who embraces the dual-title program of the student. During the candidacy examination, the student will also be assessed for candidacy to the dual-title program, and at least one member of the candidacy committee must come from the dual-title program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Neuroscience and Clinical and Translational Sciences dual-title doctoral degree candidate must include at least one member of the Clinical and Translational Sciences Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in CTS, the member of the committee representing CTS must be appointed as co-chair. The CTS representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and expertise in both Neuroscience and Clinical and Translational Sciences. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

M.D./Ph.D. Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the M.D. Program section of the Penn State College of Medicine website. Degree requirements for the Ph.D. degree are listed above.

During the first two years of medical school, the student conducts at least three research rotations. In addition, students are required to take BMS 506A and 506B during the M1 (Spring) and M2 (Fall), as well as either a 1 credit course in genetics or immunology. After successful completion of the first two years of medical school the candidate joins their dissertation lab in the Neuroscience Graduate Program.

During the summer after the second year of medical school M.D./Ph.D. students take Step 1 of the United States Medical Licensing Examination (USMLE), which serves in lieu of the knowledge-based portion of the Candidacy Examination for the Neuroscience program.

The doctoral committee of an M.D./Ph.D. student in the Neuroscience program is formed upon entry into the dissertation laboratory. In addition to the general Graduate Council requirements for doctoral committees, the committee must include at least two members of the Neuroscience program Graduate Faculty and one M.D./Ph.D. steering committee member.

In addition to taking the required courses NEURO 590 Colloquium (2 cr.), BMS 591, Ethics in the Life Sciences (1 cr.), and PHS 520 Introduction to Biostatistics (3 cr.), students are required to take the core neuroscience courses NEURO 521 Systems Neuroscience (3 cr.), NEURO 522 Seminar in Neuroscience I (2 cr.), NEURO 523 Seminar in Neuroscience II (2 cr.), and NEURO 530 Professional Development (1 cr.).A minimum of 4 elective credits is required. Other elective courses are selected in consultation with the student's dissertation adviser and doctoral committee.

The Neuroscience program will accept passing grades in the medical school courses SPM 711 Scientific Principles of Medicine (11 cr.) and NBS 723 Neural and Behavioral Science (3 cr.) in lieu of 12 required credits for the Neuroscience Ph.D. The 12 required credits are BMS 501 (3 cr.), BMS 502 (3 cr.), NEURO 520 (3 cr.), and NEURO 511 (3 cr.). M.D./Ph.D. candidates are not required to take NEURO 602 Supervised Experience in College Teaching (1 cr.).

The M.D./Ph.D. candidate prepares a written comprehensive examination in the format of a grant application and gives an oral presentation of this proposal to their doctoral committee.

M.D./Ph.D. candidates are required to have at least one paper accepted for publication in a major peer-reviewed scientific journal prior to the final oral examination, and this must be accepted before they return to the third year of medical school. A student may petition to waive this requirement due to extenuating circumstances (e.g., adviser relocation, abnormal issues with publication process). All waivers must be approved by the Vice Dean for Research and Graduate Studies of the College of Medicine. A dissertation must be prepared and defended by each M.D./Ph.D. candidate prior to returning to the M3 year of medical school. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass the final oral examination (the dissertation defense). If a student decides not to return to medical school, or for some other reason is not able to complete the last two years of medical school, but they have successfully completed their Ph.D. dissertation and final oral examination and met all other degree requirements of the Neuroscience program, they will be able to complete the Ph.D.. The latter will be conferred after the student notifies the program that she/he wishes to withdraw from the M.D. program and completes all requirements for conferral of the graduate degree.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*. All support is continuous for the first year from the Neuroscience program. Support in years two and above, when the student is conducting dissertation research, must be acquired from either the basic science department in which the candidate elects to pursue his/her minor or from funds available from the dissertation adviser. These funds must be secured by the student in conjunction with his/her adviser.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

NEUROSCIENCE (NEURO) course list

Last Revised by the Department: Fall Semester 2017

Blue Sheet Item #: 46-02-000

Review Date: 10/3/17

Faculty linked: 6/27/14; updated co-director: 7/24/15

Nuclear Engineering (NUC E)

Program Home Page

ARTHUR T. MOTTA, *Chair of Nuclear Engineering*
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Degrees Conferred:

Ph.D., M.S., M.Eng.

The Graduate Faculty

The Programs

Graduate programs and research facilities are available in thermal-hydraulics, neutronics, computational methods, advanced controls with applications of artificial intelligence, materials, radiation monitoring and effects, fuel management, and radioactive waste management. Application areas include advanced reactor design, safety analysis, radiation instrumentation development, neutron imaging, and plant life extension.

Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Students with a 3.00 junior/senior grade-point average and with appropriate course backgrounds will be considered for admission. General aptitude GRE test results are required. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

To qualify for admission, an international student must achieve a minimum score on the Test of English as a Foreign Lanaguage (TOEFL) of 550 on the paper-based test, 213 on the computer-based test, and 80 on the Internet-based test with a 19 in the speaking section. This requirement is waived if the student's native language is English or if the student received a bacclauareate or master's degree from an institution in which the language of instruction was English. Letters of recommendation and a statement of purpose written by the applicant are also required to complete the application package.

Degree Requirements

The M.Eng. degree is a nonthesis professional master's degree. In the M.Eng. degree program, 30 course credits are required. Twelve of those credits must be in Nuclear Engineering with at least 18 credits at the 500 level. No thesis is required for the M.Eng. degree. Instead, the student must take 3 credits of NUC E 597C Professional Topics in Nuclear Engineering, which represents formal recognition of the student's effort spent on writing a paper about an engineering subject. It must be approved by the adviser, a faculty reader, and the program chair.

The M.S. degree program is designed for students to gain advanced knowledge for research, analysis, and design in nuclear engineering. Student pursuing an M.S. degree must complete 24 course credits and submit an acceptable thesis (6 research credits) to the Graduate School.

Continuous registration is required of all Ph.D. students until the thesis is approved.

The Ph.D. program emphasizes scholarly research and helps students prepare for research and related careers in industry, government, and academe. Students are admitted to candidacy after passing written and oral examinations. The Ph.D. program is quite flexible, with minimal formal requirements. The Ph.D.. degree is awarded upon completion of a program of advanced study that includes a minimum period of residence, a satisfactory thesis, and the passing of comprehensive and final oral examinations as determined by the student's doctoral committee.

Generally, a Ph.D. student must have 30 credits above a master's degree before taking a comprehensive examination.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin,* the following awards typically have been available to graduate students in this program:

NATIONAL ACADEMY FOR NUCLEAR TRAINING FELLOWSHIPS-Available to graduate students in nuclear engineering; stipend plus tuition.

U.S. DEPARTMENT OF ENERGY-NUCLEAR SCIENCE AND ENGINEERING FELLOWSHIPS-Available to graduate students interested in engineering and engineering support related to nuclear technology; stipend plus tuition.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level will not count. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

NUCLEAR ENGINEERING (NUC E) course list

Last reviewed by Graduate School: 5/6/04

Faculty linked: 6/27/14

Nursing (NURS)

Program Home Page

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JUDITH E. HUPCEY, *Associate Dean for Graduate Education and Research*
201 Nursing Sciences Building
814-863-0245

Degrees Conferred:

Ph.D., D.N.P., M.S., M.S.N.
Dual-Title Ph.D. in Nursing and Bioethics (BIOET)
Dual-Title Ph.D. in Nursing and Clinical and Translational Sciences

The Graduate Faculty

The Programs

The graduate programs emphasize productive scholarship and research in the development of nursing knowledge and the translation of knowledge into practice. Advanced study is in human health and development throughout the life span, and in nursing's role in providing health services to individuals, families, and communities.

The Ph.D. program, the dual-title Ph.D. program in nursing and bioethics, and the dual-title Ph.D. program in nursing and clinical and translational sciences prepare nurse scientists to provide leadership in nursing education, practice and research. Individualized curricula prepare nursing graduates to assume positions as faculty, researchers and leaders in educational, community, governmental, or institutional settings.

The D.N.P. degree program prepares nurse administrators and advanced practice nurses to assume leadership roles in practice settings in the community, governmental agencies, or healthcare institutions

The M.S. degree program with a major in nursing prepares nurse scientists and clinical scholars who plan to complete a Ph.D. in nursing or dual-title Ph.D. in nursing and bioethics or a dual-title Ph.D. in nursing and clinical and translational sciences.

The M.S.N. degree in Nursing consists of a base program and five options. The options include: Family Nurse Practitioner, Adult Gerontology Primary Care Nurse Practitioner, Adult Gerontology Acute Care Nurse Practitioner, Nurse Administrator, and Nurse Educator.

The M.S., M.S.N., and D.N.P. degree programs in Nursing are accredited by the Commission on Collegiate Nursing Education.

The Nurse Practitioner options are designed to help prepare the professional nurse to function in an expanded nursing role providing direct care to specific groups of clients in a variety of health care settings. Since that practice is inherently interdisciplinary in nature, advanced knowledge and research from nursing is combined with knowledge from science, medicine, and related disciplines. The Nurse Practitioner may also function in supervisory, consultative, education, and research roles.

The Nurse Administrator option enables the student to acquire advanced knowledge of organizational leadership, health policy, and evidence-based health care delivery. The program is designed to prepare students for leadership and administrative roles in a variety of health care settings.

The Nurse Educator option enables the student to acquire advanced knowledge of evidence-based teaching and learning principles, curriculum development, and evaluative techniques. The program is designed to prepare students for educator roles in a variety of academic and health care settings.

Admission Requirements for M.S., M.S.N., D.N.P., and Ph.D. Programs

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants must apply for admission to the program via the Graduate School application for admission.

1. For admission to the Nursing program, an applicant must hold either (1) a bachelor's degree in Nursing from a U.S. regionally accredited institution or (2) a postsecondary degree in Nursing that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Students entering the doctoral program via the traditional post-master's route must have earned a master's degree with a major in nursing from a program accredited by a national accrediting agency for nursing. Well-qualified Ph.D. applicants with a baccalaureate degree in nursing and master's degree in a related discipline (e.g., public health) will be evaluated individually to assess the need for prerequisite master's-level course work in nursing for doctoral program admission.
2. Applicants must submit official transcripts from all post-secondary institutions attended. For M.S.N. applicants, a cumulative grade-point average of 3.3 (on a 4.0 scale) for the baccalaureate degree is expected with a B or better in all science and nursing courses. For M.S. applicants, a cumulative grade-point average of 3.5 (on a 4.0 scale) for the baccalaureate degree is expected with a B or better in all science and nursing courses. College chemistry and statistics are also required (chemistry is not required for the nurse administrator option). B.S.N. to D.N.P. applicants are expected to have a cumulative undergraduate grade-point average of 3.5 (on a 4.0 scale). For master's to Ph.D. or D.N.P. applicants, a cumulative grade-point average 3.5 (on a 4.0 scale) for master's and subsequent course work is expected.
3. Two letters of reference are required for the M.S.N. degree program and three letters of reference are required for the M.S., D.N.P., and Ph.D. degree programs. The letters should be solicited from professional supervisers and faculty who can attest to the applicant's ability.
4. All applicants must submit a statement of purpose. In addition, M.S., D.N.P., and Ph.D. degree applicants must also submit a published or unpublished scientific paper, thesis, or other scholarly writing sample and a complete curriculum vitae.
5. GRE scores are required for admission to the M.S. and Ph.D. programs. GRE scores are not required for the M.S.N. or D.N.P. applicants, but if the scores are submitted to Penn State they will be reviewed as part of the application.
6. The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information. Applicants to the Nursing program must have a minimum TOEFL score of 80 with a 25 on the speaking section for the internet-based test (iBT). For the paper-based test, taken prior to July 2017, a minimum of 580 is required. The minimum composite score for the IELTS for applicants to the Nursing program is 7.
7. Applicants to the M.S.N. options and D.N.P. degree offered online via the World Campus must hold a current license to practice professional nursing in at least one U.S. state or in a foreign country. All other applicants to the M.S. and M.S.N. degree programs must hold a current Pennsylvania license to practice professional nursing. Applicants to the Ph.D. degree program must be licensed to practice professional nursing in at least one state or in a foreign country.
8. Applicants to the Adult Gerontology Acute Care Nurse Practitioner Option are required to have two years of acute care hospital experience.
9. Applicants to the M.S.N. degree program are encouraged to discuss program options with the faculty; however, an interview is not required. Doctoral (B.S.N. - Ph.D., B.S.N.- D.N.P., D.N.P., and Ph.D.) applicants will be contacted by the College of Nursing to schedule a required interview (either in person or via internet-based video conferencing).

M.S. and M.S.N. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

Candidates in the Master of Science (M.S.) degree program in nursing (B.S.N.- Ph.D.) are required to complete a minimum of 30 credits, with at least 18 credits in the 500 and 600 series combined, to be awarded an M.S. degree. A minimum of 12 credits in course work (400, 500, and 800 series), as contrasted with research, must be completed in the major program. There are 9 credits required in M.S. core coursework, including NURS 510 Theoretical and Scientific Foundations of Advanced Nursing Practice (3 credits); NURS 808: Population Health Perspectives (3 credits); and NURS 836: Healthcare Informatics (3 credits.

In addition, 9-12 credits are required in research and statistics courses approved in advance by the student's adviser. Additional courses that will count as electives towards this degree can be chosen from a list of approved elective courses maintained by the graduate program office.

If the M.S. student chooses to complete a thesis, at least 6 credits in thesis research (600 or 610) must be taken in conjunction with the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense. If the student chooses the non-thesis track, the students must submit a satisfactory scholarly paper while enrolled in NURS 596 (3 credits). If no thesis is required, at least 18 credits of course work must be in 500-level courses.

The Master of Science in Nursing (M.S.N.) requires a minimum of 30 credits, with at least 6 credits at the 500 level, including 12 credits of M.S.N. Program Core courses, 15 credits of electives, and at least 3 credits in a capstone course. The M.S.N. Program Core Courses are: NURS 501: Issues in Nursing and Health Care (3 credits), NURS 510 Theoretical and Scientific Foundations of Advanced Nursing Practice (3 credits), NURS 830: Evidence-Based Practice I: Theory and Research Methods (3 credits), and NURS 513 Evidence-Based Practice in Professional Nursing (3 credits). Additional courses that will count as electives towards this degree can be chosen from a list of approved elective courses maintained by the graduate program office. Students in the M.S.N. degree program are required to complete a capstone project, which demonstrates the application of theory and research to a clinical problem based on review of the literature and research utilization for that problem. For M.S.N. students who do not choose to complete an option, the capstone project is completed while enrolled in NURS 596 (3 credits).

The five advanced role options offered in the M.S.N. degree program include nurse educator, nurse administrator, family nurse practitioner, adult gerontology primary care nurse practitioner, and adult gerontology acute care nurse practitioner. Students in these options complete the 12 credits of M.S.N. Program Courses as described above. The option-specific course requirements described below replace the requirement for 15 credits of electives.

Students must earn a minimum of 45 credits for the M.S.N. with the Family Nurse Practitioner option. The option-specific course requirements total 27 credits, including: NURS 802 (3), NURS 802A (1), NURS 803 (3), NURS 804 (3), NURS 870 (3), NURS 871 (3), NURS 872 (3), NURS 873 (4), NURS 875(2), and NURS 876 (2). The capstone course for students completing this option is NURS 874 (6).

Students must earn a minimum of 41 credits for the M.S.N. with the Adult Gerontology Primary Care Nurse Practitioner option. The option-specific course requirements total 23 credits, including: NURS 802 (3), NURS 803 (3), NURS 804 (3), NURS 870 (3), NURS 871 (3), NURS 872A (4) and NURS 873A (4). The capstone course for students completing this option is NURS 874A (6).

Students must earn a minimum of 43 credits for the M.S.N. with the Adult Gerontology Acute Care Nurse Practitioner option. The option-specific course requirements total 25 credits, including: NURS 802 (3), NURS 803 (3), NURS 804 (3), NURS 860 (3), NURS 861 (3), NURS 862 (4), NURS 863 (4), NURS 865 (1), and NURS 866 (1). The capstone course for students completing this option is NURS 864 (6).

Students must earn a minimum of 37 credits for the M.S.N. with the Nurse Administrator option. The option-specific course requirements total 12 credits, including: NURS 836 (3), NURS 845 (3), NURS 846 (3), and NURS 847 (3). The capstone course for students completing this option is NURS 848 (4). Students in this option are required to take 9 additional elective credits chosen from a list of approved elective courses maintained by the graduate program office.

Students must earn a minimum of 37 credits for the M.S.N. with the Nurse Educator option. The option-specific course requirements total 18 credits, including: NURS 802B (3), NURS 803 (3), NURS 804 (3), NURS 840 (3), NURS 841 (3), and NURS 842 (3). The capstone course for students completing this option is NURS 843 (4). Students in this option are required to take 3 additional elective credits chosen from a list of approved elective courses maintained by the graduate program office.

D.N.P. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students may enter the program directly with a B.S.N. degree or following completion of a Master's degree in nursing.

For the B.S.N. to the D.N.P., a core of master's courses is required. A minimum of 61 credits, 1000 hours of practicum time, and a DNP project is required. The 61 credits include:

- 9 credits of Master's Core Courses: NURS 501(3), NURS 510(3), and NURS 512(3)
- 13 credits of Nurse Administrator Option Courses: NURS 845(3), NURS 846(3), NURS 847(3), and NURS 848A(4).
- 12 credits of D.N.P. Core Courses: NURS 830(3), NURS 831(3), NURS 832(3), and NURS 833(3).
- 8 credits of Other Required Courses: NURS 590(1), NURS 587(1), NURS 808(3), and NURS 836(3).
- 5 credits of Advanced Practice Clinical (needed to meet the 1000 hour practicum requirement): NURS 834(5)
- 6 credits of DNP Project: NURS 835(6)
- 8 credits of electives chosen from a list of approved elective courses maintained by the graduate program office

The Master of Science in Nursing (M.S.N.) to D.N.P. program requires a minimum of 30 post-master's degree credits completed at Penn State. The curriculum is individualized based on previous course work and number of practicum hours completed during the master's program. A maximum of 550 practicum hours from the previous master's program will be accepted to fulfill to 1000 hours of required practicum hours. The curriculum is composed of 5 components, for a minimum of 38 credits:

- 12 credits of D.N.P. Core Courses: NURS 830 (3), NURS 831 (3), NURS 832 (3), and NURS 833 (3).
- 14 credits of Other Required Courses: NURS 510 (3), NURS 590 (1), NURS 587 (1), NURS 808 (3), NURS 836 (3) and NURS 845 (3).
- 6 credits of DNP Project: NURS 835 (6)
- 6 credits of electives chosen from a list of approved elective courses maintained by the graduate program office

In addition to the minimum 38 credits, up to 8 credits of NURS 834 may be required for M.S.N. to D.N.P. students, depending on the number of practicum hours completed in the student's M.S.N. program

For both entry options, students are required to participate in 3 intensives offered at the University Park or Hershey Medical Center campus. For full-time students, the first intensive is August of semester I for M.S.N. to D.N.P. and Semester III for B.S.N. to D.N.P. students. Intensive 2 is the beginning of the subsequent semester, Intensive 3 is at the end of semester II for M.S.N. to D.N.P. and semester IV for B.S.N. to D.N.P. students.

In addition to course work, all students are required to complete a series of three benchmarks, Candidacy Examination, Comprehensive Examination, and a Final Oral Presentation.

D.N.P. Doctoral Committee Composition: The doctoral committee will consist of the student's academic adviser, the DNP project course (NURS 835) instructor, and a third member of the graduate faculty, all from the graduate program in Nursing. The academic adviser will be the chair of the committee.

Candidacy Examination: All students must satisfactorily complete the candidacy examination, which is designed to evaluate the student's past performance and potential for successfully completing the program. Candidacy typically occurs prior to the 2nd intensive, which follows completion of one semester of full-time study for the M.S.N. to D.N.P. student and after three semesters of full-time study for the B.S.N. to D.N.P. student. Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

Comprehensive Examination: The comprehensive examination marks the student's progression into their D.N.P. project. This occurs during the 3rd intensive, when students present their D.N.P. project proposal. The comprehensive examination needs to be successfully completed prior to the submission of the proposal for human subjects' review or carrying out the project (if it does not require a review). Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

Final Oral Presentation: Upon completion of the project, the Final Oral Presentation is scheduled. Students are required to present the project for approval by their doctoral committee. The Associate Dean for Graduate Education & Research will sign off on the final paper, following completion of the paper during NURS 835 and the student's passing of the oral presentation. Students who fail the presentation on the first attempt may repeat it once. The student's final paper will be made publicly available through ScholarSphere.

Ph.D. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students may enter the program directly with a B.S.N. degree (and may receive an M.S. degree en route to the Ph.D.) or a concurrent M.S.N. (nurse practitioner option) or following completion of a B.S.N. and a Master's degree (either in Nursing or non-Nursing). A dual-title Ph.D. degree in Nursing and Bioethics, and a

dual-title Ph.D. degree in Nursing and Clinical and Translational Sciences are also available.

Students entering with an M.S.N. will complete a minimum of 43 credits. The curriculum is composed of 3 components:

1. Nursing Science Core: minimum of 16 credits, consisting of NURS 580 (3), NURS 582 (4), NURS 583 (3), NURS 587 (1), NURS 588 (3), and NURS 590 (2). NURS 596 (3) will also be required of students who are not research assistants on an active faculty research study.
2. Research Methodology and Statistics: minimum of 15 credits approved by the student's adviser and/or doctoral committee.
3. Courses for Individual Specialty: minimum of 12 credits; minimum of 15 credits for a minor.

In addition to course work, all students are required to complete a series of examinations: the Candidacy Examination, the Comprehensive Examination (written and oral components), the Dissertation Proposal Defense, and Final Oral Examination. Students are required to pass the Final Oral Examination, have the dissertation approved and submitted, and graduate within five years of passing the candidacy examination.

Candidacy Examination: All students must satisfactorily complete the candidacy examination, which is designed to confirm the student's mastery of basic nursing theory and research methods. For students entering the doctoral program with a master's degree, the candidacy examination must be taken at the end of the first year of full-time study or the equivalent. Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

Comprehensive Examination: The comprehensive examination is designed to test the student's mastery of and ability to synthesize and integrate the theoretical basis for nursing science, advanced research methods, and the chosen specialty area. This examination is taken when a candidate has substantially completed all course work. Students who fail the examination on the first attempt may repeat it once. Students who fail the examination the second time are terminated from the program.

Dissertation and Final Oral Examination (the Dissertation Defense): Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Each student is required to conduct an original and independent research project which adds to nursing's body of knowledge, and to communicate the research report in a written dissertation. A written dissertation proposal is required and must be approved at a proposal hearing by a majority vote of the student's doctoral committee. A majority vote is also required for approval of the completed written dissertation at the Final Oral Examination (the dissertation defense). The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Bioethics

Nursing Ph.D. students may pursue additional training in bioethics through the dual-title Ph.D. program in Bioethics. Students must apply and be admitted to the graduate program in Nursing and the Graduate School before they can apply for admission to the dual-title degree program. Admission to the dual-title is determined upon review of all application materials (forwarded from the College of Nursing) by the admissions committee in Bioethics. Students must apply and be admitted to the dual-title degree program in Bioethics prior to taking the candidacy exam.

To qualify for the dual-title degree, students must satisfy the requirements of the Nursing Ph.D. program. In addition, they must satisfy the requirements described below, as established by the Bioethics program committee. Within this framework, final course selection is determined by the student, their Nursing adviser, and their Bioethics program adviser.

The dual-title Ph.D. in Nursing and Bioethics requires a minimum of 1 credit of course work beyond the requirements for the Ph.D. in Nursing (17 credits of the 18 Bioethics credits are part of the current degree requirements in Nursing), as follows:

- 10 credits: 7 required credits (BIOET 501 (3), BIOET 502 (3), and BIOET 590 (1)), plus at least 3 additional BIOET credits at the 500 level. These credits can be applied to the Courses for Individual Specialty requirement for the Nursing Ph.D.
- 8 additional credits from a list of approved electives at the 400 or 500 level, at least two of these courses must be at the 500 level. Many of the available electives that students may wish to take are 3-credit courses, so 9 additional credits may be a more typical number for most students. The list of elective courses will be maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. The Nursing Science core constitutes 7 of these elective credits.

Candidacy Examination: In order to be admitted to Ph.D. candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by Nursing; a single candidacy examination will be administered that includes assessment of both Nursing and Bioethics. At least one member of the candidacy committee must have a Graduate Faculty appointment in Bioethics. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Comprehensive Examination: In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Nursing and Bioethics dual-title Ph.D. student must include at least one member of the Bioethics Graduate Faculty. Graduate faculty members who hold appointments in both programs may serve in a combined role. If the chair of the committee representing Nursing is not also a member of the Graduate Faculty in Bioethics, the member of the committee representing Bioethics must be appointed as co-chair. The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their nursing.

Dissertation and Final Oral Examination (the Dissertation Defense): Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and expertise in Nursing and Bioethics. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. in Clinical and Translational Sciences

Nursing Ph.D. students may pursue additional training in CTS through the dual-title Ph.D. program in CTS. Students must apply and be admitted to the graduate program in Nursing and the Graduate School before they can apply for admission to the dual-title degree program. Admission to the dual-title is determined upon review of all application materials (forwarded from the College of Nursing) by the admissions committee in CTS. Students must apply and be admitted to the dual-title degree program in CTS prior to taking the candidacy exam.

To qualify for the dual-title degree, students must satisfy the requirements of the Nursing Ph.D. program. In addition, they must satisfy the requirements described below, as established by the CTS program committee. Within this framework, final course selection is determined by the student, their Nursing adviser, and their CTS program adviser.

The CTS dual-title requires 26 credits: 18 credits from a list of approved electives in each of the following areas (at least half of which must be at the 500 or 800 level): Statistics (3 cr.), Epidemiology (3 cr.), Bioinformatics (3 cr.), Experimental Design and Interpretation (3 cr.), The Regulatory Environment (3 cr.), and Scientific Communication (3 cr.); 2 credits of CTS 590; and 6 credits of CTS 595 or BMS 571. Of the 18 elective credits required, 12 credits can be double-counted from the required courses for the Ph.D. in Nursing: STAT 500/PHS 520 meets the 3-credit requirement for Statistics, and an additional 9 credits of Individual Specialization Coursework required for Nursing can be selected from the list of CTS approved electives to meet the 3-credit requirements in Epidemiology, Bioinformatics, and The Regulatory Environment. Therefore, dual-title Ph.D. students in Nursing and CTS may require a minimum of 14 credits of additional course work, consisting of approved electives in Experimental Design and Interpretation (3 cr.) and Scientific Communication (3 cr.), 2 credits of CTS 590; and 6 credits of CTS 595 or BMS 571.

Candidacy Examination: In order to be admitted to Ph.D. candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by Nursing; a single candidacy examination will be administered that includes assessment of both Nursing and CTS. At least one member of the candidacy committee must have a graduate faculty appointment in CTS. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Comprehensive Examination: In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Nursing and CTS dual-title Ph.D. student must include at least one member of the CTS Graduate Faculty. Graduate faculty members who hold appointments in both programs may serve in a combined role. If the chair of the committee representing Nursing is not also a member of the Graduate Faculty in CTS, the member

of the committee representing CTS must be appointed as co-chair. The faculty member (or members) affiliated with the CTS Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to CTS, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their nursing.

Dissertation and Final Oral Examination (the Dissertation Defense): Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their dissertation research and expertise in Nursing and CTS. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

In addition to the STUDENT AID section of the Graduate Bulletin, the following awards typically have been available to graduate students in this program:

U.S. PUBLIC HEALTH SERVICE TRAINEESHIPS IN NURSING
Open to selected registered nurse, full-time students in nursing; stipend may be available plus tuition. Apply to Associate Dean for Graduate Education & Research, College of Nursing.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students but courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

NURSING (NURS) course list

Last Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07

Review Date: 6/26/2018

Faculty linked: 6/27/14

Nutritional Sciences (NUTR)

Program Home Page

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Degrees Conferred:

Ph.D., M.S., M.P.S.
Dual-Title Ph.D. (Nutritional Sciences and Clinical and Translational Sciences)

The Graduate Faculty

The Program

(Ph.D., M.S., Dual-title Ph.D. (Nutritional Sciences and Clinical and Translational Sciences)
Graduates are prepared for careers in basic and applied research in nutrition and in college teaching. The course of study is planned to meet the professional objectives of the individual student. Students may emphasize molecular and cellular nutritional sciences, nutritional biochemistry, applied human nutrition, applied animal nutrition, nutrition education, and nutrition in public health. Supporting courses are available in biochemistry, physiology, genetics, microbiology, biophysics, food science, health policy and administration, human development and family studies, anthropology, sociology, psychology, public health sciences, and statistics.

Current research emphasizes minerals, vitamin A, lipid metabolism, metabolic disorders, nutrition and behavior, nutrition education strategies, evaluation of dietary intake and nutritional status, nutrition policy and health promotion and disease prevention across the life cycle.

Facilities include well-equipped nutrition science laboratories with animal facilities supervised by a University laboratory animal resource staff. The Diet Assessment Center and the metabolic kitchens serve as laboratories for students in community nutrition, nutrition education, and metabolic nutrition.

M.P.S.
This online professional master's degree is designed for those seeking to become registered dietitians, for those already registered and interested in enhancing their careers, and for those interested in pursuing a career with a focus in Nutritional Sciences. Graduates of the program may expect to become leaders on the health care team and other practice teams, and share their knowledge and expertise with other health care professionals and colleagues. Graduates will be positioned for career success and will be innovators in today's dynamic health and wellness sector.

Admission Requirements

Ph.D., M.S., Dual-title Ph.D. (Nutritional Sciences and Clinical and Translational Sciences)
Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE), or from the Medical College Admission Test (MCAT), are required for admission. At the discretion of the graduate program, the GRE or other test scores may be waived for an individual on a case-by-case basis.

College graduates with an undergraduate degree in nutrition, animal sciences, food science, dietetics, or a related biological or social science will be considered for admission. Applicants should have a minimum grade-point average of 3.00 (on a 4.00 scale), an acceptable score on the GRE (an average quantitative and verbal score above the fiftieth percentile), and three supporting recommendations. Exceptions may be made at the discretion of the program for students with special backgrounds, abilities, and interests. When openings are limited, the best-qualified candidates are given priority.

The basic expectations for admission from undergraduate studies include 6 credits in chemistry (organic and inorganic); 3 credits each in physiology, biochemistry, and nutrition; and physics, calculus, and analytical chemistry for some research areas in nutrition science and social science for public health and community nutrition. Students with more than 8 credits of deficiency and a superior record may beprovisionally admitted to the graduate degree program. The deficiencies identified must be made up with a 3.00 grade-point average or better within the first two semesters.

Doctoral students with research and educational interests in clinical and translational science may apply for the Dual-Title Ph.D. Degree in Nutritional Sciences and Clinical and Translational Sciences following admission to the Graduate School and Nutritional Sciences and prior to taking the candidacy examination in Nutritional Sciences. An admissions committee comprised of faculty affiliated with the dual-title program will evaluate applicants. Applicants must have a graduate GPA of at least 3.5 in a research area related to human health. Prospective dual-title program students will write a statement of purpose that addresses the ways in which their research and professional goals will be enhanced by an interdisciplinary course of study in clinical and translational sciences.

M.P.S.
Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. . Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE), or from the Medical College Admission Test (MCAT), are required for admission. At the discretion of the graduate program, the GRE or other test scores may be waived for an individual on a case-by-case basis.

College graduates with an undergraduate degree in nutrition, dietetics, public health or related health sciences will be considered for admission. Applicants should have a minimum grade-point average of 3.00 (on a 4.00 scale), an acceptable score on the GRE (an average quantitative, verbal, and analytical score above the fiftieth percentile), and three supporting recommendations. Exceptions may be made for students with special backgrounds, abilities, and interests at the discretion of the program. When openings are limited, the best-qualified candidates are given priority.

The basic expectations for admission from undergraduate studies include 3 credits in physiology, 3 credits in biochemistry, 3 credits in organic chemistry, 3 credits in introductory nutrition (equivalent to or more advanced than NUTR 251 at Penn State), and 3 credits in advanced nutrition. If these courses were taken more than 10 years prior to application, they may be accepted at the Programs Director's discretion. Students can beprovisionally admitted to the program without these basic expectations, but they must complete all identified deficiencies with a 3.00 grade-point average or above on a 4.0 scale within the first two semesters after acceptance, prior to beginning graduate coursework.

M.P.S. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The program can be completed on a full-time basis in 24 months or students may elect to complete the program on a part-time basis. Requirements for the completion of the Master of Professional Studies in Nutritional Sciences degree include 30 credits at the 500 and 800 level, with a minimum of 6 credits of 500-level course work. There are 28 credits required in the following core courses:

NUTR 805 Advanced Nutrient Metabolism 4
NUTR 540 Research Methods 3
NUTR 801 Leadership in the Nutrition Profession 1
NUTR 810 Nutritional Assessment and Diagnosis 3

NUTR 820 Advanced Clinical Nutrition 3
NUTR 830 Advanced Community Nutrition & Education 3
NUTR 840 Advanced Nutrition Counseling 3
NUTR 850 Leadership Concepts & Application for the Nutrition Profession 3
NUTR 860 Capstone Project in Nutritional Sciences 2-5
STAT 500 Applied Statistics 3

All students must enroll in NUTR 560 Capstone Project in Nutritional Sciences and successfully complete the Capstone Project in order to earn the M.P.S. degree. Depending on the nature of the proposed Capstone Project, the program will approve between 2 and 5 credits of NUTR 560 to count towards the degree requirements. Elective credits may be chosen from a list of approved electives maintained by the program office.

Master of Science Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The graduate program in Nutritional Sciences offers the M.S. degree with an emphasis in basic nutritional sciences, applied human nutrition, or nutrition in public health. The M.S. degree requires a minimum of 30 credits of course work at the 400, 500, 600, or 800 level, including at least 12 credits in 500-level courses and 6 credits in thesis research (NUTR 600 or 610). There are 14 credits required in the following courses: NUTR 501(4), NUTR 502(3), NUTR 520(2), NUTR 551(1), and 4 additional credits at the 500 level from a list maintained by the program. In addition, students must complete 6 credits in Supporting Courses: ENGL 418 or equivalent (3), and 3 credits in Statistics. Elective credits may be chosen from a list of approved electives maintained by the program office. Students pursuing an M.S. degree with an emphasis in nutrition and public health are required to complete a 4-credit field experience. Students must write and defend a master's thesis accepted by the advisers and committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The Ph.D. requires a minimum of 25 credits of course work at the 400, 500, 600, or 800 level, including 13 credits in the following core required courses: NUTR 501 (4 cr.), NUTR 502 (3 cr.), NUTR 520 (2 cr.), NUTR 551 (1 cr.), and 4 additional credits at the 500 level from a list maintained by the program. Students choose an additional 12 credits in consultation with their advisers and doctoral committee, from a list of approved electives maintained by the program office. In addition, one credit of NUTR 520, NUTR 551 or NUTR 590 per year is required until after the semester in which the Comprehensive Exam is passed.

Students must pass a candidacy examination designed to assess the student's potential and academic preparation for doctoral study. Candidacy examinations must be scheduled in compliance with Graduate Council policy. For students with a master's degree, the candidacy examination must be scheduled prior to earning 24 graduate credits or prior to completing 3 semesters following admission to the graduate program, whichever comes first. The candidacy examination is administered and evaluated by the Graduate Candidacy Committee. After completion of the candidacy examination, each student will form a doctoral committee comprised of graduate faculty internal and external to the Graduate Program in Nutritional Sciences, in accordance with Graduate Council requirements. Students must pass a comprehensive examination, the specific format and content of which is determined in consultation with the doctoral committee. A successful defense of the dissertation proposal and the writing of a satisfactory dissertation accepted by the doctoral committee, the head of the graduate program, and the Graduate School, along with the passing of a final oral examination in Nutritional Sciences, is required.

English Competence: Written and oral English competency will be determined by the candidacy committee and remediation assigned, if necessary. Competence must be formally attested by the program before the doctoral candidate's comprehensive examination is scheduled.

Dual-Title Ph.D. Degree in Nutritional Sciences and Clinical and Translational Sciences: This dual-title degree program emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences, and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary adviser in the Graduate Program in Nutritional Sciences and another individual serving as the secondary adviser in an area covered by the dual-title program who is a member of the Clinical and Translational Sciences faculty.

Students must apply and be admitted to the graduate program in Nutritional Sciences and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the **Clinical and Translational Sciences**dual-title program. Refer to the Admission Requirements section of the Clinical and Translational Sciences Bulletin page. Doctoral students must be admitted into the dual-title degree program in **Clinical and Translational Sciences** prior to obtaining candidacy in their home department.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Nutritional Sciences, listed above. In addition, students pursuing the dual-title Ph.D. in Nutritional Sciences and **Clinical and Translational Sciences** must complete the degree requirements for the dual-title Ph.D. in **Clinical and Translational Sciences**, listed on the Clinical and Translational Sciences Bulletin page. Approximately 12 credits of course work required for the CTS dual-title may also be counted as required elective courses for the Ph.D. in Nutritional Sciences.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Nutritional Sciences and must include at least one Graduate Faculty member from the **Clinical and Translational Sciences** program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Nutritional Sciences and **Clinical and Translational Sciences**. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees , the doctoral committee of a Nutritional Sciences and **Clinical and Translational Sciences** dual-title Ph.D. student must include at least one member of the **Clinical and Translational Sciences** Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in **Clinical and Translational Sciences**, the member of the committee representing **Clinical and Translational Sciences** must be appointed as co-chair. The Clinical and Translational Sciences representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in Nutritional Sciences and **Clinical and Translational Sciences**. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

NUTRITION (NUTR) course list

Last Revised by the Department: Fall Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Operations Research (O R)

Program Home Page

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Degrees Conferred:

Students electing this option through participating programs earn a degree with a dual title at both the Ph.D. and the M.S., M.A., or M.Eng. levels, i.e., Ph.D. in (graduate program name) and Operations Research, or M.S., M.A., or M.Eng. in (graduate program name) and Operations Research.

The following graduate programs offer dual-title degrees in Operations Research: Agricultural and Biological Engineering; Animal Science; Business Administration; Civil Engineering; Chemical Engineering; Computer Science and Engineering; Electrical Engineering; Economics; Educational Leadership; Energy, Environmental, and Food Economics; Energy and Mineral Engineering; Entomology; Forest Resources; Geography; Geosciences; Hospitality Management; Industrial Engineering; Mathematics; Statistics; and Workforce Education and Development.

The Graduate Faculty

The Program

The Operations Research dual-title degree program is administered by an Operations Research committee, which is responsible for management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the option, and recommends policy and procedures for its operation to the dean of the Graduate School. This dual-title degree program is offered by graduate major programs in eight colleges. The dual-title program enables students from diverse graduate programs to attain and be identified with the tools, techniques, and methodology of operations research, while maintaining a close association with areas of application. Operations research is the analysis--usually involving mathematical treatment--of a process, problem, or operation to determine its purpose and effectiveness and to gain maximum efficiency. Students must apply and be admitted to one of the approved graduate programs and The Graduate School before they can apply for admission to the dual-title degree program.

Admission Requirements

For the M.S., M.A., M.Eng. dual-title degree in Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 140, MATH 141, MATH 220; CMPSC 101; and 3 credits of probability and statistics.

For the Ph.D. dual-title degree in Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 401, MATH 436; CMPSC 101; and 3 credits of probability and statistics.

Doctoral students must apply and be admitted to the Operations Research dual-title program prior to taking the candidacy exam.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the graduate major programs in which they are enrolled, in addition to the minimum requirements, or their equivalent, in the Operations Research program. Students must enroll in O R 590 Colloquium for at least 1 credit in each year enrolled in the program and in residence.

For the M.S. or M.A. dual-title degree in Operations Research, the minimum requirements are: 6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes; 6 credits in optimization, including a minimum of 3 credits in linear programming; 3 credits in computational methods; and 3 credits in applications/specialization. (Application courses are those that involve problem solving through the use of decision methods.) A minimum of 9 credits must be in the 500 series. Particular courses may satisfy both the graduate major program requirements and those in the Operations Research program. A list of courses that will satisfy these requirements is maintained by the graduate program office.

A thesis may be required by the graduate major program, the supervisor of which must be a member of the Graduate Faculty recommended by the chair of the program granting the degree and approved by the Operations Research committee as qualified to supervise thesis work in operations research. If the graduate major program has an approved non-thesis track for the M.A./M.S. degree, a scholarly paper may be written in lieu of a thesis. All M.Eng. students and M.A./M.S. students who choose to submit a scholarly paper instead of a thesis must take an additional 6 credits in the Operations Research program. It is the prerogative of the graduate major program to assign these credits to one or more of the following categories: stochastic/statistical methods, optimization, computational methods, or applications.

The minimum requirements for the Ph.D. dual-title degree in Operations Research are: 9 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes; 9 credits in optimization, including a minimum of 3 credits in linear programming; 6 credits in computational methods, including a minimum of 3 credits in simulation; and 12 credits in applications/specialization. A minimum of 18 credits must be in the 500 series, and particular courses may satisfy both the graduate major program requirements and those in the Operations Research program.

The candidacy examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Operations Research program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both the primary graduate degree program and Operations Research. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the chair and at least two members of the doctoral committee of an Operations Research dual-title Ph.D. student must be members of the Operations Research Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. The Operations Research representatives on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students in the dual-title program are required to write and orally defend a dissertation on a topic that is approved in advance by their doctoral committee and reflects their original research and education in both their primary graduate program and Operations Research. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

A Ph.D. minor program in Operations Research is available for doctoral students who find it advantageous to include advanced quantitative methods of systems analysis in their programs of study and have been approved to do so by their doctoral committees. To qualify for a minor in Operations Research, students must satisfy the requirements of their graduate major programs, meet the same admissions prerequisites as the M.S. dual-title degree students, and meet the following minimum degree requirements: 6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes; 6 credits in optimization; and 3 credits in computational methods. A minimum of 6 credits must be taken at the 500 level.

Official requests to add the minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishment of the

doctoral committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from Operations Research must serve on the candidate's doctoral committee.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

OPERATIONS RESEARCH (O R) course list

Last Revised by the Department: Summer Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Faculty linked: 6/27/14

Organization Development and Change (ODC)

WILLIAM J. ROTHWELL, Program Chair
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Degree Conferred:

Master of Professional Studies (M.P.S.)

The Graduate Faculty

The Program

The MPS in Organization Development and Change (MPS-OD&C) is an online 33-credit program of study designed for professionals working primarily in organization change and workforce development related careers.

The program will highlight the changing nature of the field of Organization Development, including the impact of the globalization of private and public organizations and the growing importance of organization change and development in the workforce. It will culminate in a field-based project course in which students will demonstrate their understanding of the curriculum and apply it to their professional areas of interest. Students will be expected to complete an organization development-related project and are encouraged to solicit project ideas from a work-related environment to ensure that the problems or opportunities they identify are grounded in the reality of organization development. Upon completion of the MPS-OD&C degree, students will be equipped to work as professionals in corporate development, talent management, workforce development, performance improvement, training and development, and with private employers, government agencies, and non-profit organizations.

Thirty-three (33) credits are required to complete the MPS-OD&C degree program. The course work includes nine prescribed 3-credit courses (27 credit hours), which provide a strategic body of knowledge in assessment, diagnosis, feedback, and marketing of organization development, process consultation, appreciative inquiry, and facilitation of groups and teams; one elective course (3 credit hours) designed to allow students to develop additional expertise in related areas of professional interest and in consultation with their advisors; and one capstone course (3 credit hours), which provides a culminating experience for students to demonstrate their knowledge, understanding, theoretical framework, and practical application of Organization Development and Change, building upon their knowledge acquired from the curriculum.

Admission Requirements

Requirements listed here are in addition to the Graduate Council requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin. The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses. The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

Applicants to the MPS-OD&C must submit the following materials:

- Penn State graduate degree application form and application fee;
- World Campus program application
- A statement of career and educational goals including documentation of a minimum of two years of related full-time work. The statement should be an essay (2-3 pages in length) that demonstrates the applicant's written communication skills. A resume should be attached as a supplement.
- Three letters of recommendation that attest to the applicant's readiness for graduate study and that he or she has the requisite minimum of two years of work experience
- Official transcript(s) of all institutions attended
- TOEFL score, if applicable

Admissions decisions for the program are based on the quality of the applicant's credentials. The decisions are based on a review of the complete application portfolio. During the admission process, students who appear to be better suited for another graduate level program will be encouraged to apply to the appropriate program. Graduate Record Examination (GRE) scores are not required.

Degree Requirements

The MPS in OD&C is conferred upon students who earn a minimum of 33 credits of course work while maintaining a grade-point average of 3.0 or better in all course work, including at least 18 credits at the 500-level or above (with at least 6 credits at the 500-level), and who complete a quality culminating field-based project course in consultation with a graduate adviser. The program curriculum includes nine prescribed courses (27 credits), which provide a strategic body of knowledge in assessment, diagnosis, feedback, and marketing of organization development, process consultation, appreciative inquiry, and facilitation of groups and teams; one elective course (3 credit hours) designed to allow students to develop additional expertise in related areas of professional interest and in consultation with their graduate advisers; and one required field-based project course (3 credit hours), which provides a culminating experience for students to demonstrate their knowledge, understanding, theoretical framework, and practical application of Organization Development and Change, building upon their knowledge acquired from the curriculum.

Required Courses

- WF ED 572 Organization Development for Trainers
- TRDEV 565 Implementing Training and Development Programs
- WF ED 582 Assessing and Feeding Back Data: Organizational Diagnosis
- WF ED 578 Process Consultation
- WF ED 884 Appreciative Inquiry
- WF ED 585 Appraising Organization Development and Consulting
- WF ED 881 Marketing Organization Development and Consulting
- WF ED 880 Facilitating Groups and Teams
- WF ED 405 Project Management for Professionals
- WF ED 595A Field Based Project in Industrial Training

Substitutions for the above required courses, either with resident-instruction courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis, and must be petitioned and approved by the Program Chair, with input from the student's graduate adviser.

Electives

Elective courses can be taken at any time during degree progression. Students will need to obtain prior approval from their academic adviser before taking any 400- or 500-level graduate courses to fulfill the elective requirements. Students may also be able to transfer credits into the program, in consultation with their academic adviser. An extensive variety of elective courses are available; the most current list is maintained on the program's website.

Culminating Experience

Students will take WF ED 595A, Field Based Project in Industrial Training, and complete an organization development and change related capstone project as a culminating experience.

Student Aid

Graduate assistantships are currently not available. Financial aid opportunities for part-time students with the World Campus are discussed at http://www.worldcampus.psu.edu/tuition-and-financial-aid/financial-aid

Graduate-Level Courses

A minimum of 30 credits of coursework at the 400 level or higher is required, of which at least 18 credits must be at the 500-level and above, with a minimum of 6 credits of 500-level course work. A significant culminating or "capstone" experience or other mechanism to demonstrate evidence of analytical ability and synthesis of material is required. These may typically include, but are not limited to, a paper, an internship, an exhibition, a production, a comprehensive examination, or a capstone course. The specific form of the culminating experience is determined by the assigned faculty in the Workforce Education and Development program.

Last Revised by the Department: Fall Semester 2013

Review Date: 11/19/2013

Faculty linked: 8/14/14

Public Administration (P ADM)

Program Home Page

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GOKTUG MORCOL, *Coordinator,* email: gxm27@psu.edu

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Degrees Conferred:

M.P.A., Ph.D.

The Graduate Faculty

M.P.A. Program

The Master of Public Administration (M.P.A.) program is intended for those with career interests in public management, health and human services, government, and other public service and nonprofit organizations. The curriculum blends theoretical and applied concepts and assures "real-world" experiences for the novice administrator. In addition, it requires that students devote attention to general professional development. The M.P.A. program is accredited by the National Association of Schools of Public Affairs and Administration (NASPAA).

FULL-TIME OR PART-TIME--Students may begin the program in any semester. Three courses (or 9 credits) per semester are considered a normal course load for full-time students. Part-time students typically take one or two 3-credit courses each semester and one or two courses during the summer session to maintain steady progress toward the degree. The program, including an internship in a public agency or nonprofit organization for those without three years of managerial, supervisory, or professional experience, requires eighteen to twenty-four months of full-time study, or three to five years on a part-time basis.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission. Applicants who are still completing their baccalaureate requirements at the time of application may be provisionally admitted to the Graduate School conditional on the awarding of the baccalaureate degree.

Admission to the MPA program is based on clear suitability for the program as demonstrated by the application as a whole, including the following: a completed application with the application fee; official transcripts from all post-secondary institutions attended; a statement of career and educational goals; a successful undergraduate record with a grade-point average of 3.00 (either as the cumulative GPA or for the last 60 hours of relevant course work); satisfactory scores on the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), or Law School Admission Test (LSAT) if the GPA is less than 3.0; and recommendations from three references.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The M.P.A. degree program requires a minimum of 39 credits—18 credits in core courses, 15 credits in electives, 3 credits for the research project that serves as the culminating experience for the degree, and a 3 credit internship. The 3-credit internship may be waived at the discretion of the program for students who have at least two years of full-time relevant work experience that consists of supervisory, managerial, or professional work, or who gain this experience while enrolled in the program. Students for whom the internship requirement is waived can complete the program with a minimum of 36 credits. Up to 6 credits of 400-level courses may be taken as electives, with the approval of an adviser.

REQUIRED CORE COURSES (18 credits)

PADM 500 (3), PADM 502 (3), PADM 503 (3), PADM 505 (3), PADM 507 (3), PADM 510 (3)

ELECTIVE CONCENTRATION AREA (15 credits)

With the faculty adviser's approval, a student selects 15 credits of electives from a list of approved electives maintained by the program office.

RESEARCH PROJECT (3 credits)

PADM 594

INTERNSHIP IN PUBLIC ADMINISTRATION (3 credits)

PADM 595

Ph.D. Program

The mission of the PhD program in Public Administration is to provide advanced graduate education in theory and research in the field to prepare students for academic, research, and advanced professional careers in public administration.

Each student is expected to graduate with:

1. Research experience working with public administration faculty
2. Experience in presentation of scholarly papers and posters at national and regional conferences
3. Experience in developing, authoring, or co-authoring with a faculty member, and submitting at least one article for a refereed publication
4. Teaching experience at the college/university level

Application and Requirements for Admission

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Individuals with superior academic records and a strong interest in careers emphasizing research and scholarship are encouraged to apply to the program. The program typically admits a Ph.D. cohort of full-time students to begin each fall semester.

Admission to the Ph.D. program is based on the applicant's undergraduate and graduate academic records, standardized test scores, letters of reference, and the compatibility of their backgrounds and interests with those of the program faculty members, as expressed in the applicant's statement of goals and research interests. All applicants must have completed a master's degree. A completed master of public administration (M.P.A.) degree is preferred, but students with master's degrees in related areas (political science, public policy, economics, sociology, anthropology, social work, business management, and health administration, for example) or Juris Doctorate degrees (law) will also be considered.

Application Deadlines: There are two deadlines for applications for the fall semester of the following academic year: **January 15** and **March 15** of each year. For those applicants seeking research or teaching assistantships, the deadline to submit all application materials is January 15. Late applications may be considered if assistantships are still available. Applicants who wish to finance their education with their own funds or other sources (foreign governments

that fund international students for Ph.D. studies in the United States and other funding agencies, such as Fulbright commissions) must submit all application materials by March 15.

Application Package: A complete application must include:

1. A completed online Graduate School application
2. Payment of a non-refundable application fee
3. Official Graduate Record Examination scores (verbal, quantitative, and analytical) taken within the five years prior to the date of application
4. A resume that includes work experience, volunteer activities, academic and professional honors, honorary societies, extracurricular activities, offices held, any publications and other significant activities
5. A statement of goals and research interests, including evidence of research aptitude and interest as well as "fit" with the faculty interests in the Ph.D. program at Penn State Harrisburg. The candidate should make the case why this Ph.D. program at Penn State Harrisburg would be a good fit for him/her
6. A writing sample that reflects the applicant's background in conducting academic research and potential to conduct academic research in the future
7. At least three letters of recommendation, preferably from faculty members who can comment upon the applicant's potential as a doctoral student
8. Official transcripts from all post-secondary institutions attended.

International Students: The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A Ph.D. student must first successfully complete the **prerequisite courses** specified by the program to make up for deficiencies, if any exist. After these are completed, a student must take a minimum of 42 credits: **five 3-credit foundation courses**, **four 3-credit research methods courses**, and **five 3-credit specialization area courses**. All doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School .

Prerequisite courses and provisional admission: Applicants who do not have the necessary background, but otherwise meet the criteria for admission may be admitted provisionally and must make up any deficiencies in graduate courses in public administration noted in the letter of acceptance. Students who must make up deficiencies are considered to be provisionally admitted into the program.

Provisionally admitted students are required to take **one or both** of the following prerequisite courses: PADM 500 (Public Organization and Management) and PADM 507 (Introduction to Public Policy Analysis). In consultation with the program faculty members, the coordinator of the Ph.D. program makes the decisions on which prerequisite courses each student should be required to take.

A student may remain in this temporary classification for a period of no longer than two semesters following admission. Upon successful completion of the prerequisite courses noted in the letter (with at least a 3.5 grade-point average), the student will be removed from provisional status and be regularly enrolled. The provisional status must be removed before a student takes his/her candidacy exam.

Foundations of public administration: All the students in the program will be required to take the following foundational courses before they are eligible to take the candidacy examination:
PADM 570. Scope and Methods (3 credits)
PADM 571. Seminar in Organizational Theory (3 credits)
PADM 573. Research and Theory in Public Policy and Governance (3 credits)
PADM 574. Research and Theory in Public and Nonprofit Management (3 credits)
PADM 572. Research and Theory in Public Budgeting and Finance (3 credits)

Specialization area courses: In consultation with the student's adviser and doctoral committee, each doctoral student will develop a public administration specialization that consists of five 3-credit courses. These specialization areas are not pre-defined. They may be tailor-made by the student and his/her committee, based on the student's interests and the availability of the courses in the School of Public Affairs and other colleges and graduate programs at Penn State. Examples of possible specialization areas are **public and nonprofit management, organizations and human resource management, public budgeting and finance, public policy analysis, state and local government administration, criminal justice, health administration, and homeland security.**

Research methods courses: Students are required to take four 3-credit research methods courses. The following two research methods courses are required for all Public Administration Ph.D. students:

PADM 503. Research Methods (3 credits)
PADM 575. Advanced Research Design (3 credits)

Students also will select two in-depth 3-credit research methods courses on the basis of their research interests (quantitative, qualitative, or mixed methods), suitability of the courses in preparing students for their dissertation studies, and the availability of the courses.

Students may find suitable courses in the Ph.D. program in Public Administration or other graduate programs at Penn State. These two in-depth methods courses should be approved in advance by the student's doctoral committee. A student's committee may also allow him/her to take in-depth methods courses that are offered by other universities or research institutions, if the equivalent courses cannot be found within Penn State, if the equivalency of these courses to 3-credit graduate-level courses offered at Penn State can be verified by Graduate Enrollment Services, and if the costs of taking these courses can be covered by the student or another arrangement can be made to cover the costs.

Candidacy examination: Only students who complete the required courses in the Foundations of Public Administration successfully, with a minimum 3.5 GPA, may take the candidacy examination. The candidacy examination will cover topics about the intellectual history and enduring questions in the field. Many of these subjects are covered in the required foundational doctoral courses; they include such topics as public administration and democratic theory, public organizations and management, and constitutional and legal foundations. The exam is written and graded by the Public Administration graduate faculty.

Comprehensive Examination: Upon successful completion of the specialization courses and research methods courses, with a minimum 3.5 GPA, a doctoral candidate takes a comprehensive written and oral examination. Comprehensive examinations are administered by the student's doctoral committee. In comprehensive examinations students are tested about the contents of their specialization areas and they will be required to propose a research design on a relevant topic.

Dissertation: After passing the comprehensive examination, a student must work with his or her adviser and doctoral committee to develop a full dissertation proposal within three months of the exam. Once the doctoral committee approves the full proposal, dissertation research can begin. Students will be required to conduct their dissertation research and write and defend their dissertations in accordance with Graduate Council policy and as agreed on by their doctoral committees.

Grade Point Average and Time Limit

Full-time students are expected to finish the program in four to five years. Graduate Council policy requires that a student must complete the program within eight years after passing the candidacy examination. The Ph.D. Program in Public Administration requires that students have at least a 3.50 grade-point average in order to graduate.

Joint Degree with Penn State Dickinson Law (J.D./M.P.A.)

JEREMY F. PLANT, *Program Coordinator*
Penn State Harrisburg
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www.hbg.psu.edu

Degrees Conferred:

J.D./M.P.A.

Penn State Dickinson Law and the School of Public Affairs, Penn State Harrisburg, the Capital College, offer a joint degree program leading to the degrees of Juris Doctor, granted by Penn State Dickinson Law, and Master of Public Administration, granted by Penn State Harrisburg.

Admission Requirements

In order to be admitted to the program, students must first be admitted to Penn State Dickinson Law under its regular admission procedures. Subsequently, the student must be recommended for admission to the M.P.A. program by Penn State Dickinson Law, and must apply for admission to the M.P.A. degree program as described in the Admission Requirements section above. Penn State Harrisburg will make independent admissions decisions as to all joint degree applicants.

Admissions requirements and applications for Penn State Dickinson Law are available at the Admissions & Aid section of its website.

Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on thePenn State Dickinson Law website. Degree requirements for the M.P.A. degree are listed in the Degree Requirements section above.

A maximum of 9 credits of Penn State Dickinson Law course work may be double-counted for credit toward the M.P.A. degree at Penn State Harrisburg, subject to program approval based on relevance to the M.P.A. degree.

A maximum of 9 credits of M.P.A. course work with a grade of B or better may be double-counted for credit toward the J.D. degree at Penn State Dickinson Law, subject to approval by Penn State Dickinson Law.

A student in the joint degree program can graduate with one degree prior to completing the other, if all requirements for that degree have been completed. Students must earn at least a 3.0 grade-point average to be eligible for the M.P.A. degree. If students accepted into the joint degree program are unable to complete the J.D. degree, they are still eligible to receive the M.P.A. degree if all the M.P.A. degree requirements have been satisfied.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*. Qualified Ph.D. students will be supported with 9-month merit-based research or teaching assistantships. The assistantship granted to a student may be renewed at the end of each academic year, based on the student's academic performance in the program. While these are not guaranteed, funding opportunities may also be available for admitted students during the summer semesters. Such opportunities may include, but are not limited to, teaching and involvement in faculty-sponsored research. Students may also apply for other financial aid programs through the University'sOffice of Student Aid.

In addition, the program faculty may admit to the program qualified full-time students who will finance their educations with scholarships from sources outside Penn State or with personal funds. These sources may include foreign governments that fund international students for Ph.D. studies in the United States and other funding agencies, such as Fulbright commissions.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer 2017

Blue Sheet Item #: 46-01

Review Date: 8/22/2017

Faculty linked: 8/14/14

Pathobiology (PATHB)

Program Home Page

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Degrees Conferred:

Ph.D., M.S.
Dual-Title Ph.D. (Pathobiology and Clinical and Translational Sciences)

The Graduate Faculty

The Program

The graduate program in Pathobiology is designed to provide flexibility in graduate work while providing opportunities to study immunology, microbiology, nutrition, biochemistry, virology, veterinary pathology, physiology, or toxicology, usually as related to problems seen in human, domestic animal, and wildlife health.

Graduate instruction is directed by graduate faculty members from the Department of Veterinary Science and related unitswith research interests in animal science, biochemistry, biology, biophysics, immunology, nutrition, physiology, zoology, and others. The Ph.D. program is designed for completion in three to four academic years. Doctoral candidates usually complete certain required courses and obtain laboratory experience before selecting an area of specialization and completing an original research problem, including the defense of the Ph.D. dissertation.

Requirements listed here are in addition to general Graduate Council requirements stated in the Academic Information and Procedures and Degree Requirements sections of the Graduate Bulletin.

Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by Pathobiology and authorized by the dean of the Graduate School, are required for admission. At the discretion of Pathobiology, a student may be admitted for graduate study in a program without these scores.

Applicants with a 3.0 or better grade-point average (on a 4.00 scale) in undergraduate science courses and appropriate course backgrounds will be considered for admission. Applicants should have a baccalaureate degree in a biological science-related field, or a degree as a graduate veterinarian or equivalent. Undergraduate preparation should include biology, chemistry, physics, mathematics through calculus, and preferably biostatistics and biochemistry.

Master's Degree Requirements

A minimum of 30 credits of coursework at the 400 level or higher is required for the M.S. degree, of which at least 18 credits must be taken in 500- and 600-level courses.

Satisfactory completion of the following courses or their equivalent is required of all M.S. degree candidates: Statistics, 3 credits; Biochemistry or molecular and cell biology, 3 credits (usually chosen from B M B 400, and BMMB 501) VB SC 520, Pathobiology, 3 credits.

All Pathobiology students are required to complete one semester of VB SC 590 Colloquium each year as well as 8 elective credits from a list of courses that is maintained by the Pathobiology program office..

Pathobiology requires no program-specific qualifying examinations, and there is no communication/language requirement for the M.S.

A thesis is required of all candidates for the M.S. degree, including 6 credits of VB SC 600.

Doctoral Degree Requirements

The doctor of philosophy degree places a strong emphasis on research. It is conferred in recognition of the capacity to carry out independent research and the attainment of a high level of scholarship. General requirements for the doctorate specify a minimum period of residence (two semesters, excluding summer sessions, within a 12-month period), the passing of candidacy, comprehensive and final oral examinations, and the writing of a satisfactory dissertation. The particular combination of courses, seminars, individual study, and research that constitutes an individual student's program is arranged by the doctoral committee and should include the courses that have been designated in the Pathobiology graduate curriculum. http://vbs.psu.edu/graduateprograms/pathobiology/curriculum), subject to the general policies of Graduate Council.

The Pathobiology graduate program requires a total of 21 credits of coursework at the 400-level or higher for the Ph.D. degree. A minimum grade-point average of 3.00 for work done at the University is required.

There are formal communications requirements for the Ph.D. degree in Pathobiology that are required by Graduate Council. The doctoral committee will assess the technical writing and oral communication skills of the candidate and may require that formal course work or other means to improve these skills be undertaken.

The graduate program in Pathobiology requires that each graduate student have 3 credits in statistics. Ph.D. candidates in Pathobiology additionally are expected to have statistical skills equivalent to those learned in STAT 501 and STAT 502. Ub addutuibm the candidacy examination committee and the doctoral committee may require that additional course work in statistics be taken if deficiencies are noted.

A candidacy examination is given to students entering the Ph.D. program and after they complete at least 18 credits of post-baccalaureate course work.

After being admitted to candidacy, each doctoral candidate is guided by a doctoral committee consisting of four or more members of the graduate faculty as specified by the Graduate School. These committees are appointed through the Office of Graduate Enrollment Services, upon recommendation of the department head, after the student is admitted to candidacy.

Clinical and Translational Sciences Dual-Title Degree Program

Doctoral students with research and educational interests in clinical and translational science may apply for the Dual-Title PhD Degree in Pathobiology and Clinical and Translational Sciences (CTS) following admission to the Graduate School and Pathobiology and prior to taking the candidacy examination in Pathobiology (end of the third semester). An admissions committee comprised of faculty affiliated with the dual-title program will evaluate applicants. Applicants must have a graduate GPA of at least 3.5 in a research area related to CTS and Pathobiology. Prospective dual-title program students must submit a statement of purpose that addresses the ways in which their research and professional goals will be enhanced by an interdisciplinary course of study in clinical and translational sciences.

This dual-title degree program emphasizes interdisciplinary scholarship at the interface of basic sciences, clinical sciences and human health. Students in the dual-title program are required to have two advisers from separate disciplines: one individual serving as the primary mentor in the Graduate Program in Pathobiology and another individual serving as the secondary mentor in an area covered by the dual-title program who is a member of the CTS faculty. The dual-title PhD degree in Pathobiology and CTS requires the completion of 18 credits of coursework, in addition to the completion of all requirements for the Pathobiology Ph.D. degree program. Coursework from an approved list of courses is required and covers the areas of epidemiology, bioinformatics, experimental design and interpretation, statistics, regulatory environment and scientific communication. A current list of approved coursework will be maintained by the CTS program head and will be available in the CTS program office and/or on the CTS website. Up to 6 credits of coursework may be

double-counted as elective courses to meet the requirements for the Ph.D. in Pathobiology. For students in the dual-title program, the candidacy examination will include content from both the Graduate Program in Pathobiology and the CTS programs and will be completed with the other Pathobiology students in the third semester. The student's doctoral committee will include faculty from Pathobiology and faculty with expertise in clinical and translational science. The fields of Pathobiology and CTS will be integrated in the student's comprehensive examination. All dual-title students are required to conduct dissertation research that contributes fundamentally to the fields of Pathobiology and CTS.

Other Relevant Information

After a student has been admitted to graduate study in the department, an adviser will be appointed by the program director. This person may be a member of the eventual M.S. committee or someone else assigned the responsibility for directing the student's scheduling of course work. In the case of a doctoral candidate, the person may be a member of the eventual doctoral committee or someone else designated the responsibility for directing the student's scheduling of course work. The adviser is also responsible for initiating the scheduling of the candidacy examination.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin.

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

VETERINARY SCIENCE (V SC) course list

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-06

Review Date: 04/14/2015

Faculty linked: 6/27/14

Public Health (PH)

Program Home Page

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Degrees Conferred:

M.P.H., Dr.P.H.
Joint M.D./M.P.H.
Joint J.D./M.P.H.

The Graduate Faculty

The Program

The Master of Public Health (M.P.H.) in Public Health program is a professional degree program that builds knowledge and skills in the areas of systems thinking, evidence-based public health, leadership, program planning and management, public health and health systems, communication, and interprofessional practice. In addition, the M.P.H. in Public Health program advances expertise in community and behavioral health, epidemiology and biostatistics, global health, and health systems organization and policy. The M.P.H. degree leads to careers in a wide variety of fields and settings, including local, state, and federal government agencies; health care settings; health insurance industry; health services networks; nonprofits; and the pharmaceutical industry.

The Doctor of Public Health (Dr.P.H.) in Public Health program is a professional degree program that provides advanced public health education and training to prepare its graduates for evidence-based practice and leadership in the application of translational science and implementation research findings. It allows graduates to pursue career opportunities in the federal, state, and local government, as well as in the non-profit, academic, and private sectors. Educationally it places an emphasis on discovery, teaching, integration, and application with a primary purpose of bridging research and practice to protect and improve the public's health. The Dr.P.H. builds on Master of Public Health (M.P.H.) competency domains and, as a professional degree, integrates public health practice and project-based learning with local, state, and federal networks to enrich learning in health policy and program development and implementation. Dr.P.H. program of study includes course work, an advanced field experience, and integrative doctoral research and provides an opportunity for further specialization within a specified cognate.

Admission Requirements

Applicants apply for admission to the program via the Graduate School application for admission. Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

M.P.H. Admission Requirements

Admission to the Penn State M.P.H. Program is granted jointly by the M.P.H. Program and the Graduate School at Penn State.

For admission to the M.P.H. Program, applicants must submit:

- Completed online Graduate School application with nonrefundable application fee
- Resume or curriculum vitae
- Statement of purpose
- Two letters of recommendation
- Official transcripts from all post-secondary institutions attended
- Official scores from one of the following standardized tests taken within the past five years; Graduate Record Examination (GRE), Medical College Admission Test (MCAT), or Law School Admission Test (LSAT)

Standardized Test Requirement Waiver 1: This requirement is waived for applicants who have an advanced degree beyond the baccalaureate.

Standardized Test Requirement Waiver 2: This requirement may be waived at the discretion of the program for applicants who, prior to submitting the application for admission, have successfully completed (with a grade of B or better in each course):

- At least one 3-credit graduate-level course in biostatistics; AND
- At least one 3-credit graduate-level course in epidemiology; AND
- At least one 3-credit graduate-level course in the social and behavioral sciences or health services administration core areas of public health

Dr.P.H. Admission Requirements

- Completed online Graduate School application with nonrefundable application fee
- Three recommenders to provide letters of academic and professional reference
- Statement of purpose
  - Describe why you want to pursue a Dr.P.H., how you plan to use your education and training, the needs and/or challenges you perceive as important in your field of study, and any personal qualities, characteristics, skills and experiences you believe will enable you to be successful in public health
- Official Graduate Record Examination (GRE) scores taken within the past five years
- Official transcripts from all post-secondary institutions attended
- CV or resume

M.P.H. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

M.P.H. students must complete a total of 42 credits of graduate level course work, the majority of which are 500 level courses, specifically:

- 24 credits in prescribed courses, including:
  - 18 credits of core classroom-based courses
  - 3 credit practicum experience
  - 3 credit capstone
- 18 credits in elective courses

The capstone course (PHS 894) provides the students with the knowledge and skills to design, carry out, and present a scholarly public health project based upon competencies gained in previous courses. Topics include defining a scholarly project, selecting a topic and project type, describing the problem, reviewing the literature, identifying project methodology, presenting project results, ethics and scholarly work, writing and critiquing scholarly work, and creating and delivering a poster presentation.

Prescribed Courses: 24 credits

PHS 501(3), PHS 504(3) or BBH 504(3), PHS 520(3), PHS 536(3), PHS 550(3), PHS 571(3) or HPA 520(3), PHS 894(3), PHS 895A(3).

Additional Courses: 18 credits

The 18 credits of electives may be selected from a list of approved courses that is maintained by the graduate program office. Multiple tracks of specialization are available. Please visit med.psu.edu/mph to learn more about the approved elective courses and available tracks.

Joint Degree Offering with the Penn State Hershey College of Medicine

Degrees Conferred:
M.D. (Hershey)
M.P.H. (Hershey)

Joint Degree Program

The M.P.H. in Public Health program and M.D. Program at Penn State Hershey College of Medicine offer a joint degree program leading to the degrees of Doctor of Medicine (M.D.) and Master of Public Health (M.P.H.).

Admission Requirements

Admissions requirements for the M.D./M.P.H. program are the same as those for the M.D. and M.P.H. in Public Health programs. M.D./M.P.H. students will have to meet the admissions requirements of both programs, and each program will make a separate admissions decision. The admission requirements for the M.P.H. degree are listed above. Admissions requirements and applications for admission for the Penn State College of Medicine are available at the M.D. Program section of the Penn State College of Medicine website. Students will first apply and be accepted to the M.D. program at the Penn State College of Medicine. After being accepted to and matriculating at the Penn State M.D. program, M.D. students will be eligible to submit a Penn State Graduate Application for Admission to the M.P.H. in Public Health. M.D. students may submit an application starting their first semester in the M.D. program up through the fall semester of their third year of medical school.

M.D./M.P.H. students who, for whatever reason, withdraw from the M.D. program retain the option of remaining in the M.P.H. in Public Health program to earn the graduate degree.

M.D./M.P.H. Degree Requirements

M.D./M.P.H. degree requirements are the same as that of the standalone M.P.H. degree program. Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the M.D. program are listed on the M.D. Programsection of the Penn State College of Medicine website. Degree requirements for the M.P.H. degree are listed above.

Double-Counting of Courses

Sixteen credits of M.D. course work may be double-counted toward the M.P.H. degree.

Advising of Students

All students in the M.D./M.P.H. program will have two academic advisers, one in the M.P.H. degree program and one in the M.D. program.

Joint Degree Offering with Penn State Dickinson Law

Degrees Conferred:
J.D. (Dickinson)
M.P.H. (Hershey)

Joint Degree Program

The M.P.H. in Public Health program and J.D. Program at Penn State Dickinson Law offer a joint degree program leading to the degrees of Juris Doctor (J.D.) and Master of Public Health (M.P.H.).

Admission Requirements

Admissions requirements for the J.D./M.P.H. program are the same as those for the J.D. and M.P.H. in Public Health programs. J.D./M.P.H. students will have to meet the admissions requirements of both programs, and each program will make a separate admissions decision. Admissions requirements and applications for admission for Dickinson Law are listed in the J.D. Admissions section of the Dickinson Law website. The admission requirements for the Master of Public Health are listed above. Students will first apply and be accepted to the J.D. program at the Penn State Dickinson Law. After being accepted to and matriculating at the Penn State Dickinson Law, J.D. students will be eligible to submit a Penn State Graduate Application for Admission to the M.P.H. in Public Health. J.D. students may submit an application starting their first semester in the J.D. program up through the fourth semesters of law school.

J.D./M.P.H. students who, for whatever reason, withdraw from the J.D. program retain the option of remaining in the M.P.H. in Public Health program to earn the graduate degree.

J.D./M.P.H. Degree Requirements

Students must fulfill all requirements for each degree in order to be awarded that degree, subject to the double-counting of credits as outlined below. Degree requirements for the J.D. program are listed on thePenn State Dickinson Law website. Degree requirements for the M.P.H. degree are listed in the M.P.H. Degree Requirements section above.

Double-Counting of Courses

Twelve credits of J.D. coursework may be double-counted toward the M.P.H. degree. In lieu of PHS 895A, J.D./M.P.H. students will complete IHCLN 997 Medical-Legal Partnership Clinic (3 cr.), which will double-count for both degrees. In addition, up to 9 law school elective credits will be double-counted towards the M.P.H. Up to 9 credits of M.P.H. course work may be applied towards the J.D. degree. The Associate Dean for Academic Affairs at Dickinson Law will approve, in advance of the student's enrollment in M.P.H. elective courses, which of those courses will double-count towards to J.D. degree.

Advising of Students

All students in the J.D./M.P.H. program will have two academic advisors, one in the M.P.H. degree program and one in the J.D. program.

Dr.P.H. Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Dr.P.H. students must complete a minimum of 60 credits of graduate-level course work beyond a master's degree, the majority of which are 500-level and 800-level courses, specifically:

- 24 credits in prescribed, core classroom-based courses
- 21 credits in elective courses
  - 9 credits of track elective courses
  - 12 credits of general (cognate) elective courses
- 15 additional credits
  - 6 credits of Advanced Field Experience
  - 9 credits of Integrative Doctoral Research

Prescribed Courses: 24 credits
PHS 575(3); PHS 576(3); PHS 577(3); PHS 554(3); PHS 555(3); ADTED 550(3); PHS 806(3); and PHS 892(3)

Elective Courses: 21 credits
The remaining credits may be selected from a list of approved courses that is maintained by the graduate program office. Multiple tracks of specialization are available. Please visit www.med.psu.edu/drph to learn more about the approved elective courses and available tracks.

Additional credits: 15 credits
PHS 895B(6), PHS 896A(6), PHS 896B(3)

Dr.P.H. students must meet Penn State doctoral degree requirements as outlined in the Graduate Bulletin, including candidacy examinations, English competencies, and doctoral committee composition. Dr.P.H. students must also meet additional Dr.P.H.-specific requirements.

Dr.P.H. --Additional Specific Requirements

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

1. Satisfactory completion of a prescribed period of study;
2. Ability to apply translational science and implementation research findings in evidence-based public health practice;
3. Successful performance of candidacy and comprehensive examinations, covering public health core areas of study and a field of specialization; and
4. The preparation and acceptance of integrative doctoral research.

Residency requirements--The Doctor of Public Health requires 24 core credits to be taken in residence as a registered student engaged in academic work at the Hershey and Harrisburg campuses.

Additional Course Requirements for Applicants without a Master of Public Health
Applicants must have a graduate (e.g. master's) or advanced professional (e.g., M.D.) degree. Applicants without a Master of Public Health or related degree are required to take core courses to ensure a firm foundation in discipline-specific M.P.H. competency domains. These foundation courses include: PHS 501 (3), PHS 504 (3), PHS 520 (3), PHS 550 (3), and PHS 571 (3).

For applicants entering the program without a Master of Public Health, the minimum credits required for the Dr.P.H. degree will include these 15 credits of foundation courses, for a minimum total of 75. Some or all of the foundation courses may be waived based on previous graduate-level course work, in which case the total credits required for the degree may be reduced in an equivalent manner, down to the base minimum of 60 credits. Students must petition the head of the graduate program to obtain a waiver for the foundation courses, and students' transcripts will be reviewed to assess their eligibility for a waiver.

Comprehensive Examination--Upon completing all core and most cognate course work, Dr.P.H. students will take comprehensive exams to ensure they meet Dr.P.H. core and track program competencies. Comprehensive exams will be overseen and evaluated by students' doctoral committee.

Integrative Doctoral Research--Dr.P.H. students will be required to complete two major components for their Dr.P.H. integrative experience: two publishable-quality manuscripts and a doctoral portfolio.
With guidance from their doctoral adviser and doctoral committee, students will develop two manuscripts that comprehensively address, generate, and/or interpret and evaluate knowledge applicable to public health practice. Manuscripts are encouraged to be of an applied nature and must demonstrate students' abilities to conduct independent research on a contemporary public health issue. Students will demonstrate the application of advanced public health practice skills and knowledge in the design and execution of a scholarly project, the analysis and interpretation of the findings, and the application of the new knowledge to advance public health practice. This work should contribute to the evidence base of public health practice, be of publishable quality, and demonstrate critical thinking and rigorous analytic strategies.

Throughout their doctoral program, students will develop a doctoral portfolio that will document how Dr.P.H. courses, advanced field experience, other experiential learning, and self-knowledge has informed their leadership style and approach to integrating evidence-based research into public health practice. Components of the portfolio may include, but are not limited to, research (e.g., publications, conference presentations), teaching (academic and non-academic, community-based teaching), and field and other service learning experiences. Portfolios will require reflection on in-class and out-of-class experiences and demonstrate students' broad public health knowledge, specialized knowledge, translation of this knowledge into evidence-based public health practice, and leadership style. Integrative Doctoral Research will demonstrate the following competencies: data and analysis, communication, systems thinking, leadership, critical thinking, and problem solving. Written and oral presentation of this work will be required.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

PUBLIC HEALTH (PH) course list

Last Revised by the Department: Spring 2018

Blue Sheet Item #: 46-05-000

Review Date: 2/20/2018

Faculty linked: 8/14/14

Philosophy (PHIL)

Program Home Page

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Degrees Conferred:

Ph.D., M.A.
Dual-title Ph.D. in African American and Diaspora Studies
Dual-title Ph.D. in Classics and Ancient Mediterranean Studies
Dual-title Ph.D. and M.A. in Women's Studies

The Graduate Faculty

The Programs

Graduate education in the Penn State Department of Philosophy coordinates our longstanding strength in Continental philosophy with our emerging specialties in feminist philosophy and critical philosophy of race. The graduate program's signature style of pursuing these strengths involves engagement with and reflection on the history of philosophy. It also integrates our strengths with the study of ethics richly informed by a historical approach. We understand Continental philosophy, feminist philosophy, and critical philosophy of race necessarily draw from multiple traditions, including analytic and American as well as Continental philosophy. Likewise, the field of ethics draws on multiple traditions, and the history of philosophy can be and is pursued by means of different problematics and diverse philosophical traditions. Graduate students are trained in multiple traditions, helping produce a new generation of diverse students who are philosophically "multilingual."

Interdisciplinary study is also possible across the humanities, the social sciences, the arts, the natural sciences, and interdisciplinary programs such as Women's Studies and African American Studies. Doctoral minors are available in social thought and in literary theory, criticism, and aesthetics. Study abroad is possible as well, through exchange programs or individual arrangements with leading departments of philosophy.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Philosophy graduate program, are required for admission. At the discretion of the graduate program, a student may be admitted provisionally for graduate study without these scores.

Undergraduate preparation in Philosophy is advisable.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 GPA may be made for students with special backgrounds, abilities, and interests at the discretion of the program.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

M.A. Credit Requirements

Students receive an M.A. degree as a part of their work for the Ph.D. The M.A. is awarded after successful completion of the candidacy exam, part of which serves as the master's scholarly paper, and after acquiring the minimum 30 credits of courses.

Students awarded an M.A. will have met the following requirements:

1. A minimum of 30 credits including at least 18 credits in 500 level courses.
    a. At least 18 credits must be in Philosophy. (At least 12 of these credits must be in 400 and 500 level courses).
    b. 6 credits may be in a Graduate Minor.
2. The submission of a candidacy portfolio, a portion of which serves as the master's scholarly paper. The portfolio must be accepted by the candidacy committee and the head of the graduate program.
3. Successful completion of the candidacy exam.

The department does not admit applicants for the terminal master's degree.

Ph.D. Credit Requirements

A minimum of 30 credits in residence at Penn State. 18 of these course credits must be at the 500 level in Philosophy. In addition, at least 9 credits must be taken at the 600 level in Philosophy. Candidates typically take 50 credits of course work and 36 research credits. At the program's discretion, candidates may take up to 15 non-Philosophy credits toward a doctoral minor.

The foreign language requirement for the Philosophy Ph.D. degree is satisfied either by passing department translation examinations in two languages other than English, or by passing one language examination and PHIL 512 Logic.

To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Doctoral Degree in Philosophy and African American and Diaspora Studies

Admission Requirements

Students must apply and be admitted to the graduate program in Philosophy and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest known on their applications to Philosophy. Students must

apply and be admitted to the dual-title degree program in African American and Diaspora Studies prior to taking the candidacy exam. In addition to the admission requirements set forth by the Graduate Council and the Department of Philosophy, students will be admitted to the dual-title degree program in African American and Diaspora Studies by an admissions committee of African American and Diaspora Studies faculty.

GPA and GRE Requirements

Applicants entering with only an undergraduate degree should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale), and, where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken. Exceptions to the minimum GPA requirement may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Each applicant must provide the scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application that have already been provided for admission to the graduate major program.

Ph.D. Degree Requirements

To qualify for the dual-title degree in Philosophy and African American and Diaspora Studies, students must satisfy the Philosophy Ph.D. degree requirements listed in the “Degree Requirements” section above. In addition to the Philosophy Department requirements listed above, the minimum course requirements for this dual-title Ph.D. degree are as follows:

15 credits of course work related to African American and Diaspora Studies, all at the 500 or 800 level. Of these 15 credits, 9 must come from the required core course sequence in African American and Diaspora Studies, which comprises the following courses:

AFAM 501. Seminar in African American Studies (3)
AFAM 502. Blacks and African Diaspora (3)
AFAM 503. Sexual and Gender Politics in the African Diaspora (3)

Students must also take 6 elective credits, all of which must come from the list of approved electives maintained in the African American and Diaspora Studies program office. Penn State allows a maximum of 10 transfer credits of high-quality graduate work to be applied toward the requirements for a graduate degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin.*

Candidacy

In accordance with Graduate Council policy, the candidacy committee must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs’ graduate faculty may serve in a combined role.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The dual-title field must be fully integrated into the candidacy exam for the doctoral program. In addition, candidates for the dual-title Ph.D. in African American and Diaspora Studies will be required to present to their committee a portfolio of work in African American and Diaspora Studies which includes a statement of the student’s interdisciplinary research interests, a program plan, and samples of writing that indicate the student’s interest in questions taken up by scholars of African American and Diaspora Studies.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Philosophy and African American and Diaspora Studies dual-title doctoral degree student must include at least one member of the African American and Diaspora Studies Graduate Faculty. Faculty members who hold appointments in both programs’ Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not a member of the Graduate Faculty in African American and Diaspora Studies, the member of the committee representing African American and Diaspora Studies must be appointed as co-chair.

Comprehensive Exams

The African American and Diaspora Studies graduate faculty member on the student’s committee is responsible for developing and administering the African American and Diaspora Studies portion of the student's comprehensive exams. The exam must incorporate written and oral components in African American and Diaspora Studies based on the student’s thematic or regional area of interest and specialization in African American and Diaspora Studies. The African American and Diaspora Studies portion of the exam will include the following components: broad history of the field, contemporary theory and debates, and either sexual and gender politics or a topic related to the student’s specific area of interest.

Dissertation

The candidate must complete a dissertation and pass a final oral defense of that dissertation on a topic that reflects their original research and education in both Philosophy and African American and Diaspora Studies in order to earn the dual- title Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Doctoral Degree in Classics and Ancient Mediterranean Studies

Admission Requirements

Students must apply and be admitted to the graduate program in Philosophy and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest known on their applications to Philosophy. Students must apply and be admitted to the dual-title graduate program in Classics and Ancient Mediterranean Studies prior to taking the candidacy exam. In addition to the admission requirements set forth by the Graduate Council and the Department of Philosophy, students seeking admission to the dual-title program will be admitted to graduate study in CAMS by an admissions committee of CAMS faculty and the approval of the head of CAMS.

Applicants to this dual-title degree program should have an academic record that demonstrates expertise in a field relevant to ancient Mediterranean studies and proficiency at an intermediate level (e.g., 3 semesters of study) in one or more ancient languages. Prospective students seeking admission to this dual-title degree program are required to write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary research in the participating program and the disciplines and fields included in CAMS.

GPA and GRE Requirements

Applicants entering with only an undergraduate degree should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale), and, where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken. Exceptions to the minimum GPA requirement may be made for students with special backgrounds, abilities, and interests at the discretion of the program. Each applicant must provide the scores of the Graduate Record Examination (GRE) taken within five years previous to the date of application that have already been provided for admission to the graduate major program.

Ph.D. Degree Requirements

To qualify for the dual-title degree in Philosophy and Classics and Ancient Mediterranean Studies, students must satisfy the Philosophy Ph.D. degree requirements listed in the “Degree Requirements” section above. In addition to the Philosophy Department requirements listed above, the minimum course requirements for this dual-title Ph.D. degree are as follows:

15 credits of CAMS-related coursework at the 400 or 500 level.

3 of these credits will come from CAMS 592 (Proseminar). At least 3 credits will come from CAMS 593 (Research Seminar). The remainder may come from CAMS courses or courses relevant to the student's research interests, as approved by the student's doctoral adviser and the CAMS program director of graduate studies. Unless exempted by the student’s graduate supervisory committee, at least 6 of these credits should be in an ancient language.

Language Requirements

In addition to advanced proficiency in one ancient language, students will be expected to acquire and demonstrate reading proficiency in those modern foreign languages (e.g., but not exclusively, French, German, Italian) appropriate to their research interests, as identified by their doctoral committee.

Candidacy

In accordance with Graduate Council policy, the candidacy committee must include at least one member of the Classics and Ancient Mediterranean Studies Graduate Faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The dual-title field must be fully integrated into the candidacy exam for the doctoral program. In addition, candidates for the dual-title Ph.D. in Classics and Ancient Mediterranean Studies will be required to present a portfolio of work in Classics and Ancient Mediterranean Studies which includes a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's work in Classics and Ancient Mediterranean Studies.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Philosophy and Classics and Ancient Mediterranean Studies dual-title doctoral degree student must include at least one member of the Classics and Ancient Mediterranean Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not a member of the Graduate Faculty in Classics and Ancient Mediterranean Studies, the member of the committee representing Classics and Ancient Mediterranean Studies must be appointed as co-chair.

Comprehensive Exams

The Classics and Ancient Mediterranean Studies graduate faculty member on the student's committee is responsible for developing and administering the Classics and Ancient Mediterranean Studies portion of the student's comprehensive exams. The exam must incorporate written and oral components in Classics and Ancient Mediterranean Studies based on the student's thematic or historical area of interest and specialization in Classics and Ancient Mediterranean Studies.

Dissertation

The candidate must complete a dissertation and pass a final oral examination (the dissertation defense) on a topic that reflects their original research and education in both the primary discipline and Classics and Ancient Mediterranean Studies in order to earn the dual- title Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in Philosophy and Women's Studies

Admission Requirements

Students must apply and be admitted to the graduate program in Philosophy and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest known on their applications to Philosophy. Students must apply and be admitted to the dual-title degree program in Women's Studies prior to taking the candidacy exam. In addition to the admission requirements set forth by the Graduate Council and the Department of Philosophy, students will be admitted to the dual-title degree program in Women's Studies by an admissions committee of Women's Studies faculty.

Students applying to the dual-title program must submit: a copy of the Graduate School Application originally submitted to the Philosophy Department; official transcripts from all previous coursework; official GRE scores; a writing sample; a personal statement that describes how the dual degree program fits with their scholarly interests; and one letter of recommendation from a Women's Studies faculty member at Penn State.

GPA and GRE Requirements

Applicants entering with only an undergraduate degree should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale), and, where applicable, a minimum GPA of 3.50 for all graduate work previously undertaken. Exceptions to the minimum GPA requirement may be made for students with special backgrounds, abilities, and interests at the discretion of the program.

M.A. Degree Requirements

To qualify for the dual-title degree in Philosophy and Women's Studies, students must satisfy the Philosophy M.A. degree requirements listed in the "Degree Requirements" section above. In addition to the Philosophy Department requirements listed above, the minimum course requirements for this dual-title M.A. degree are as follows:

A total of 12 credits of course work in Women's Studies. Of these 12 credits, 9 must come from the required core course sequence in Women's Studies, which is comprised of the following courses:

WMNST 501. Feminist Perspectives in Research and Teaching Across the Disciplines (3)
WMNST 502. Global Perspectives on Feminism (3)
WMNST 507. Feminist Theory (3)

The other 3 credits must be chosen in consultation with the Women's Studies Graduate Officer. Penn State allows a maximum of 10 transfer credits of high-quality graduate work to be applied toward the requirements for a graduate degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin.*

One faculty member from Women's Studies should be included on the master's committee. In addition, students should select a thesis topic that reflects their inquiry in women's studies. In the event that the master's thesis requirement is waived by the Philosophy Department, students need to take three additional credits of Women's Studies course work and complete a master's paper on a topic approved by the student's committee.

Ph.D. Degree Requirements

To qualify for the dual-title degree in Philosophy and Women's Studies, students must satisfy the Philosophy Ph.D. degree requirements listed in the "Degree Requirements" section above. In addition to the Philosophy Department requirements listed above, the minimum course requirements for this dual-title Ph.D. degree are as follows:

18 credits of course work in Women's Studies. Of these 18 credits, 9 must come from the required core course sequence in Women's Studies, which is comprised of the following courses:

WMNST 501. Feminist Perspectives in Research and Teaching Across the Disciplines (3)
WMNST 502. Global Perspectives on Feminism (3)
WMNST 507. Feminist Theory (3)

Of the remaining 9 credits, at least 6 of these credits must be at the 500 level, and all of them must be chosen in consultation with the Women's Studies Graduate Officer. Penn State allows a maximum of 10 transfer credits of high-quality graduate work to be applied toward the requirements for a graduate

degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin.*

Candidacy

In accordance with Graduate Council policy, the candidacy committee must include at least one member of the Women's Studies Graduate Faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

The dual-title field must be fully integrated into the candidacy exam for the doctoral program. In addition, the student will be required to present a portfolio of work in Women's Studies to their committee. Such a portfolio would include a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's work in Women's Studies.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Philosophy and Women's Studies dual-title doctoral degree student must include at least two members who are Women's Studies-affiliated Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the committee representing Philosophy is not also a member of the Graduate Faculty in Women's Studies, a member of the committee representing Women's Studies must be appointed as co-chair.

Comprehensive Exams

The Women's Studies affiliated faculty members on the student's committee are responsible for administering a comprehensive examination in Women's Studies that constitutes a portion of the student's comprehensive exams. The women's studies portion of the exam will focus on the following areas: feminist theory, feminist methodology, global feminism, and feminist studies in the student's discipline.

Dissertation

The candidate must complete a dissertation and pass a final oral examination (the dissertation defense) on a topic that reflects their original research and education in both Philosophy and Women's Studies in order to earn the dual- title Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid for Philosophy Graduate Students

Every student admitted to the department's Ph.D. program receives full assistantship or fellowship funding (stipend and tuition waiver) for five years (assuming reasonable progress). In addition to the many fellowships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the Graduate Bulletin, the department awards annually an Edwin Erle Sparks Fellowship in the Humanities. In the last several years, Philosophy graduate students have received numerous external national and international fellowships and awards (such as DADD, Fulbright, Javits, Mellon). Many Philosophy graduate students have received assistantship support for interdisciplinary teaching assignments in programs such as American Studies, Classics and Ancient Mediterranean Studies, Religious Studies, and Women's Studies. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Faculty linked: 6/27/14

Public Health Sciences (PHS)

Program Home Page

VERNON M. CHINCHILLI, *Chair of the Department of Public Health Sciences*
College of Medicine, Penn State Milton S. Hershey Medical Center
Hershey, PA 17033
717-531-7178

Degree Conferred:

M.S.

The Graduate Faculty

The Program

The Master's Program in Public Health Sciences includes graduate-level course work in biostatistics, epidemiology, and health services research, and provides knowledge and insight required in health related research. Students learn population-based methods for planning, executing, analyzing, and disseminating research results, and methods for evaluating and improving health care practices.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Prospective applicants for this program should have at least a bachelor's degree in a biological, physical, or behavioral science. Please see the program web page for specific program application requirements.

Master's Degree Requirements

Each student in Public Health Sciences is expected to acquire breadth of knowledge in the disciplines of Biostatistics, Epidemiology and Health Services Research, and skills in the areas of experimental design, data collection and quantitative analysis. The PHS Master of Science degree can lead to careers in a wide variety of fields and settings, including academic health centers; the health insurance industry; health services networks; local, state, and federal government agencies; and the pharmaceutical industry. Each student must complete at least 30 credits at the 500 level or higher. Each student must submit an original Master's thesis according to the guidelines outlined by the Graduate School.

Prescribed Courses: 16 credits

PHS 500(1), PHS 520(3), PHS 521(3), PHS 536(3), PHS 550(3), PHS 551(3)

Additional Courses: 11 credits

PHS 510(3), PHS 511(1), PHS 518(1), PHS 519(2), PHS 522(3), PHS 535(3), PHS 540(1), PHS 541(1), PHS 552(3), PHS 560(1), PHS 561(1), PHS 570(3), PHS 580(3), PHS 581(1)

Research Courses: 3 credits

PHS 594(3)

Thesis Research: 6 credits

PHS 600 (6)

Courses in Health Policy and Administration (HPA) and Statistics (STAT) may be taken as elective courses and will be considered on an individual basis in consultation with the student's academic adviser.

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

PUBLIC HEALTH SCIENCES (PHS) course list

HEALTH ADMINISTRATION (H ADM) course list

STATISTICS (STAT) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 6/1/04

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-021

Review Date: 06/21/2011

Faculty linked: 8/14/14

Integrative and Biomedical Physiology (PHSIO)

Program Home Page

DONNA KORZICK, *Chair of Program*
Professor of Physiology and Kinesiology
Penn State University Park
814-865-5679
Fax: 814-867-1769

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

Integrative and Biomedical Physiology (PHSIO)

The Intercollege Graduate Degree Program (IGDP) in Integrative and Biomedical Physiology will enable students to obtain interdisciplinary training encompassing both the fundamentals of biomedical physiology and advanced training in a specialized area, in preparation for varied biomedical careers in academia or industry. This IGDP is uniquely focused on the study of integrative mechanisms of mammalian body systems at the molecular, cellular, tissue, and organ levels, and the application of that knowledge to study a number of human diseases and conditions. A broad range of research is conducted by faculty, all of whom are widely regarded in their respective fields. Subspecialization areas include aging, exercise and muscle biology, biophysics, cancer, cardiovascular regulation and disease, energy and nutrient regulation, immunology and inflammation, obesity and diabetes, and reproductive biology. The master's program, including courses, laboratory experience, and original research, is designed for completion in approximately two years, while the doctoral degree requires approximately five years.

Graduate instruction in integrative and biomedical physiology is under the direction of graduate faculty from multiple colleges and departments at University Park–including animal science, biochemistry, biology, bioengineering, biomedical engineering, kinesiology, and nutrition, as well as veterinary and biomedical sciences.

Admission Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE) are required for admission. At the discretion of the graduate program, a student may be admitted provisionally for graduate study in a program without these scores if MCAT scores are available.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made at the discretion of the program for students with special backgrounds, abilities, and interests. Deficiencies in chemistry, biological science, mathematics (through a second course in calculus), and physics must be made up early in the student's graduate program. The majority of students are admitted directly into the Ph.D. program.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

All candidates must complete rotations in physiology laboratories before choosing an area of specialization. Possible areas of specialization include cellular, molecular, animal or human aspects of the following: cardiovascular and respiratory physiology; comparative physiology; environmental physiology; exercise physiology; muscle physiology; physiology of nutrition and metabolism; immunology; neurophysiology; and reproductive physiology. Students in the Ph.D. program must successfully pass the candidacy, comprehensive, and final oral examination (the dissertation defense) required by Graduate Council. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School. The doctoral committee shall be appropriately represented by members of the Integrative and Biomedical Physiology faculty and those of the area of specialization who shall have the responsibility and jurisdiction for determining the course program and research acceptable in satisfying degree requirements.

The doctoral degree in Integrative and Biomedical Physiology requires a minimum of 30 credits, including 25 required core credits in: PHSIO 571 (3), PHSIO 572, (3), NUTR 501(4), MCIBS 591 (1), PHSIO 590 (2), STAT 501 (3), STAT 502 (3), a 3-credit course in immunology, and a 3-credit course in molecular biology. The remaining 5 credits may be chosen from 500-level Physiology courses or other relevant 400- or 500-level course. For a list of suggested courses, contact the graduate program. Students must earn a grade of B or better in each course and maintain an overall average of 3.00.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

M.S. degree students must complete a minimum of 30 credits for the degree, including 21 core credits in: PHSIO 571 (3), PHSIO 572 (3), NUTR 501 (4), MCIBS 591 (1), STAT 500 (3), a 3-credit course in immunology, and a 3-credit course in molecular biology. At least 6 credits in thesis research (600 or 610) must be taken in conjunction with the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense which includes a public presentation. Students in the non-thesis option must write a satisfactory scholarly paper, while enrolled in PHSIO 596.

Integrative and Biomedical Physiology Minor

The objective of the doctoral minor in Integrative and Biomedical Physiology is to augment the training of doctoral students with a coordinated group of courses that provide an integrated perspective of physiology from the molecular to the organismal level. It is expected that most students pursuing the minor will be graduate degree candidates in basic biological sciences, health sciences, or bioengineering.

The graduate minor in Integrative and Biomedical Physiology requires the following:

- BIOL 472 (3). If the student took a one-semester, upper-level undergraduate mammalian physiology course as an undergraduate, then this requirement may be waived with approval by the chair of the Integrative and Biomedical Physiology program.
- PHSIO 571 (3) and PHSIO 572 (3). If these courses are required for the major, then substitute an equal number of credits in 500-level Integrative and Biomedical Physiology elective courses.
- A 3-credit, 500-level Integrative and Biomedical Physiology elective course.
- Select additional credits from 500-level Integrative and Biomedical Physiology courses or a relevant 400- or 500-level course so that the total course credits for the minor is 15. These 15 credits cannot include course work that is used to fulfill requirements in the student's major.
- Elective courses for the minor must be approved by the chair of the Integrative and Biomedical Physiology program. For a list of suggested courses, contact the graduate program.
- Students must earn a grade of C or better in each course in the minor and maintain an overall average of 3.00 in the minor.

- One member of the doctoral committee must be a faculty member in the Intercollege Graduate Degree Program in Integrative and Biomedical Physiology.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

DATE LAST REVIEWED BY GRADUATE SCHOOL: 10/4/16

UCA Revision #1: 9/1/06

Faculty linked: 6/27/14

Physics (PHYS)

Program Home Page

NITIN SAMARTH, *George A. and Margaret M. Downsbrough Department Head*
104 Davey Laboratory
814-865-7533

Degrees Conferred:

Ph.D., M.S., M.Ed.

The Graduate Faculty

The Programs

Graduate instruction and research opportunities are available in atomic and molecular physics, laser physics, experimental and theoretical condensed matter and materials physics, surface physics, low-temperature physics, statistical physics, acoustics, nuclear physics, experimental and theoretical particle physics, quantum field theory, general relativity, cosmology and relativistic astrophysics and quantum gravity. Work in some areas is conducted in cooperation with the Materials Research Institute, the Applied Research Laboratory, and other interdisciplinary research facilities.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School Requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

A bachelor's degree in physics or an allied field is required for admission to the M.S., and Ph.D. programs. Students with a 2.50 or higher junior/senior grade-point average (on a 4.00 scale) in physics and mathematics will be considered, and the best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 2.50 GPA may be made for students with special backgrounds, abilities, and interests. Exceptions may also be made for applicants for doctoral programs who have completed master's degrees at other institutions.

Admission and study programs for the M.Ed. degree are handled on an individual basis.

Master's Degree Requirements

M.S. program: Required courses include PHYS 530, PHYS 557, PHYS 559 (2 credits), PHYS 561, or PHYS 410. There are two options. Thesis option: The thesis must be based on at least 6 credits of PHYS 600 and must conform to Graduate School regulations. Nonthesis option: An additional 6 credits of 500-level physics courses beyond the required ones must be taken, and a short paper must be submitted to, and accepted by, the department. There is no degree examination for either option.

M.Ed. program: At least 18 credits in physics are required, of which up to 6 credits may be for research. Six additional nonresearch science credits (which may be in physics) and a 6-credit minor in a field of professional education also must be included. A thesis or term paper must be submitted and accepted by the department.

Doctoral Degree Requirements

Ph.D. program: Required courses include PHYS 517, PHYS 525, PHYS 530, PHYS 557, PHYS 559 (2 credits), PHYS 561, PHYS 562, and a first-year seminar series. Courses required beyond these depend on the Ph.D. option. Students take at least four additional 3-credit, 500-level physics courses.

A candidacy examination is given at the end of the first year, a comprehensive examination approximately two years after the candidacy examination, and a final thesis defense takes place after the completion of the thesis. There is no departmental foreign language requirement, although a reading knowledge of one foreign language may be needed in some areas of research.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

HOMER F. BRADDOCK GRADUATE FELLOWSHIPS Available to exceptional Ph.D. candidates in several departments of the Eberly College of Science. They carry stipends of $3,500 to $7,500 per year for each of the first three years.

WHEELER P. DAVEY MEMORIAL FELLOWSHIPS Carry stipend of variable amount and are available to a limited number of qualified graduate students in the Eberly College of Science.

DAVID C. DUNCAN GRADUATE FELLOWSHIPS Available to first- and second-year graduate students in physics and carry a stipend of approximately $2,000 per year for each of the first two years.

FRYMOYER SCHOLARSHIP

W. DONALD MILLER GRADUATE FELLOWSHIP

DAVID H. RANK MEMORIAL PHYSICS AWARD

THE NELLIE AND OSCAR L. ROBERTS FELLOWSHIPS Available to graduate students majoring in the physical sciences and in biochemistry and molecular biology. Each award is for $4,000 per year for one or two years.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

PHYSICS (PHYS) course list

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-07-008

Review Date: 06/22/2010

Faculty linked: 6/27/14

Political Science

44-06-000 Change. New Dual Title in Political Science and Social Data Analytics.

Propsoed Effective Date: Summer 2016

Political Science (PL SC)

Program Home Page

LEE ANN BANASZAK, *Head of the Department*
221 Pond Laboratory
814-865-7515; Graduate Program: 814-863-1595

Degrees Conferred:

Ph.D., M.A.
Dual-Title Graduate Degree (Ph.D.) in Political Science and African Studies
Dual-Title Graduate Degree (Ph.D.) in Political Science and Asian Studies
Dual-Title Graduate Degree (Ph.D.) in Political Science and Social Data Analytics
Dual-Title Graduate Degree (Ph.D.) in Political Science and Women's Studies

The Graduate Faculty

The Program

The purpose of the graduate program in Political Science is to train professional political scientists who intend to pursue careers in research, teaching, and public service. The department offers programs leading to the M.A. and Ph.D. degrees. The programs are designed to enable students to acquire both methodological sophistication and substantive knowledge in a variety of fields.

The graduate program in Political Science encourages the study of a variety of substantive concerns, methodological approaches, and research skills. Among the department's special areas of strength are United States politics and political behavior (legislative politics, public opinion and voting, parties and interest groups, and judicial process); political and social theory; international relations and peace science; the politics of western and eastern Europe, Latin America, and South Asia; international conflict; international political economy; democratization; social movements; political culture; and gender and politics.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin .

Entrance to the Political Science graduate program occurs in the fall semester. Applications must be received by the department no later than January 15 for fall admission. However, the department will begin accepting applications as of September 1.

The Department of Political Science requires M.A. and Ph.D. program applicants to submit transcripts, Graduate Record Examinations (GRE) scores (verbal, quantitative, and analytical), a statement of career plans and proposed emphasis in political science, at least three letters of recommendation from persons familiar with the applicants academic performance, and a writing sample demonstrating research and/or analytical skills.

The language of instruction at Penn State is English.

Students can be admitted to the masters degree program or, after passing a Ph.D. candidacy exam, can be admitted to the Ph.D. program with a master's degree.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

Depending on the student's previous methodological training, 30 credits of course work, including an essay, are required for a master's degree. At least 18 credits must be at the 500-level or above. The course work includes a methodological core of 9 credits (PL SC 501, 502, and 503); 12 credits in a primary field (including the survey seminar in the field); 6 credits in a secondary field; and 3 credits for the M.A. essay. Students also take a seminar on teaching and professional development in political science. There are no language requirements for the degree. Every master's candidate is required to pass an examination of their master's essay.

In the case of transfer students, a maximum of 10 credits earned in an advanced degree program at another university or in another department at Penn State may count toward the 30-credit requirement. For more information, refer to the Transfer Credit section in the Graduate Bulletin.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin .

The Department of Political Science requires a minimum total of 60 post-baccalaureate credits for the Ph.D. At least 45 credits, exclusive of the dissertation, must be in political science. Course work accepted for the M.A. in Political Science at Penn State will count toward the department's 60-credit requirement. In the case of students who have earned credits in an advanced degree program at another university or in another department at Penn State, a maximumm of 30 credits may count toward the 60-credit departmental requirement.

In the case of transfer students, a maximum of 30 credits earned in an advanced degree program at another university or in another department at Penn State will count toward the 60-credit requirement.

The department requires that a student complete the designated "core" courses in methodology (PL SC 501, 502, and 503) and a seminar on teaching and professional development in political science. Ph.D. degree candidates must present three fields for the purposes of comprehensive examinations. The major and one of the minor fields must be selected from the department's recognized fields, and one of the minor fields may be outside political science. The major field requires a minimum of 15 credits; each minor field requires a minimum of 9 credits.

The communication and foreign language requirement for the Ph.D. may be satisfied by advanced course work and competence developed in foreign languages, statistics, or other research methods.

Dual-Title Doctoral Degree in Political Science and African Studies

Political Science doctoral students, who have research and educational interests in comparative policy analyses, environmental change and livelihood systems, socio-economic and political change, and other aspects of African Studies may apply to the dual-title doctoral degree program in Political Science and African Studies. The goal of the program is to enable graduate students from Political Science to complement their knowledge and skills in a major area of specialization in Political Science with in-depth knowledge of prevailing theories on and problem-solving approaches to thematic, regional, or national issues pertaining to African development and change.

The dual-title doctoral degree program provides interested Political Science doctoral students with a multidisciplinary approach that enhances their analytical

capabilities for addressing key issues in African development and adds value to their Political Science degree by increasing their competitiveness in the job market. The well-rounded, regional specialist who graduates from this program, is likely to be employed in an international setting. The program, therefore, enhances the reputation of the Political Science department, the College of the Liberal Arts, and Penn State.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an interest in African Studies-related research.

To be enrolled in the Dual-Title Doctoral Degree Program in African Studies, a student must submit a letter of application and transcript, which will be reviewed by an African Studies Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in African Studies prior to obtaining candidacy in Political Science.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin .

To qualify for the dual-title degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the African Studies Program. Final course selection is determined by the student in consultation with the Political Science and African Studies academic advisers.

Upon acceptance by the African Studies admissions committee, the student will be assigned an African Studies academic adviser in consultation with the African Studies director and the African Studies admissions committee.

As a student develops specific scholarly interests, s/he may request a different African Studies adviser from the one assigned by the African Studies admissions committee. The student and Political Science and African Studies academic advisers are to establish a program of study that is appropriate for the student's professional objectives and that is in accordance with the policies of the Graduate Council, the Political Science graduate program and the African Studies Program.

Requirements for the Political Science-African Studies Ph.D.

The Ph.D. in Political Science and African Studies is awarded to students who are admitted to the Political Science doctoral program and admitted subsequently into the dual-title degree in African Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and African Studies are as follows.

• A minimum of 60 post-baccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation research credits, must be in Political Science.
• Completion of course work in two major fields (the first of which is a Political Science subfield as detailed in the Political Science graduate handbook, and the second of which is in African Studies) and one minor field (in a regular Political Science subfield).
• Completion of the designated core of courses in methodology (PL SC 501, 502, and 503).
• Completion of two 1.5-credit seminars on teaching, writing, and professional development in Political Science.
• Completion of introductory field seminars appropriate to one's two political science fields of study.
• AFR 501 (3)
• 15 credits of Africa-related course work at the 400 or 500-level; minimum of 3 of these credits must be taken from a list of courses maintained by the African Studies program chair.
• As many as 6 of the 15 credits may come from Political Science, as approved by the student's Political Science and African Studies Program academic advisers.
• The remaining credits can be taken in AFR or in any department other than Political Science. Of these, no more than 6 credits may be taken at the 400-level and no more than 3 combined credits may come from 596 and 599 listings.
• Communication and foreign language requirements, which will be determined by the student, the Political Science and African Studies Program advisers in accordance with the existing Political Science language requirements.

Foreign Language/Research Skills Competency Requirement

The language requirement for a student in the dual-title doctoral degree program will be determined by the student and the Political Science and African Studies program advisers in accordance with the existing Political Science language requirements. The Political Science Foreign Language/Research Skills Competency Requirement, contained in the Political Science Graduate Handbook, indicates that doctoral students must satisfy one of the following four criteria to demonstrate proficiency in foreign language and/or research skills:

1) Reading proficiency and translation skills in two foreign languages. Proficiency is certified by the School of Languages and Literatures at Penn State. The School's website details the procedures that students must follow to obtain certification (see http://sll.la.psu.edu/langprof.htm).

2) Superior command of one foreign language. Superior command is defined as the ability to use the language to conduct field research abroad. This may include the ability to live and work in the relevant foreign country; the ability to converse with librarians, government officials, and other gatekeepers of documents and information; and the ability to conduct interviews with citizens or officials. There is no single test or criterion for demonstrating superior command of a foreign language. Rather, the student must provide to the doctoral committee letters from language instructors, faculty who have conducted fieldwork in the language in question, and similar documents so that its members can determine if the language skill is sufficient given the student's specialization and subfield.

3) Reading and translation proficiency in one foreign language plus a grade of B or higher in an advanced statistics course (i.e., material beyond that covered in PL SC 503) which has been approved by the student's doctoral adviser and the Director of Graduate Studies.

4) A statistical methods specialization consisting of three advanced statistics courses (each covering material beyond what is covered in PL SC 503). Students must receive a grade of B or higher in each class. The selection of courses must be approved by the student's doctoral adviser and the Director of Graduate Studies. These advanced courses may overlap with the advanced courses used if methodology is chosen as the student's first or second minor field.

Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 post-baccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program. There will be a single candidacy examination, containing elements of both Political Science and African Studies.

The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the African Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the African Studies program.

Doctoral Committee Composition

In accordance with Graduate Council policy, the doctoral committee of a Political Science and African Studies dual-title doctoral degree student must include at least one member of the African Studies graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. The African Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in African Studies, the member of the committee

representing African Studies must be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and African Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate's major Political Science subfield and African Studies. The African Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The African Studies component of the exam will be based on the student's thematic, national or regional area of interest and specialization in African Studies.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and African Studies.

Dual-Title Doctoral Degree in Political Science and Asian Studies

Graduate students with research and educational interests in international education may apply to the dual-title doctoral degree program in Political Science and Asian Studies. The goal of the dual-title degree in Political Science and Asian Studies is to enable graduate students from Political Science to acquire the knowledge and skills of their major area of specialization in Political Science while at the same time gaining the perspective of Asian Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title Ph.D. in Political Science and Asian Studies will add value to their degree and their status as candidates. It will produce excellent political scientists who are experts in Asian Studies as well. The dual-title degree Political Science and Asian Studies will build curricular bridges beyond the student's major field so as to provide a unique training regime for the global scholar.

Additional details of the dual-title program are available at the Department of Asian Studies' website.

Admission Requirements

Requireemnts listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin .

For admission to the dual-title Ph.D. program, a student must first apply and be admitted to the Political Science graduate program and the Graduate School. After admission to the Political Science graduate program, a student must then apply for admission to the Asian Studies Program. The Asian Studies admissions committee reviews applications and recommends student for admission to the Asian Studies program to the Graduate School. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background. Students already in their first and second years of the Political Science graduate program may also apply to the dual-title program. Students must apply and be admitted to the dual-title graduate program in Political Science and Asian Studies prior to taking the candidacy exam.

In addition to the requirements of the Graduate School and Political Science, applicants interested in the dual-title program should also make their interest in the dual-title program known clearly on their applications and include remarks in their statement of purpose that address the ways in which their research and professional goals reflect an interest in interdisciplinary and Asian Studies-related research.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

To qualify for an Asian Studies degree, students must satisfy the requirements of the Political Science program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Asian Studies committee. Within this framework, final course selection is determined by the student, their Asian Studies adviser, and their Political Science program adviser.

Upon a student's acceptance by the Asian Studies admissions committee, the student will be assigned an Asian Studies academic adviser in consultation with the Asian Studies chair. As students develop specific scholarly interests, they may request that a different Asian Studies faculty member serve as their adviser. The student and adviser will discuss a program of study that is appropriate for the student's professional objectives and that is in accord with the policies of the Graduate School, the Political Science department and the Asian Studies program.

Requirements for the Political Science/Asian Studies Ph.D.

The doctoral degree in Political Science and Asian Studies is awarded only to students who are admitted to the Political Science doctoral program and admitted to the dual-title Ph.D. degree in Asian Studies. The minimum course requirements for the dual-title Ph.D. degree in Political Science and Asian Studies are as follows:

- A minimum total of 60 postbaccalaureate credits. Course work accepted for the M.A. in Political Science will count toward the 60-credit requirement. At least 45 credits, exclusive of dissertation, must be in political science.
- Completion of course work in two major fields (the first of which is a political science sub field as detailed in the Political Science graduate handbook, and the second of which is Asia-related) and one minor field (in a regular political science subfield).
- Completion of the designated core of courses in methodology (PL SC 501, 502, and 503).
- Completion of two, 1.5 credit seminars on teaching, writing, and professional development in political science.
- Completion of introductory field seminars appropriate to one's three fields of study.
- 15 credits of Asia-related course work at the 400 or 500 level. At least 6 of these 15 credits will be from ASIA 501 and 502. As many as 6 may come from Political Science, as approved by the student's doctoral adviser and the Asian Studies Program director of graduate studies. The remaining 3 credits can be taken in ASIA or in any department other than Political Science.
- All-skills proficiency in one Asian Language AND two years' college study (or equivalent knowledge) of another Asian language OR alternative proficiency appropriate to the student's field.

Particular courses may satisfy both the Political Science requirements and those of the Asian Studies program. Final course selection is determined by the student in consultation with their dual-title program advisers and their major program advisers.

Language Requirement

Students must show all-skills proficiency in one Asian language. All-skills proficiency in a foreign language can be assessed through the following mechanisms: 1) native speaker status, 2) completion of graduate-level research using the foreign language, 3) study abroad, and 4) independent study or examination. All final determinations of all-skills proficiency will be made by a student's Asian Studies doctoral adviser in consultation with the Asian Studies Director of Graduate Studies.
In addition to demonstrating all-skills proficiency in one Asian language, a student must also:

- Complete two years' college study (or equivalent knowledge) of another Asian language OR
- Achieve alternative proficiency appropriate to the student's field.

Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program. There will be a single candidacy examination, containing elements of both Political Science and Asian Studies.
The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the Asian Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the Asian Studies program.

Doctoral Committee Composition

In accordance with Graduate Council policy, the doctoral committee of a Political Science and Asian Studies dual-title doctoral degree student must include at least one member of the Asian Studies graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. The Asian Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.
If the chair of the committee representing Political Science is not also a member of the graduate faculty in Asian Studies, the member of the committee representing Asian Studies must be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and Asian Studies must pass a comprehensive examination that includes written and oral components. Written components will be administered on a candidate's major Political Science subfield and Asian Studies. The Asian Studies representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and Asian Studies.

Dual-Title Doctoral Degree in Political Science and Social Data Analytics

Political Science doctoral students seeking to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with political science, may apply to pursue a dual-title Ph.D. in Political Science and Social Data Analytics. Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. aims to enable scientists who expand the capability of social data analytics, and use those capabilities creatively to answer important social scientific questions and to address grand social challenges, in both academic and nonacademic settings.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Political Science and include remarks in their statement of purpose that address the ways in which their research and professional goals in political science reflect an expanded interest in Social Data Analytics-related research.
To be enrolled in the dual-title doctoral Ph.D. in Political Science and Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Program. An applicant must have a minimum grade-point average of 3.0 (on a 4.0 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title Ph.D. in Social Data Analytics prior to obtaining candidacy in Political Science.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D in Political Science. In addition, they must satisfy the requirements described below, as established by the Social Data Analytics Committee. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department adviser and Social Data Analytics.

Course work

The minimum course work requirements for the dual-title Ph.D. in Political Science and Social Data Analytics are as follows:

- Course work and other requirements of the Ph.D. in Political Science.
- SODA 501 (3 credits)
- SODA 502 (3 credits)
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  - (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives. *(A Political Science Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Political Science Ph.D.)*
  - (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.
  - (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives.*(A Political Science Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Political Science Ph.D.)*
  - Cross-departmental distribution.
    - 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department. *(A Political Science Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Political Science Ph.D.)*
    - 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.
    - 6 or more credits in approved courses outside Political Science.
    - 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SO DA electives that also meet requirements of the primary program. In particular, the 12 elective credits can be met with as few as 6 credits of appropriately chosen course work. Within this framework, final course selection is determined by the student in consultation with academic advisers from Political Science and Social Data Analytics. There is no formal maximum number of credits from the primary PL SC degree that can be double-counted toward the SO DA degree. For those meeting the SO DA elective requirement with the minimum of 12 credits, the outside-program minimum effectively limits the number of primary degree PL SC credits that count toward SO DA at 6. Advising committees may limit the number of credits taken for the SO DA degree that can count toward home degree requirements.

Candidacy Committee and Exam

The candidacy examination committee will be composed in accordance with rules of the Political Science Ph.D. and will include at least one graduate faculty member from the Social Data Analytics Program. Faculty member who hold appointments in both programs' graduate faculty may serve in a combined role.

The dual-title degree will be guided by the Candidacy Exam procedure of the Political Science graduate program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be held within three semesters (summer sessions do not count) of entry into the Political Science graduate program. There will be a single candidacy examination to assess whether the student

should be admitted into Ph.D. candidacy in both Political Science and Social Data Analytics.

The Social Data Analytics Program maintains a list of recommended background and skills that it recommends students have in place by the time they begin the interdisciplinary course work required to complete the Social Data Analytics degree. The candidacy exam is the appropriate setting for assessing the student's preparation for the interdisciplinary work of the dual-title Ph.D. in Political Science and Social Data Analytics.

Doctoral Committee Composition

The doctoral committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council policy, the doctoral committee of a Political Science and Social Data Analytics dual-title doctoral degree student must include at least one member of the Social Data Analytics graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. The Social Data Analytics representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair. The ideal arrangement then, is for a member of the Social Data Analytics graduate faculty with primary appointment in Political Science to act as dissertation chair, and for a member of the Social Data Analytics graduate faculty with primary appointment outside the administrative unit of the primary program to act as both Outside Field Member and Outside Unit Member.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Political Science and Social Data Analytics must pass a comprehensive examination that includes written and oral components.

Written components will be administered on a candidate's major Political Science subfield and Social Data Analytics (acting as a first minor field). The Social Data Analytics representative(s) on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

The oral component of the comprehensive involves the defense of a dissertation prospectus, which must contain substantial Social Data Analytics content.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Political Science and Social Data Analytics.

Dual-Title Doctoral Degree in Political Science and Women's Studies

Graduate students with research and teaching interests in gender and politics may apply to the dual-title manster's or doctoral degree program in Political Science and Women's Studies. The goal of the dual-title graduate degree program in Political Science and Women's Studies is to enable graduate students from Political Science to acquire the knowledge and skills of their major area of specialization in Political Science while at the same time gaining the perspective of Women's Studies.

In order to prepare graduate students for the competitive job market, this program provides them with a solid disciplinary foundation that will allow them to compete for the best jobs in their field. For such students the dual-title graduate degree in Women's Studies will add value to their degree and their status as candidates. It will produce excellent political scientists who are experts in Women's Studies as well. The dual-title graduate degree in Political Science and Women's Studies will build curricular bridges beyond the student's major field so as to provide unique training for the interdisciplinary scholar.

Additional details of the dual-title program are available at the Department of Women's Gender, and Sexuality Studies website.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Students must apply and be admitted to the graduate program in Political Science and the Graduate School before they can apply for admission to the dual-title degree program in Women's Studies. Doctoral students must apply and be admitted to the dual-title Ph.D. program prior to taking the candidacy exam.

Students will be admitted to graduate study in Women's Studies by an admissions committee of Women's Studies-affiliated faculty. The Women's Studies program will follow the timetable and admission requirements of Political Science. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background should be considered for study. Prospective students seeking admission to the dual-title degree program must write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary and feminist research.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the Graduate Bulletin.

The Dual-Title Master of Arts Degree in Political Science and Women's Studies (30 credits plus essay)

- 12 credits in major political science field (including proseminar)
- Political Science 501: Methods of Political Analysis (3)
- Political Science 502: Statistical Methods for Political Research (3)
- Women's Studies 501: Feminist Perspectives in Research and Teaching (3)
- Women's Studies 502: Global Perspectives on Feminism (3)
- Women's Studies 507: Feminist Theory (3)
- 3 elective credits in Women's Studies approved courses (may double count if in political science field)
- Oral exam and MA essay defense as specified in the Department of Political Science Graduate Student Handbook.

Of these requirements, at least 21 credits must be at the 500 level. In addition there is a 6-credit maximum for independent study and a 10-credit maximum for transfer credits. For more information, refer to the Transfer Credit section in the Graduate Bulletin. The student is expected to conduct research for the M.A. essay on a Women's Studies topic.

For the dual-title Master of Arts degree in Political Science and Women's Studies, the student's committee will include at least one Women's Studies-affiliated faculty member.

The Dual-Title Ph.D. Degree in Political Science and Women's Studies (60 credits)*

- 15 credits in major political science field (including proseminar)
- 9 credits in 2nd minor political science field

- Political Science 501: Methods of Political Analysis (3)
- Political Science 502: Statistical Methods for Political Research (3)
- Political Science 503: Multivariate Analysis for Political Research (3-6)
- Women's Studies 501: Feminist Perspectives in Research and Teaching (3)
- Women's Studies 502: Global Perspectives on Feminism (3)
- Women's Studies 507: Feminist Theory (3)
- 9 elective credits in Women's Studies approved courses (may double count if in political science field)
- Ph.D. candidacy exam in major political science field, plus portfolio of Women's Studies work.

Of these requirements at least 51 credits must be at the 500 level. In addition there is a 12-credit maximum for independent study.

Candidacy Examination Committee Composition: The candidacy examination committee for the dual-title degree will be composed of graduate faculty from Political Science and at least one graduate faculty member from the Women's Studies Program. The designated dual-title faculty member may be appointed from Political Science if that person holds a formal appointment with the Women's Studies program.

Candidacy Exam: In accordance with Graduate Council policy, the candidacy examination will assess candidacy for both the primary and the dual-title program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses; it must be taken within three semesters (summer sessions do not count) of entry into the Political Science graduate program.

Doctoral Committee Composition: In accordance with Graduate Council policy, the doctoral committee of a Political Science and Women's Studies dual-title doctoral degree student must include at least one member of the Women's Studies graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. The Women's Studies representative to the committee may serve as the Outside Field Member, and may also serve as the Outside Unit Member, if his or her primary appointment is in an administrative unit outside the unit in which the dissertation adviser's primary appointment is held.

If the chair of the committee representing Political Science is not also a member of the graduate faculty in Women's Studies, the member of the committee representing Women's Studies must be appointed as co-chair.

Comprehensive Exam: After completion of required course work, doctoral candidates for the dual-title doctoral degree must pass a comprehensive examination. The dual-title faculty representative on the student's doctoral committee will participate in the writing and evaluation of the examination.

Dissertation and Dissertation Defense: Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in their home discipline and Women's Studies.

Students must pass the Ph.D. candidacy and comprehensive exams and have their dissertation proposal approved as specified in the Department of Political Science Graduate Student Handbook.

* The Department of Political Science requires a minimum total of 60 postbaccalaureate credits for the Ph.D. At least 45 credits, exclusive of the dissertation, must be in political science. Course work accepted for the M.A. in Political Science at Penn State will count toward the department's 60-credit requirement. In the case of students who have earned credits in an advanced degree program at another university or in another department at Penn State, a maximum of 30 credits may count toward the 60-credit departmental requirement.

Other Relevant Information

Penn State is a member of the Committee on Institutional Cooperation (CIC), an association of the Big Ten universities and the University of Chicago. The CIC sponsors the Traveling Scholars program, which provides doctoral-level students with an opportunity to study at another CIC university. In addition to participating in CIC programs, the department sponsors attendance at the ICPSR Summer program at the University of Michigan.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

POLITICAL SCIENCE (PL SC) course list

Last Revised by the Department: Spring Semester 2012

Blue Sheet Item #: 44-06

Review Date: 04/5/2016

Faculty linked: 6/27/14; dept head updated: 12/5/14

Plant Biology (PLBIO)

Program Home Page

TEH-HUI KAO, *Head of the Graduate Program in Plant Biology*
Plant Biology Program Office
101 Huck Life Sciences Building
814-865-8165
huck-plantbio@psu.edu

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

The Intercollege Graduate Degree Program in Plant Biology includes faculty from nine departments in the College of Agricultural Sciences, College of Engineering, and Eberly College of Science. Each student becomes associated with the adviser's department, which may provide financial support, research facilities, and office space. Applicants are encouraged to explore opportunities by contacting faculty who may be prospective advisers.

The objective of this program is to educate and train plant biologists using the most modern techniques available today. Graduates from this program have gone on to a diverse range of careers, including positions in colleges and universities, research institutes, industry, and government. Research interests of the program faculty span the breadth of scientific areas ranging from molecular, cell, and evolutionary biology, biochemistry, biophysics, genetics, and functional genomics to whole-plant physiology and ecology. Student training includes a comprehensive set of team-taught courses that reflects this breadth of scientific approaches.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE) Aptitude Test (verbal, quantitative, analytical) are required for admission.

Students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and with appropriate course background will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces available for new students. Students entering this program should have a strong foundation in the biological sciences, including biochemistry, general physics, and college mathematics through calculus. Students with limited deficiencies may be admitted but must make up their deficiencies concurrently with their graduate studies. B.S.-level applicants with good academic records who have had strong training in plant biology and related courses, including research experience, are generally admitted directly into the Ph.D. program.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

All M.S. degree candidates will be required to complete 30 credits of course work at the 400, 500, 600, or 800 level, with at least 18 credits at the 500 and 600 level, combined. All students must complete the following core courses: PLBIO 512 (4 cr.); PLBIO 513 (4 cr.); MCIBS 591 (1 cr.); and PLBIO 590 (1 cr.). The remaining elective credits may be chosen from a list of approved electives maintained by the program office.

Students are required to write a thesis, and at least 6 credits in thesis research (600 or 610) must be taken in conjunction with completing the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students in the Ph.D. program must successfully pass the candidacy, comprehensive, and final oral examinations required by Graduate Council. To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Ph.D. candidates must complete a minimum of 17 credits, including the following courses: PLBIO 512 (4 cr.); PLBIO 513 (4 cr.); PLBIO 514 (2 cr.); PLBIO 515 (2 cr.); PLBIO 516 (2 cr.); MCIBS 591 (1 cr.); PLBIO 590 (2 cr.); and two biochemistry courses. A list of courses approved to count towards the biochemistry course requirement is maintained by the graduate program office. Upon consultation with the head of the graduate program, equivalent courses taken at another university may be substituted for some of the above requirements. Based on the results of the candidacy examinations, the student's adviser and doctoral committee will determine other course requirements.

One of the main goals of the candidacy examination is to determine the potential of a student to successfully obtain a Ph.D. degree and is intended to be a rigorous test of a student's abilities, prior to the major investment in time and effort necessary to pass the comprehensive examination. Students enrolled in the Ph.D. program must pass a written English competency evaluation based on the dossier of papers written for PLBIO 512 and PLBIO 513. This evaluation is done at the end of the student's first year. The oral candidacy examination is based on two of the papers, jointly chosen by the student and the Candidacy Examination Committee, and must be passed by the end of the student's third semester.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

In most participating departments, Plant Biology applicants are eligible for departmental teaching or research assistantships, and other assistantships supported by grant funds of individual faculty who make the award decisions. More detailed and up-to-date information about student aid may be found in the Plant Biology Student and Faculty Handbook, which is updated annually during the summer.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

PLANT BIOLOGY (PLBIO) course list

Last Revised by the Department: Summer 2018
Blue Sheet Item #: 46-07
Review Date: 6/26/2018
Date last reviewed by Graduate School: 5/24/04
Faculty linked: 6/27/14

Psychology of Leadership

Melvin M. Mark, *Head of the Department of Psychology*
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Degree Conferred

Master of Professional Studies (MPS)

The Graduate Faculty

Master of Professional Studies in Psychology of Leadership

The MPS degree in Psychology of Leadership is a 33-credit program of study for individuals who are in the early and middle stages of their organizational careers, currently in or aspiring to managerial positions. The content of the program will be appropriate for such individuals employed in a wide range of functional specialties and industry sectors, including public agencies.

The MPS degree in Psychology of Leadership examines the nature and role of leadership across varied organizational settings. Leadership is broadly defined as the process of influencing others (individually or collectively) in organizational settings. Program content rather exposes the student to a broad range of psychological theory, research, and application related to leading others in work organizations of all types. Courses address how effective leadership can enhance the motivation and performance of individual employees and work teams and are designed to facilitate the solving of complex human issues within diverse organizational settings.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Educational Background

Students who do not have a GPA of at least 3.0 will be considered on a case-by-case basis depending on the quality of their overall application. Applicants who are still completing their baccalaureate requirements at the time of application may be admitted to the Graduate School provisionally, pending the awarding of the baccalaureate degree. Students are also expected to have a minimum of two years of full-time work experience prior to admission.

Core Application Packet

- Completed official online Graduate School application and payment of nonrefundable application fee.
- Statement of purpose: a 2-3 page essay articulating career and educational goals that demonstrates the student's written communication skills.
- A current vita or resume..
- Three letters of recommendation that attest to the student's readiness for graduate study and document the requisite minimum of two years of work experience. Letters must be submitted through the online application. Within the online application you will be asked to enter the names and email addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via email asking them to complete a brief form that will serve as your recommendation. Please inform all recommenders they must submit the form in order for your application to be complete.
- Official transcripts from all post-secondary institutions attended

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Total required credits for the MPS: 33 credits at the 400, 500, or 800 level; at least 27 must be at the 500 or 800 level, with at least 6 at the 500 level. Students must complete 9 credits of required courses and a 3-credit capstone course that serves as the culminating experience. Students choose the remaining 21 credits from a list of approved electives maintained by the program office.

Required courses: (9 credits, plus the 3-credit capstone course described below)

- PSY 532. Psychological Foundations of Leadership
- PSY 533. Ethics and Leadership: Psychological and Social Processes
- PSY 539. Foundations of Behavior, Motivation, and Attitudes at Work

Culminating Experience: (3 credits)

- PSY 894. Capstone Experience

The culminating experience provides students with an opportunity to apply their knowledge of the psychological theories and principles concerning leadership to an applied research project. The choice of research project topic and exact form (e.g., conceptual analysis, review of multiple cases in an organization) will be mutually determined by the instructor and each student. A written paper based on the applied project is required and must contain project description, analysis, and interpretation of its findings, as well as a review of relevant published literature.

Student Aid
World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid section of the World Campus website for more information.

Courses
Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-04

Review Date: 1/10/2017

Plant Pathology (PPATH)

Program Home Page

Carolee Bull, Head, Plant Pathology and Environmental Microbiology
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Degrees Conferred:

Ph.D., M.S.
Dual-title Ph.D. in Biogeochemistry
Dual-title Ph.D. and M.S. in International Agriculture and Development

The Graduate Faculty

The Program

Plant pathology is the study of disease in plants and concerns the dynamic interaction between the plant, the causal agent (bacteria, fungi, viruses, nematodes, etc.), and their environments. A student prepares for a professional career in research, teaching, extension, or industry through advanced studies of the principles of plant infection, the physiology of disease in plants, the ecology of root diseases, the nature and inheritance of disease resistance in plants, epidemiology, ecology and physiology of air pollution injury to plants, or plant disease control by biological or chemical means. A student may specialize in the nature and control of diseases of forest trees, agronomic or horticultural crops, and commercial mushrooms. Advanced studies in molecular systematics of fungi and applied mycology, related to the production of the commercial mushroom, are also available. Modern, well-equipped laboratories, controlled environment facilities and greenhouses, and well-developed field research areas are available for graduate study.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of the graduate program, a student may be admitted for graduate study in the program without these scores.

Students scoring in the fiftieth percentile or above on each section of the GRE will be given preference. The best-qualified applicants will be accepted up to the number of spaces and advisers that are available for new students. Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. Exceptions to the minimum 3.00 grade-point average may be made at the program's discretion for students with special backgrounds, abilities, and interests.

Students are expected to have a strong foundation in biological and physical sciences. Generally, students with B.S. degrees in biology, microbiology, plant science, molecular biology, or biochemistry are well prepared for graduate study in Plant Pathology.

Degree Requirements

M.S. DEGREE

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The Master of Science degree program in Plant Pathology leads students either to the development of special proficiencies in Plant Pathology, which will allow the individual to directly enter a professional career, or to the development of a basic knowledge of the discipline, allowing for advancement to the Ph.D. degree. M.S. degree students will be introduced to the broad aspects of the field of plant pathology, including exposure to the various causal agents of plant disease and the diseases they incite; diseases of current and classical importance affecting a wide range of crop plants; a variety of techniques used to isolate, characterize, and identify causal agents of plant disease; and an appreciation for the relationship between plant pathology and other biological and physical sciences.

A minimum of 31 credits at the 400 level or higher is required, with at least 18 credits in the 500 and 600 series combined. Required courses for the M.S. Degree are: PPEM 405 (3), PPEM 416 (3), PPEM 417 (3), PPEM 425 (4), PPATH 502 (3), PPATH 522 (1), and PPATH 590 (2)*. Students are required to take a minimum of 6 additional credits at the 500 level in Plant Pathology courses from a list provided by the department. A minimum of 6 thesis research credits (600 or 610) must be taken in Plant Pathology. Students may complete additional coursework at other levels as required and/or approved by their committee.

*All students are required to register for and participate in PPATH 590 (1 credit Pass/Fail) for all semesters enrolled. No more than two (2) credits of PPATH 590 may count towards the Master's degree.

All Master degree students must write a thesis. The thesis must be accepted by the adviser(s), committee members, the head of the graduate program, and the Graduate School. The student must present and pass a thesis defense.

Ph.D. DEGREE

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Candidates for the Ph.D. degree in Plant Pathology are required to have an M.S. in plant pathology or a closely related field, or equivalent educational background. In addition, all students must enroll in PPATH 505 (2) and other courses tailored to the individual by the candidate's doctoral committee. Ph.D. candidates must prepare a dissertation and present seminars in the departmental colloquium (PPATH 590), which will evaluate English communication skills. During their studies, Ph.D. students will have an opportunity to assist in teaching a disciplinary subject.

All doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. Degree in Plant Pathology (PPATH) and Biogeochemistry

Doctoral students with research and educational experiences in plant pathology and environmental microbiology may apply to the Plant Pathology/Biogeochemistry Dual-Title Doctoral Degree Program. The goal of the dual-title Ph.D. degree in Plant Pathology and Biogeochemistry is to enable PPATH graduate students to acquire the knowledge and skills of their major area of specialization in PPATH, while at the same time gaining expertise and skills in biogeochemistry. Graduate study in this program seeks to provide students with the intellectual foundation for integrated and mechanistic understanding of interactions between plant hosts, microbes, and environmental systems. Interdisciplinary training that includes biogeochemistry will prepare students for positions in academia, government, non-profit organizations, and the private sector. It will also prepare students for a wide array of

research careers in the private sector, including agricultural and environmental sciences, energy industries, and the integrated study of the sustainability of biological systems.

Admission Requirements

For admission to the dual-title doctoral degree in Biogeochemistry, a student must first apply and be admitted to the Plant Pathology graduate program and The Graduate School, preferably but not necessarily discussing the dual-title interest beforehand with a major adviser who has been appointed to the Biogeochemistry program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Biogeochemistry dual-title program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page. Doctoral students must apply for enrollment into the dual-title degree program in Biogeochemistry prior to obtaining candidacy in their home department.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the Plant Pathology Ph.D. degree requirements, listed above. In addition, students pursuing the dual-title Ph.D. in Plant Pathology and Biogeochemistry must complete the degree requirements for the dual-title Biogeochemistry Ph.D., listed on the Biogeochemistry Bulletin page. Students are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program who is a member of the Biogeochemistry graduate faculty. The major program adviser normally will also be a member of the Biogeochemistry graduate faculty. The two faculty advisers can represent different academic programs, but this is not required, as faculty from a scientifically diverse department could represent very different areas of expertise.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Plant Pathology and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Plant Pathology and Biogeochemistry. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees , the doctoral committee of a Plant Pathology and Biogeochemistry dual-title doctoral degree student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Plant Pathology and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in Plant Pathology (PPATH) and International Agriculture and Development (INTAD)

Graduate students with research and educational interests in international education may apply to the Plant Pathology/INTAD Dual-Title Degree Program. The goal of the dual-title degree Plant Pathology and INTAD graduate program will enable graduate students to acquire the knowledge and skills of their primary area of specialization in Plant Pathology, while at the same time gain the perspective and methods needed for work in international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of plant-microbe interactions, plant disease biology and epidemiology, environmental microbiology, mycology, plant virology, mushroom biology, genomics and disease management. They will acquire a broad perspective on applying their research findings in the context of the broader international community. The dual-title will allow students to master their field of specialization from an international perspective allowing them to compare practices and outcomes between countries and regions.

Admission Requirements

Students must apply and be admitted to the graduate program in Plant Pathology and The Graduate School before they can apply for admission to the dual-title degree program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the INTAD dual-title program. Refer to the Admission Requirements section of theINTAD Bulletin page. Doctoral students must apply for enrollment into the dual-title degree program in INTAD prior to obtaining candidacy in their home department.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Plant Pathology, listed above. In addition, students pursuing the dual-title in Plant Pathology and INTAD must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Plant Pathology and must include at least one Graduate Faculty member from the INTAD program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Plant Pathology and INTAD. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond thenormal period allowable.

In addition to the general Graduate Council requirements for doctoral committees , the doctoral committee of a Plant Pathology and INTAD dual-title doctoral degree student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair. The INTAD representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Plant Pathology and INTAD. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

PLANT PATHOLOGY (PPATH) course list

INTAD course list

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-03

Review Date: 11/15/2016

Faculty linked: 6/27/14

Public Policy (PPOL)

David Lowery, Miller-Lavigne Professor of American Politics and Public Policy
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Degrees Conferred:

M.P.P.

The Program

The Master of Public Policy (M.P.P.) Degree program is designed to provide professional training in public policy for those seeking careers in the design, adoption, implementation, and evaluation of public policies. The professional careers students should be prepared for include the full range of careers for which public policy expertise would be valued: national, state, and local government agencies, think tanks and consulting firms, non--?profit organizations, and lobby firms and private sector organizations engaged in public affairs representation. The core of the M.P.P. degree curriculum will provide students with a strong knowledge base relevant to public policy rooted in the social science disciplines of economics, political science, sociology, and industrial psychology housed in the College of the Liberal Arts along with training in quantitative policy analysis and evaluation. And through its specialization course requirements, it will provide students with public policy relevant training across a wide spectrum of substantive public policy areas drawing on expertise found on the University Park campus. Students will work closely with faculty to design a specialization curriculum around their core course work.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the General Information section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission. All applicants will submit GRE scores, résumé or curriculum vitae, two letters of recommendation, and a personal statement addressing their reasons for pursuing a graduate degree in public policy and discussing their plans and goals. The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information. English proficiency test scores must meet or exceed the minimum acceptable scores listed in the Bulletin. Applicants with a score of 19 or higher on the speaking section of the TOEFL Internet--?based test will be considered for admission, though a score of 23 or higher is desirable. The minimum IELTS score required for admission is 7.0 (overall, and in each of the subsections). Admissions will be based on a review of all submitted materials and spaces will be offered to the best qualified applicants, taking into account academic achievement, relevant work experience and other indices of aptitude for advanced study in public policy.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

A minimum of 49 credits at the 400, 500, or 800 level, with at least 18 credits at the 500 or 800 level and a minimum of 6 credits at the 500 level, is required. More specifically, the program requires 24 credits in 8 core courses that are designed to establish a base of knowledge in key subject areas reflecting the statistical skills and the disciplinary foundations from economics, political science, and organizational theory and management needed for successful careers in public policy: PPOL 801 (3 credits), PPOL 802 (3 credits), PPOL 503 (3 credits), PPOL 804 (3 credits), PPOL 805 (3 credits), PPOL 506 (3 credits),
PPOL 807 (3 credits), and PPOL 808 (3 credits). Three additional courses in the core (9 credits) of the M.P.P. curriculum focus specifically on the practice of conducting prospective and retrospective public policy analyses: PPOL 809 (3 credits), PPOL 810 (3 credits), and PPOL 811 (3 credits). These 11 core courses, constituting 33 credits, are required for completion of the M.P.P. degree and include two courses at the 500 level. An additional four courses (12 credits) are required in the student's field of public policy specialization. These courses will be selected by students with approval from by M.P.P. program and may be at the 400, 500, or 800 level. Students may count up to 12 credits in the fields of specialization from 400--?level courses.

In addition to completing the core curriculum and the specialization curriculum, students are required to take a summer internship (PPOL 895, 1 credit), as approved by the M.P.P. program, between their two years of on--?campus study. The internship placement should be of sufficient depth and professionalism that would allow the student to experience the integration of their curricular studies in an actual public policy professional environment. Successful completion of the internship will require an evaluation by the supervisor and a
reflective paper.

In addition to these degree requirements, students must complete a capstone project as their master's culminating experience. This entails completing both the Project Design and Methods class (PPOL 811, 3 credits and one of the 11 core courses listed above) and the capstone project requirement (PPOL 894, 3 credits). The capstone project will involve integrating and showing mastery of the subject matter of the student's public policy specialization via conducting original research using prospective public policy analysis or retrospective program/policy evaluation. Successful defense of the capstone project will entail its presentation at an annual capstone conference sponsored by the M.P.P. program.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revsied by the Department: Fall 2018

Blue Sheet: 8/28/2018

Project Management (PRMGT)

JEFFREY PINTO, Program Chair
Penn State Erie, The Behrend College
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The Graduate Faculty

The Program

The Master of Project Management (MPM) is a 30-credit graduate degree program that emphasizes all aspects of project management theory and practice. The MPM is an interdisciplinary program that utilizes problem-based learning as well as Web-based instructional methods to transcend time and space, and to support effective teaching and learning. The key areas of the MPM include: planning, cost, and value management; project control; human issues in project management; strategic issues in project management; and commercial and procurement law as it relates to project management.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

Students complete eight required courses (24 credits) in which they apply course concepts to project management scenarios through the use of cases, simulations or actual situations in their employing organizations. The required courses are:

MANAGEMENT (MANGT)
510. Project Management (3)
515. Cost and Value Management (3)
520. Planning and Resource Management (3)
525. Commercial Law and Project Management (3)
531. Organizations (3)
535. Interpersonal and Group Behavior (3)
540. Strategy: Corporate, Business, and Project (3)
575. Management of Projects (3)

In addition, students take 6 credits of elective courses. Electives may include additional program-approved courses or an applied research project focusing on some aspect of project management completed as an independent study. All students must attend a minimum of one online orientation in order to complete the graduation requirements of the program. The program culminates with a capstone project, which is completed while enrolled in MANGT 575 (See the Course Scheduling Considerations section below for more information).

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

Only candidates who demonstrate high promise of success for graduate work are admitted to the MPM program. Successful admission to the MPM Program can be achieved in one of the following three ways:

1. Applicants must achieve a minimum GMAT score of 450. Applicants must also submit a personal essay and 2 letters of recommendation for review.
2. Applicants have a cumulative undergraduate grade-point average or major grade-point average of 3.0 or above and five or more years of relevant project management experience as approved by the program chair. Applicants must also submit a personal essay and 2 letters of recommendation for review.
3. Students may apply to enter the MPM Degree program upon successful completion of the Graduate Certificate in Project Management with a GPA of 3.0 or higher.

The MPM program emphasizes application of course concepts to actual project management opportunities and problems. Therefore, students who currently are, or previously were, employed as project managers or project team members will derive the greatest benefit from the program. All applicants must provide evidence of sufficient current or previous work experience that will enable them to successfully complete course assignments requiring the application of course concepts to real project management situations. This evidence may be provided in either the form of two letters of recommendation from individuals who know the applicant in a professional capacity or through nomination to participate in the program by an appropriate official within the applicant's employing organization. Those who write letters of recommendation or submit nominations on behalf of the candidate will be asked to attest to the nominee's suitability for the program of study considering factors such as the applicant's length of employment, level and areas of work responsibility, personal qualities, career goals, maturity of purpose, and program requirements to apply course concepts to work-related issues. Applicants are encouraged to consult with the program chair concerning the suitability of their work experiences in relationship to program requirements.

All students must be computer literate and have ready and reliable access to a computer and the Internet to successfully complete the MPM program. They must know how to use word processing software, log on to an Internet provider, and use e-mail. Additionally, MPM students will use Microsoft Office in their coursework that will require they have a working knowledge of Microsoft Office programs such as Word, Excel, Power Point, and Access. Access to fax facilities may be needed as an additional form of communications between student and instructor or between students.

Course Scheduling Considerations

The recommended maximum course load is 6 credits per semester for students working full-time. MANGT 510 must be taken in the first semester of study and is a prerequisite or co-requisite for all other courses in the program. MANGT 575, Management of Projects, is a problem-based capstone course that integrates the themes necessary to appreciate the overall challenge of project management. The course includes a final, integrative and comprehensive project based on the identification and analysis of real project management problems from the students' work organizations. This written assignment requires the integration of theory from previous courses along with significant library and literature searches to analyze and propose solutions to these problems. MANGT 575 must be taken following completion of at least 18 credits. No more than one of the required courses may be taken concurrently with MANGT 575.

Last Revised by the Department: Spring Session 2016

Blue Sheet Item #: 44-06-000

Review Date: 04/5/2016

Faculty linked: 8/14/14

Psychology (PSY)

Program Home Page

MELVIN M. MARK, *Head of the Department*
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Degrees Conferred:

Ph.D., M.S.
Dual-Title Doctoral Degree in Psychology and Language Science

The Graduate Faculty

The Program

The graduate Psychology program is characterized by highly individualized study leading to the Ph.D. degree. Emphasis is placed on research, teaching, and professional career development. Each student is associated with one of the six program areas offered in the department: *Clinical* (including *Child Clinical*; *Cognitive*; *Developmental*; *Psychobiology; Industrial/Organizational*; and *Social*. An individual's particular pattern of interests dictates in part the course of study followed. Within all areas, research is an integral part of study; usually, the research is empirical in focus, but it may be applied or basic, depending on the problem of interest.

The department has laboratories, computer facilities, darkroom, and shop, and students have access to the large resources of the University, which include excellent computation facilities and a large open-stack library. Opportunities for practicum experience are available; e.g., clinical students find practicum in local mental health centers, while industrial students find placement in appropriate business or industrial settings.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) verbal and quantitative portions are required; scores from the Miller Analogies Test (MAT) are optional. All applicants who were psychology majors as undergraduates should provide scores from the advanced psychology (subject) GRE test. Applicants with superior undergraduate (particularly junior and senior years) or graduate grade-point averages will be considered for admission. Although a major in psychology is not required, applicants should have a broad undergraduate background that includes 12 credits in psychology. Undergraduate study in psychology should include a course in statistics and a psychological methodology course. Requirements listed above are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Master's Degree Requirements

The psychology department does not have a graduate program designed for students seeking only the master's degree. A master's thesis, or the department's equivalent (an acceptable published journal article), is required for advancement to candidacy for the Ph.D. degree in Psychology. Usually, but not always, the master's thesis centers on an empirical research topic. The typical thesis involves a literature review, data collection, analysis, and discussion. A master's degree is not awarded unless a thesis is submitted to the Graduate School. Students must successfully propose a thesis study by the end of the second year and have a successfully defended a thesis by the end of their third year in the program.

Doctoral Degree Requirements

All students in their first year of residency must satisfactorily complete the department's English proficiency requirement (PSY 501).

Students must complete (within their first 60 graduate credits for students without previous graduate credit) 6 departmentally approved graduate credits in statistics with a grade of B or better. Students must complete 18 credits in a suitably selected major area; majors usually are defined by one of the six program areas noted above. In addition to the major area credits, students must complete a minimum of 12 credits outside the major area. Two options exist for completing these 12 credits: (1) completing four courses in APA-recommended breadth areas, or (2) completing course work in a particular area of expertise outside the major. Some areas may have additional recommended or required courses as well. The Ph.D. comprehensive examination must be taken by the time 70 graduate credits are earned, or prior to the student's fourth year in residency, whichever comes first. The department has no foreign language requirement.

Applied Linguistics Option

The program offers an option in Applied Linguistics which includes 18 credits in APLNG/LING offered in the Linguistics and Applied Language Studies program. Underpinning the option is the synthesis of knowledge related to how language is acquired, understood, and spoken by children and adults who use one or more languages.

Other Relevant Information

The Department of Psychology makes every effort to recruit and train minority psychologists. Support for minority students is coordinated by the department, the Graduate School Minority Graduate Scholars Award Program, and the American Psychological Association Minority Fellowship Program. In addition, the department often has funded minority students through minority training programs and special minority research programs.

Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Dual-Title Graduate Degree in Psychology and Language Science

Graduate students with research and educational interests in Psychology and Language Science may apply to Psychology and Language Science PH.D. Graduate Program. The goal of the dual-title degree Psychology and language Science graduate program is to enable graduate students from Psychology to acquire the knowledge and skills of their major area of specialization in Psychology, while at the same time gaining the perspective and methods of the Language Sciences.

Admission Requirements

To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted through the Psychology Department (see below for admission requirements for the Graduate Program in Psychology). Upon admission to the Psychology Program and with a recommendation from a Language Science program faculty member in the Department of Psychology, the student's application will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third elected faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science.

Admission Requirements for Incoming Graduate Students in Psychology

Most incoming graduate students have earned an undergraduate degree in psychology. In some cases, students from other majors are also admitted, but it is expected that applicants will have a background in psychology before applying. Graduate Record Exam (GRE) is required; however, the subject exam is not required. The TOEFL exam is required for international students except for those applicants who have received a baccalaureate or a master's degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States and Wales. All international students will be required to take the English Proficiency Exam upon arrival at the Penn State campus. Students are asked to complete a departmental application form, write a statement of purpose, and include a writing sample in the application materials.

Requirements for the Dual-Title Ph.D. Degree in Psychology and Language Science

Two Language Science proseminar courses (Ling 521 and Ling 522; 6 credits). One 3 credit research internship with a Language Science faculty mentor from an outside area. The 3 credit internship required by the Psychology program may satisfy both the Psychology requirement and the Language Science requirement (for 6 total credits of internship to be completed with two faculty members from the Language Science program). Students will choose one course among the following: CSD 596, GER 596, LING 596, PSY 596, SPAN 596.

Final course selection is determined by the student in consultation with their dual-title program advisors and their major program advisors. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-097

Review Date: 1/12/2010

Faculty updated: 6/27/14

Quality and Manufacturing Management (QMM)

Program Home Page

DR. DIPO ONIPEDE, *Co-Director; Associate Professor of Mechanical Engineering*
DR. DIANE PARENTE, *Co-Director; Professor of Management*

Penn State Erie, The Behrend College
School of Engineering
242 Burke Center
814-898-6153

Degree Conferred:

M.M.M.

The Graduate Faculty

The Program

Penn State's Master of Manufacturing Management (M.M.M.) degree is offered by the Quality and Manufacturing Management (QMM) program. The degree is conferred by Penn State Erie, The Behrend College, and is administered jointly by the School of Engineering and the Black School of Business. This interdisciplinary graduate program is designed to prepare students for careers in manufacturing, consulting, services, and operations. The program is offered in a full-time format and in a flexible scheduling pattern. Full-time study requires twelve months of continuous study starting in July and ending the following June. The flexible scheduling pattern requires approximately 24 months to complete. An appropriate internship experience is a precondition for entrance to the program if the applicant does not have sufficient work experience to waive the internship requirement. Students take 32 credits of work in 11 core courses.

The program develops future executives who possess in-depth, relevant manufacturing knowledge bridging engineering and management. Graduates are afforded a life-changing experience that provides them with a unique set of engineering, business, and quality skills combined with a suite of communication skills critical to management success. Students fuse Six Sigma certification with corporate social responsibility and emotional intelligence to become well-rounded leaders. QMM students develop business plans and analyze and predict corporate financial performance in a global marketplace. They emerge from Penn State as international leaders understanding the fundamentals of materials and processes and project confidence in product and manufacturing system design.

Admission Requirements

For admission to the Graduate School, applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

The program draws its students from two groups: practicing professionals from industry and individuals who have graduated from, or are currently enrolled in, a business administration, science, or engineering program. Applicants who expect to graduate with a baccalaureate in engineering, science, or business administration may apply for admission to the program in their senior year.

All applicants must submit scores from the GRE or the GMAT.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses with attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

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

All applicants must have taken the prerequisite mathematics, computer science, and statistics courses or equivalents **prior to** starting the program. Applicants **cannot** register until they have completed these courses.

Degree Requirements

The M.M.M. degree requires 32 credits of course work at the 400 level or higher, on a part- or full-time basis. The courses are as follows (each course is worth 3 credits unless otherwise specified): QMM 491 or QMM 492 (note: both may be required depending on background of the applicant); QMM 552, QMM 561, QMM 562, QMM 581, QMM 582, QMM 593 (1–2 credits), QMM 851, QMM 871, QMM 872, and QMM 891 (1–3 credits).

Student Aid

A limited number of partial scholarships are available for students in the program.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

QUALITY AND MANUFACTURING MANAGEMENT (QMM) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 12/2014

Faculty linked: 8/14/14

Rural Sociology (R SOC)

Program Home Page

C. DANIEL AZZARA, *Interim Head of the Department of Agricultural Economics, Sociology, and Education*
205 Armsby Building
814-865-5461

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Programs

All degree programs emphasize a comprehensive understanding of the various facets of societal organization pertinent to the rural sector. While breadth is encouraged, areas of special interest and research include rural social change, community structure, population, rural community development, the structure of agriculture, natural resources, and the environment.

Admission Requirements

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by a graduate program and authorized by the dean of the Graduate School, are required for admission. At the discretion of a graduate program, a student may be admitted provisionally for graduate study in a program without these scores. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Prerequisites for the master's program include 3 credits in rural sociology or sociology, and additional credits in either field. If the entering student does not have these prerequisites, they must be made up at the University during the early part of the master's program.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

Degree Requirements

All students are required to have training in sociological theory, statistics, and research methods.

There is no foreign language requirement for the Ph.D. degree; the student is expected to substitute such courses and instruction necessary to generate superior capabilities of inquiry into an analysis of basic and/or applied rural sociological problems.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

RURAL SOCIOLOGY (R SOC) course list

Dual-Title Degree in Rural Sociology (R SOC) and International Agriculture and Development (INTAD)

Graduate students with research and educational experiences in rural sociology may apply to the Rural Sociology/INTAD Dual-Title Master's Degree Program. The goal of the dual-title degree R SOC/INTAD degree program is to enable graduate students from R SOC to acquire the knowledge and skills of their major area of specialization in R SOC, while at the same time gaining the perspective and methods needed to work internationally. Graduate study in this program seeks to prepare students to assume leadership roles in professions in international agriculture and development requiring state-of-the-art methodological training, as well as of conceptual expertise in rural sociology and in one or more of R SOC's four signature areas: (1) agriculture and food systems, (2) community and international development, (3) natural resources and environment, (4) rural social demography.

This dual-title graduate degree program does not duplicate any other degree program at the University.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the Rural Sociology program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, determined by the student, their INTAD advisor, and their Rural Sociology program advisor.

Degree Requirements for R SOC/INTAD Dual Title M.S.

The Master's in Rural Sociology and INTAD is a dual-title degree awarded to students who are admitted to the Rural Sociology master's program and admitted to the dual-title degree in INTAD. In addition to the requirements of the Rural Sociology degree, dual-title degree students must:

Courses

Complete a minimum of 12 INTAD course credits (400, 500, or 800 level) as follows:

9 credits from the core curriculum:

- Program Design and Delivery (AEE 450, 3 credits)
- Leadership Development (CEDEV/R SOC/AEE 505, 3 credits, on-line)
- International Agricultural Development Seminar (INTAD 820, 3 credits)

3 credits of internship or applied courses/ independent studies with international development content

Master's Thesis & Final Oral Examination

Write a master's thesis on a topic that reflects both the graduate program in Rural Sociology and the dual-title offering in INTAD.

All members of the student's committee for the dual-title master's degree will be members of the graduate faculty. The committee must include at least one graduate faculty member from INTAD. A Degree Committee form should be filed upon selection of the committee members and should be approved by the INTAD Academic Program Committee Co-chair.

Candidates for the dual-title master's degree in R SOC and INTAD will also be required to pass a masters' thesis defense covering the general field of Rural Sociology and INTAD, with emphasis on the student's area of specialization. The oral exam is to be administered by the student's thesis committee. A favorable vote of a two-thirds majority is necessary for passing.

Some courses may satisfy both the graduate major program requirements and those of the INTAD program. Students and advisors should maintain the INTAD Master's Degree Plan of Study, which must be submitted to the INTAD program office two months before the student files the "Intent to Graduate" via eLion.

Degree Requirements for R SOC/INTAD Dual-Title Ph.D.

The doctoral degree in R SOC and INTAD is a dual-title degree awarded only to students who are admitted to the R SOC doctoral program and admitted to the dual-title degree in INTAD. The minimum course requirements for the dual-title Ph.D. degree in R SOC and INTAD, in addition to the R SOC requirements, are as follows.

Courses

Students must complete a minimum of 18 INTAD course credits with study in the following categories:

9 credits from the core curriculum, which includes:

- International Agricultural Development Seminar (INTAD 820, 3 credits)
- International Rural Social Change (R SOC 517, 3 credits)
- Sociology of Agriculture (R SOC 508, 3 credits)
- OR
- Human Dimensions of Natural Resources (R SOC 555, 3 credits)

9 credits from INTAD elective curriculum/courses with international development content/internships/independent study

Courses totaling a minimum of 18 credits must be taken at the 500-level or above; particular courses may satisfy both the R SOC requirements and those in the INTAD program. Final course selection is determined by the student in consultation with their INTAD advisors and their major program advisors. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

Candidacy

Candidacy procedures will be based on the procedures of the major department and will have an international dimension. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the candidacy exam may be delayed at the discretion of the student advisor in consultation with the INTAD program coordinators.

Committee Composition

The doctoral committee of a Ph.D. dual-title degree student must include a minimum of four faculty members, i.e., the chair and at least three additional members, all of whom must be members of the Graduate Faculty; and the committee must include at least one representative from the INTAD Program faculty. The chair of the committee can be a member of both the Major Program and the INTAD Program faculty. If the chair is not an INTAD Program faculty member, the INTAD representative must be the co-chair of the committee. An official "outside member" also must be appointed to the committee.

Comprehensive Exam

Each Ph.D. candidate must pass a comprehensive (combined written and oral) examination in rural sociology, research methods and statistics, and two or more chosen areas of specialization. It is expected that one of these areas will be INTAD. A separate comprehensive examination is not required by the INTAD program, but the INTAD representative on the student’s doctoral committee must have input into the development of and participate in the evaluation of the comprehensive examination.

Doctoral Thesis & Final Oral Examination

Ph.D. students enrolled in the dual-title degree program are required to write a doctoral thesis on a topic that reflects their original research and education in both Rural Sociology and International Agriculture and Development. The dissertation should contribute to the body of knowledge in international agriculture. Upon completion of the student’s doctoral thesis, a final oral examination is scheduled. The exam is administered by the student’s doctoral committee and focuses on the student’s thesis research. A public oral presentation of the dissertation is also required.

Courses

Graduate courses carry numbers from 500 to 599 and 800 o 899. Advanced undergraduate courses numbered between 400-499 may be used to meet some graduate degree requirements when taken by graduate students but courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up for deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-106

Review Date: 01/10/2012

Faculty linked: 6/27/14

Renewable Energy and Sustainability Systems

Ali Demirci, Professor, Department of Agricultural and Biological Engineering, Program Chair
231 Agricultural Engineering Building
University Park, PA 16802
814-863-1098
axd29@psu.edu

Degree Conferred

M.P.S.

The Graduate Faculty

Core Courses
Jeffrey Brownson, Ph.D. (Wisconsin) Assistant Professor of Energy and Mineral Engineering; Materials Science and Engineering
Seth Blumsack, Ph.D. (Carnegie Mellon) Assistant Professor of Energy Policy and Economics
Sarma Pisupati, Ph.D. (Penn State) Associate Professor of Energy and Mineral Engineering
Tom Richard, Ph.D. (Cornell) Director of Penn State Institutes of Energy and the Environment
Nancy Tuana, Ph.D. (California) Director, Rock Ethics Institute and Director of Philosophy Graduate Studies

Bioenergy Option
John Carlson, Ph.D. (Illinois), Professor of Molecular Genetics
Yongsheng Chen Ph.D. (Lehigh), Assistant Professor of Energy and Mineral Engineering
Daniel Ciolkosz Ph.D. (Cornell), Department of Agricultural and Biological Engineering
Ali Demirci, Ph.D. (Iowa State) Professor of Agricultural and Biological Engineering
Marvin Hall, Ph.D. (Minnesota), Professor of Forage Management
Jude Liu, Ph.D. (Manitoba), Assistant Professor of Agricultural and Biological Engineering
Marc McDill, Ph.D. (Minnesota), Associate Professor of Forest Management
Joe Perez Ph.D. (Delaware), Adjunct Professor of Chemical Engineering
Tom Richard, Ph.D. (Cornell) Professor of Agricultural and Biological Engineering
Gregory Roth, Ph.D. (Penn State), Professor of Agronomy
Andrew Zydney Ph.D. (MIT), Head and Professor of Chemical Engineering

Wind Energy Option
Kenneth Brentner, Ph.D. (Cambridge) Professor of Aerospace Engineering
George Lesieutre, Ph.D. (UCLA) Professor and Head of Aerospace Engineering
Mark Maughmer, Ph.D. (Illinois) Professor of Aerospace Engineering
Dennis McLaughlin, Ph.D. (MIT) Professor of Aerospace Engineering
Philip Morris, Ph.D. (Southampton) Boeing, A.D. Welliver Professor of Aerospace Engineering
Sven Schmitz, Ph.D. (California, Davis), Assistant Professor of Aerospace Engineering

Solar Energy Option
Jeffrey Brownson, Ph.D. (Wisconsin) Assistant Professor of Energy and Mineral Engineering; Materials Science and Engineering
David Riley, Ph.D. (Penn State) Associate Professor of Architectural Engineering

Sustainability Management and Policy Option
Jeffrey Brownson, Ph.D. (Wisconsin) Assistant Professor of Energy and Mineral Engineering; Materials Science and Engineering
Min Ding, Ph.D. (Penn), Professor of Marketing and Robert G. Schwartz Fellow
Zhen Lei, Ph.D. (Berkeley), Assistant Professor of Energy and Environmental Economics
David Riley, Ph.D. (Penn State), Associate Professor of Architectural Engineering
Anastasia Shcherbakova, Ph.D. (Chicago), Assistant Professor of Energy Economics, Risk & Policy

Program Description

The intercollege RESS professional master's program (iMPS-RESS) is an online-interdisciplinary master's degree program designed to prepare professionals in the fields of renewable energy and sustainability systems to lead the world's transformation from an unsustainable, fossil energy economy to a renewable, sustainable basis of operation. For example, attaining an ambitious national goal of 25% of energy from renewable resources by the year 2025 in the U.S. requires a tremendous increase in renewable energy production and use in ways that are sustainable, environmentally sound, and reliable. The iMPS-RESS program is designed to address the critical need for professionals with relevant expertise in *renewable energy* and *sustainability systems*.

The curriculum consists of 32 credits, delivered online through the Penn State World Campus. The program provides broad coverage of topics related to *renewable energy* and *sustainability systems* while providing in-depth coverage of select topics such as solar, wind, bioenergy, and sustainability management and policy. Students are required to follow a focused curriculum that combines requisite rigor with flexibility appropriate to a rapidly changing field. Students take a number of core program courses that provide an in-depth understanding of the sustainability framework relevant to energy and sustainability systems and, in consultation with their program adviser, select additional courses from a broad array of electives designed to meet their individual learning goals. While not required to do so, students may choose from one of four program options that provide specialized technical instruction in various aspects of renewable energy and sustainability systems. A comprehensive Scholarship and Academic Research Integrity (SARI) plan embeds ethics and integrity training both at the start and at the end of the master's program. A capstone course is required of all students that serves to aggregate the material learned and provide a summative educational experience within the framework of a semester long group-based project.

Admission Requirements

Educational Background
For admission to the Graduate School, an applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Academic performance and/or professional experience must be equivalent to that expected for admission to a typical resident-program master's degree. Applications must include a statement of professional goals, a curriculum vita or resume, and three letters of recommendation. Official records of scores on the Graduate Record Exam (GRE) are also required. However, this requirement may be waived under certain circumstances – please contact the graduate program directly.

Language of Instruction
The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. The minimum composite score for the IELTS is 6.5. International applicants may be exempted by the program director from the TOEFL/IELTS requirement if they have received a baccalaureate or a master's degree from a college/university/institution utilizing English as the means of instruction, such as those in Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, The Republic of South Africa, Scotland, the United States and Wales.

Core Application Packet

- Statement of Purpose
  A statement of professional experience and goals (up to 500 words)
- Vita or resume
- Three letters of recommendation
  The individuals writing letters should be familiar with you and comfortable discussing your professional and/or academic strengths and

accomplishments. Preferably, all letters will be written within the last six months and reference the applicant's current career goals and/or ability to perform graduate level study. Two official transcripts from each higher education institution attended
- Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS) score, if applicable
- Application fee

Admissions Process
Applications will be evaluated by the iMPS-RESS Admissions Committee based on the applicants' technical qualifications for the program relative to their area of interest, their previous educational experience, and English Language proficiency. In general, successful applicants are expected to have earned a junior/senior grade-point average of at least 3.0 on a 4.0 scale. Applicants with a marginal record are encouraged to first complete a related Graduate Certificate before applying for admission to the iMPS-RESS program. Exemplary performance in the graduate certificate will be taken into consideration for possible admission into the iMPS-RESS program, but completion of a certificate does not imply or guarantee admission into a degree program.

Master's Degree Requirements

The iMPS-RESS degree is conferred upon students who earn a minimum of 32 credits of coursework while maintaining an average grade-point average of 3.0 or better in all course work, including at least 18 credits at the 500 level or above (with at least 6 credits at the 500 level), and who complete a quality culminating capstone project in consultation with a graduate adviser. The program curriculum includes 11 credits of core courses, 9-12 credits of a selected option (or adviser-approved course of study), 6-9 credits of electives, and a 3-credit capstone course (ABE 589).

Required Courses
Prescribed courses for the degree include 11 credits of core courses in renewable energy and sustainability, as well as the 3 credit capstone course (ABE 589).

- A B E 589. Management and Design of Renewable Energy and Sustainability Systems (3 cr.)
- BIOET 533. Ethical Dimensions of Renewable Energy and Sustainability Systems (2 cr.)
- EME 504. Foundations in Sustainability Systems (3 cr.)
- EME 801. Energy Markets, Policy, and Regulation (3 cr.)
- EME 802. Renewable and Sustainable Energy Systems (3 cr.)

Additional Courses
An additional 18 credits must be selected from the following list of courses. This listing includes 4 Program Options that provide focused instruction in a given aspect of renewable energy and sustainability systems. Detailed information about each option can be found below.

- Bioenergy Option (12 cr.)
- Solar Energy Option (12 cr.)
- Sustainability Management and Policy Option (12 cr.)
- Wind Energy Option (9 cr.)

- A E 862. Distributed Energy Planning and Management (3 cr.)
- A B E 884. Biomass Energy Systems (3 cr.)
- EME 803. Applied Energy Policy (3 cr.)
- EME 810. Solar Resource Assessment and Economics (3 cr.)
- EME 812. Utility Solar Power and Concentration (3 cr.)
- MANGT 510. Project Management (3 cr.)
- SCM 800. Supply Chain Management (4 cr.)
- SYSEN 505. Technical Project Management (3 cr.)
- SYSEN 507. Systems Thinking (3 cr.)
- SYSEN 520. Systems Engineering (3 cr.)
- SYSEN 533. Deterministic Models and Simulation (3 cr.)

Please note that most of the listed courses are new courses except for a few existing ones for which permissions have been secured. Please see the appendix for the e-mail communications.

Program Options

Bioenergy Option *(12 cr.)*
Option Leader: Ali Demirci
Professor, Department of Agricultural and Biological Engineering
College of Agricultural Sciences
231 Agricultural Engineering Building
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The Bioenergy Option will create graduates who can lead the development of the rapidly expanding bioenergy industry. Many companies are not able to hire staff with appropriate training to meet their R&D, management, and production needs. As a result, there is a large and unmet need to train professionals at the master's level with skills in applied science, communication, business, social and industry perspectives for the emerging bio-based economy. Important components of this industry include crop production, harvesting, storage, ecology, genetics, fermentation, engineering, value chain systems modeling, marketing, economics and sociology.

NOTE: A background or courses in calculus, physics, thermodynamics, and plant biology is advised for students interested in this option. Students may contact the Option Leader for additional information.

Students are required to take the following courses:

- A B E 884. Biomass Energy Systems (3 cr.)
- A B E 885. Biomass Harvesting and Logistics (3 cr.)
- A B E 888. Conversion Technologies for Bioenergy Production (3 cr.)
- FOR 880. Bioenergy Feedstocks (3 cr.)

Solar Energy Option *(12 cr.)*
Option Leader: Jeffrey Brownson
Assistant Professor, Department of Energy and Mineral Engineering
College of Earth and Mineral Sciences
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University Park, PA 16802
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brownson@psu.edu

The Solar Energy Option will create graduates who can lead project and policy development in the solar energy industry. The skills of master's level solar systems project development include solar resource assessment for selected locales, effective communications to design to maximize the solar economic utility to the client/stakeholders, knowledge of thermal- and electric-derived solar conversion technologies, technical knowledge of design in hybridized solar systems design, and the social and policy context of solar systems project design. Courses in the solar option will have two parallel paths to address either 1) Utility-Industrial solar electric and solar thermal projects (e.g., large-scale solar and industrial processing); or 2) Distributed solar electric and solar thermal projects (e.g., residential and commercial built environment).

NOTE: A background in systems science, engineering, or physics is strongly recommended for students interested in this option. Students may contact the Option Leader for more information.

Students are required to take the following courses:

- A E 878. Solar Project Development and Finance (3 cr.)
- EME 810. Solar Resource Assessment and Economics (3 cr.)

Students select 6 credits from the following courses:

- A E 862. Distributed Energy Planning and Management (3 cr.)
- A E 868. Commercial Solar Electric Systems (3 cr.)
- EME 811. Solar Thermal Energy for Utilities and Industry (3 cr.)
- EME 812. Utility Solar Power and Concentration (3 cr.)

Sustainability Management and Policy Option *(12 cr.)*
Option Leader: Jeffrey Brownson
Assistant Professor, Department of Energy and Mineral Engineering
College of Earth and Mineral Sciences
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brownson@psu.edu

The Sustainability Management and Policy Option will create graduates who will lead sustainability project planning and policy development, given the systems approach of sustainability in business and government. The demand is already high for graduate leaders with deep understanding of the science of sustainability, combined with systems acumen to assess risk and plan for renewable energy projects, and communication skills to develop new policy implementation. The expanded fields of renewable energy, energy trading, and sustainability systems management dictate that master's level education be centralized to the science of sustainability, analysis of market and non-market strategies, communication to facilitate energy policy development, and systems thinking approaches to unify the project development approach.

Students are required to take the following courses:

- B A 850. Sustainability Driven Innovation (3 cr.)
- EME 803. Applied Energy Policy (3 cr.)
- EME 805. Renewable Energy and Nonmarket Enterprise (3 cr.)
- EME 807. Technologies for Sustainability Systems (3 cr.)

Wind Energy Option *(9 cr.)*
Option Leader: George Lesieutre
Department Head, Department of Aerospace Engineering
College of Engineering
229 Hammond Building
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814-863-0103
g-lesieutre@psu.edu

The Wind Energy Option will produce graduates who have broad understanding of the wind farm development process, as well as technical depth in turbine technology and the science of properly siting wind turbines. Graduates will be able to: model wind project performance; balance the complexities of permitting, logistics, and the ecological impacts of wind project development; and conduct turbine load and acoustic analyses. They will also understand the limitations of models and will be equipped as leaders for producing advancement in the industry.

NOTE: A background in incompressible fluid mechanics, statics, and dynamics is highly recommended for students interested in this option. Students may contact the Option Leader for more information.
Students are required to take the following courses:

- AERSP 583. Wind Turbine Aerodynamics (3 cr.)
- AERSP 880. Wind Turbine Systems (3 cr.)
- AERSP 886. Engineering of Wind Project Development (3 cr.)

Substitutions

Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis, and must be petitioned and approved by the Academic Program Chair, with input from the student's adviser.

Student Aid

Financial aid opportunities for part-time students who participate through the World Campus are discussed at http://worldcampus.psu.edu/StudentServices_Paying.shtml

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 41-07-006

Review Date: 06/11/2013

Recreation, Park, and Tourism Management (RPTM)

Program Home Page

PETER NEWMAN, *Department Head, Recreation, Park, and Tourism Management*

DEBORAH KERSTETTER, *Professor-in-Charge*
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Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

The graduate program is designed to prepare students for administrative, supervisory, research, and teaching positions in public and private recreation and park systems, in colleges and universities, in voluntary agencies and institutions, and in commercial ventures.

The program is oriented to meet the specific needs and research interests of the candidate. Students may pursue interests in the community, including public park and recreation systems, voluntary agencies, and private commercial enterprises; tourism; institution and community-oriented therapeutic settings concerned with many different disabilities and utilizing a variety of activity modalities; park planning, resource management, interpretive services, outdoor education, and outdoor recreation services.

Admission Requirements

Scores from the Graduate Record Examination (GRE) are required for admission to the master's and doctoral programs. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

For admission to the graduate program, a bachelor's or master's degree is required. Candidates from majors other than recreation and parks are welcome to apply; however, additional course work is required. Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. All students must write a thesis.

Degree Requirements

The master's program is designed for students who wish to continue their studies at the doctoral level at Penn State. Students who wish to pursue a Ph.D. degree but do not have an M.S. degree will complete a thesis and earn a master's degree in the process of working toward the doctorate.

The M.S. program requires a minimum of 30 graduate credits and a 3.00 (B) grade-point average for graduation. The master's degree must be completed within eight years from matriculation as a degree candidate.

The doctoral program builds on the master's program to achieve depth in scholarship and research. Students who have not completed a data-based thesis as part of their master's degree will be required to do so during the first three semesters as a doctoral student. The general requirements of the degree, sequentially, are (1) course work, (2) candidacy examination by the third semester,* (3) comprehensive examination (written and oral), (4) thesis proposal presentation, and (5) final defense of thesis. Between the candidacy examination and completion of the degree program, a Ph.D. candidate must have attended Penn State in residence a minimum of two semesters over a twelve-month period. (This may include the semester in which the candidacy exam is taken.) Students have a limit of eight years after candidacy to complete the doctoral program. A 3.00 (B) average is required for graduation.

Prerequisites for graduate students who do not have an undergraduate degree in RPTM typically range from 3 to 9 credits, depending on the student's background and experience. Prerequisites for incoming graduate students with undergraduate majors in RPTM range from 0 to 6 credits. Incoming graduate students with undergraduate degrees in Recreation, Park, and Tourism Management from Penn State are assumed to have met all prerequisite requirements. The graduate program director determines prerequisites for all incoming students.

*The master's thesis and oral defense may be used for the candidacy examination for continuing students.

Student Aid

Fellowships, traineeships, graduate assistantships, and other forms of financial aid are described in the STUDENT AID section of the *Graduate Bulletin.*

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

RECREATION, PARK, AND TOURISM MANAGEMENT (RPTM) course list

DATE LAST REVIEWED BY THE GRADUATE SCHOOL: 5/21/04

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-07-448

Review Date: 6/12/07

Faculty linked: 6/27/14

Russian and Comparative Literature

THOMAS O. BEEBEE, *Department Head, Germanic and Slavic Languages and Literatures*
442 Burrowes Building
814-863-5481

ROBERT R. EDWARDS, *Department Head, Comparative Literature*
442 Burrowes Building
814-863-0589

Degree Conferred:

M.A. in Russian and Comparative Literature

The Graduate Faculty

The Program

The Department of Germanic and Slavic Languages and Literatures and the Department of Comparative Literature offer a joint master's degree in Russian and Comparative Literature. The program enables students to concentrate in Russian literature at the graduate level while having the advantages of a comparative context. Students completing this M.A. will acquire an in-depth understanding of Russian literature and culture and will be proficient in Russian and one other foreign language. This program prepares students for further graduate study in Russian, Slavic, or comparative literature, for service with the U.S. or other government, or for employment with an international corporation.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Students with appropriate course backgrounds and a 3.00 junior/senior average (on a 4.00 scale) will be considered for admission. Scores from the Graduate Record Examination (GRE) are required. It is expected that students entering this degree program will have proficiency in the Russian language and will have completed a B.A. in Russian or Comparative Literature. Students in other humanistic fields such as philosophy or history who have studied some literature and are proficient in Russian are welcome to apply.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Candidates for the M.A. degree must earn a minimum of 33 credits at the 400, 500, or 800 level of which at least 18 must be at the 500 level. There are 30 credits required in the following: CMLIT 501 (3 credits), RUS 405 (3 credits), an additional 12 credits in Comparative Literature courses, and an additional 12 credits in Russian at the 400 or 500 level. Also required are: an additional 3 credits in Russian, Comparative Literature, or another approved area; passing a proficiency examination in Russian; demonstration of at least reading knowledge of one other foreign language; and the completion of an acceptable M.A. scholarly paper.

Student Aid

A number of teaching assistantships are available in the Departments of Comparative Literature and Germanic and Slavic Languages and Literatures for students taking advanced degrees in these disciplines. There is also a graduate assistant position for an editorial assistant. See also the fellowships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Spring 2018

Blue Sheet Item #: 46-05-000

Review Date: 2/20/2018

Faculty linked: 7/11/14

Department heads updated: 4/13/16

School Psychology (S PSY)

Program Home Page

BARBARA SCHAEFER, *Professor-in-Charge of Graduate Programs*
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Degrees Conferred:

Ph.D., M.S., M.Ed.

The Graduate Faculty

The Program

This intercollege program is based primarily on courses in educational psychology, psychology, and special education. In addition, courses are often drawn from counselor education, human development and family studies, educational theory and policy, educational administration, and curriculum and instruction. The objective is to develop a psychologist capable of providing health care who is interested in and knowledgeable about education and psychology in the school setting. The school psychologist must utilize professional skill and knowledge about children and youth to make contributions that are meaningful to and utilized by teachers, other school personnel, and parents. The development of competencies needed by a fully qualified school psychologist requires at least the education represented by a doctoral degree.

Practicum facilities, in addition to those in nearby public schools, include the Center for Educational Diagnosis and Remediation, the School Psychology Clinic, the Communication Disorders Clinic, the Reading Center, and the Psychology Clinic. Facilities for work with children are also available through other academic units, as well as through assistantship assignments.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Only those students who anticipate a doctoral degree will be admitted. Students are selected within the limitations of program facilities. Priority is given to applicants with work experience with children.

An undergraduate major emphasizing work in psychology and/or education is preferred, but students with fewer than 20 upper-division credits in psychology, educational psychology, or special education may be admitted with limited deficiencies to be fulfilled concurrently with their graduate work. Requirements for admission include a minimum of one-third of graduate credits of A quality; undergraduate GPA of B or higher; satisfactory recommendations from two or more professors, preferably psychologists; and a score of 1000 or higher on the two general sections or a score of 1500 or higher, including the analytical or an advanced test, of the Graduate Record Examination. Exceptions may be made for students with special backgrounds, abilities, and interests.

Master's Degree Requirements

Students entering the program with a bachelor's degree complete the M.S. as prescribed by the Graduate School.

Students qualifying for a certificate to practice in the schools must meet standards specified by the Pennsylvania Department of Education. These include, but are not limited to, a master's degree, about 60 graduate credits, practicum experiences, and successful completion of precertification tests.

Doctoral Degree Requirements

Students may be admitted with a master's degree from school psychology programs from other institutions or from related programs in this or other universities. The doctoral program includes a predissertation research requirement; the core program described here (which qualifies the candidate for a school psychology certificate); a special proficiency of 6 to 18 credits; an internship; and a dissertation.

Students completing the School Psychology Core Program will have courses in the biological bases of behavior, the cognitive bases of behavior, the social bases of behavior, personality theory or abnormal psychology, human development, professional ethics and standards, research design and methodology, statistics, psychometrics, counseling theory, educational foundations, educational administration, the education of exceptional children, and curriculum.

Other Relevant Information

The program has been accredited by the American Psychological Association, the National Commission for Accreditation in Teacher Education (NASP), and the Pennsylvania Department of Education.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

SCHOOL PSYCHOLOGY (S PSY) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 4/12/04

Faculty linked: 6/27/14

Supply Chain Management (SCM)

Department of Supply Chain and Information Systems, via Penn State Online

Program Home Page

NICHOLAS C. PETRUZZI, *Chair*
Department of Supply Chain and Information Systems
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DAVID HUFF, *Director of Online Graduate Programs in Supply Chain Management*
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Degrees Conferred:

M.P.S.

The Graduate Faculty – MPS Programs

The Master of Professional Studies in Supply Chain Management (MPS/SCM) is awarded to students who demonstrate mastery of the knowledge, problem-solving competencies, and leadership skills that are critical to leading business transformation through integrated supply chain planning and execution. The program emphasizes problem-based learning coupled with integrative, collaborative learning experiences to develop the requisite knowledge, skills, and abilities for effective supply chain management. Instruction is delivered online and in a short residency course at an on- or off-campus location, so that working professionals can complete the degree as part-time students working largely or entirely, off campus.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Students applying to the professional MPS/SCM degree program must be admitted by both the MPS/SCM program and the Graduate School at The Pennsylvania State University.

Admission to the graduate program in Supply Chain Management requires:

- A completed application for graduate study, including Graduate School application fee
- A current resume, along with a statement of professional experience and goals. This statement of approximately two pages must describe the applicant's professional goals, experience, and responsibilities. The statement must also indicate why the applicant is applying to the professional MPS/SCM program at Penn State
- One letter of recommendation relevant to the applicant's professional capabilities, preferably from the employee's immediate supervisor, which should address the applicant's readiness for graduate study
- Official transcripts from all post-secondary institutions attended
- An undergraduate GPA of at least 3.0 on a 4.0 scale, or grade average of "B" or better in graduate courses completed since the first bachelor's degree, with at least 6 credits of graduate courses completed to qualify under this option. Applicants with an undergraduate GPA below 3.0 may be admitted in limited circumstances at the discretion of the program, where the applicant demonstrates an exceptional record of professional achievement. In such circumstances, the program may require, as a condition of admission, completion of course work to make up deficiencies or fill in gaps in prior education.
- Official Graduate Management Admission Test scores reported directly from the testing center to Penn State

A committee of SC&IS Department faculty meet periodically to review applications and identify applicants qualified for admission. Admissions decisions are based on a review of a complete admission portfolio, including the application, the statement of professional experience and goals, the current resume, official transcripts from all post-secondary institutions attended, the letter of recommendation, and the GMAT scores.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Students earn the professional MPS/SCM degree by successfully completing a minimum of 30 credits including 26 credits of required courses and 4 credits of approved electives. The required courses are: SCM 530(3), SCM 800(4), SCM 801(1), SCM 812(2), SCM 822(2), SCM 842(2), SCM 850(4), SCM 860(4), B A 803(1), and the capstone course SCM 594(3). Elective credits will be chosen from a list of approved courses maintained by the program office.

Students must complete a high-quality research project as the culminating experience for the degree, while enrolled in the capstone course SCM 594(3). The research project demonstrates the student's ability to apply advanced supply chain management knowledge to a supply chain-related problem or situation in a way that makes a substantial contribution to the student's professional development.

The program requires a cumulative grade point average of at least 3.00 and no course grade below a C. All requirements for the professional MPS/SCM degree, including acceptance of the research project must be met within eight years of admission to degree status. Students are expected to make continuous progress toward the degree. Leaves of absence, however, may be granted under exceptional circumstances on a case-by-case basis, at the discretion of the program.

Penn State allows a maximum of 10 transfer credits of high-quality graduate work to be applied toward the requirements for a graduate degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin*.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

SUPPLY CHAIN MANAGEMENT (SCM) course list

Last Revised by the Department: Fall Semester 2016

Blue Sheet Item #: 45-01-000

Review Date: 8/23/16

865-1655

Sociology (SOC)

Program Home Page

JOHN ICELAND, *Head of the Department of Sociology, and Crime, Law, and Justice*
211 Oswald Tower
814-863-8260

Degrees Conferred:

M.A., Ph.D.
Dual-Title M.A. and Ph.D. in Sociology and Demography
Dual-Title Ph.D. in Sociology and Social Data Analytics

The Graduate Faculty

The Program

The graduate program in Sociology offers advanced education for students who intend to pursue academic careers in sociology or who aspire to nonacademic research positions.

The M.A. and Ph.D. programs provide training in general social theory, research methodology, statistics, and a number of traditional and developing substantive specialties. In consultation with faculty advisers, students select two specialties that are among the department's strengths, such as demography (including health and immigration); family, life course, and aging; criminology; stratification and inequality; sociology of education; urban and community studies; or quantitative methods.

Alternate specialty areas not listed above may be selected as the major or the minor, with the approval of the Graduate Director and the student's doctoral committee. Students may elect to pursue a dual-title M.A. and Ph.D. in Sociology and Demography, or a dual-title Ph.D. in Sociology and Social Data Analytics. A separate Ph.D. program in Criminology is also housed within the department.

All students who intend to pursue doctoral work are expected to earn (or have earned) an M.A. degree in their normal progress to the Ph.D.

Course work outside the department is encouraged. Areas of study related to sociology, such as rural sociology, geography, economics, business administration, statistics, cultural anthropology, political science, labor and employment relations, women's studies, social thought, biobehavioral health, and human development and family studies are available at the University.

Special department-related research and training facilities include on-site computer laboratories and the Social Science Research Center, the Population Research Institute, the Center for Research on Crime and Justice, and the Pennsylvania Commission on Sentencing. Additional University facilities used by sociology faculty and graduate students include the Computation Center (containing information about the extensive databases provided through the Inter-University Consortium for Political and Social Research) and the Center on Healthy Aging.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Applications will be accepted through January 1 for fall admission the following year. Selection is based on undergraduate grades (and where applicable, record of previous graduate work); letters of recommendation; statement of purpose; areas of interest, and career goals; a sample of written work, such as a term paper; and Graduate Record Examinations (GRE) verbal, quantitative, and writing scores. International applicants are required to submit English proficiency test scores, unless they are from one of the countries listed as exempt in the Graduate Bulletin. English proficiency test scores must meet or exceed the minimum acceptable scores listed in the Bulletin. The best-qualified applicants will be accepted up to the number of spaces available. Students with limited prior training in sociology may be accepted, with the provision that they make up background deficiencies in the early part of their graduate program in consultation with and under the supervision of the Graduate Director. Acceptance into or continuation in the program is contingent on successful performance in these areas.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Masters of Arts Degree (M.A.) in Sociology

Required courses for the M.A. are designed to enhance students' knowledge of substantive specialty areas in sociology, social theory, sociological research methods, and statistics and include:

One seminar in classical or contemporary social theory, chosen from among the following:
Sociology 502 - Theories of Society I
Sociology 503 - Theories of Society II

Three required methods and statistics courses and associated computer labs:
Sociology 513 - Sociological Research Methods
Sociology 574 - Statistical Methods for Social Research
Sociology 575 - Statistical Models for Non-experimental Research
Sociology 596 – Statistical Laboratory (to accompany SOC 574 and SOC 575)

Sociology 500 – Introduction to Graduate School in Sociology (1 credit)
Sociology 600 – MA Thesis (6 credits)
Students are also required to complete six elective graduate seminars, one of which must be a 500-level substantive seminar in Criminology, and two of which may be outside the department.

Sociology department seminars in research methods and statistics assume a background gained through some combination of undergraduate course work and individual study. Students who are not confident of their basic statistical training may find it useful to pursue foundational training at Penn State or elsewhere prior to enrollment in SOC 574.

For the M.A. in Sociology at Penn State, 38 course credits are required, no more than three of which may be for Individual Studies (SOC 596). The Graduate School specifies that students holding twenty-hour-per-week assistantships must carry 9 to 12 course credits per semester. Students receiving Fellowships are expected to enroll for 12 course credits per semester. A minimum grade-point average of 3.00 for work done at Penn State is required for graduation.

Students must either complete an M.A. thesis by the end of their second year in the program or enter the program with an M.A. degree.

Doctoral Degree (Ph.D.) in Sociology

Candidacy Exam
A candidacy examination is required of all students seeking the Ph.D. This evaluation by the departmental Graduate Committee is based on the student's

seminar papers, their proposed dissertation research and record of course performance, and faculty assessments of the student's ability to complete a high-quality Ph.D. program. The candidacy occurs after the M.A. degree has been completed.

The Doctoral Committee
The candidate's Ph.D. studies are conducted under the supervision of a doctoral committee. The doctoral committee must comply with the Graduate Council doctoral committee requirements. The committee must include faculty members having recognized expertise in the major and minor areas of specialization selected by the student, as well as expertise in general social theory, research methods, and statistics. One faculty member is designated chair of the doctoral committee; ordinarily this person also serves as general advisor and director of the dissertation. Students are strongly encouraged to choose a committee chair as early as possible. The student's chair can be of great help in selecting other committee members, especially members outside of the sociology department.

Students must identify and convene their doctoral committee no later than one semester following their candidacy examination. The doctoral committee supervises the Ph.D. candidate's course of study, comprehensive examination, and dissertation. This includes approval of proposed course work to meet requirements for the major and minor areas of specialty.

All Ph.D. candidates must have completed all courses required for the M.A. degree in Sociology at Penn State, or their equivalent. These include: SOC 500 (Intro to Graduate Studies in Sociology); SOC 574 (Statistical Methods for Social Research); SOC 575 (Statistical Models for Non-experimental Research); SOC 513 (Sociological Research Methods); one seminar in social theory, chosen from SOC 502 (Theories of Society I) or SOC 503 (Theories of Society II). All Ph.D. candidates are also required to complete a one-credit Lab in Teaching Sociology (SOC 591). The lab in teaching sociology cannot serve to meet other Ph.D. requirements to be described subsequently, such as the requirement for a minimum number of seminars in Sociology.

Major and Minor Areas of Specialization
In addition to the specific requirements common to all Ph.D. candidates, students must complete courses in which they acquire competence in a major and a minor area of specialization. The major and minor should be chosen by the student in consultation with the doctoral committee. A record of the chosen areas must be filed with and approved by the graduate officer. The major area may be selected from the department's primary Ph.D. program strengths: 1) demography (including health and immigration), 2) family, life course, and aging, 3) criminology, 4) stratification and inequality, 5) sociology of education, 6) urban and community studies, and 7) quantitative methods. Alternatively, students may develop their own customized areas that have included in recent years (but are not restricted to): race and ethnicity, social theory, sociology of organizations, sociology of religion, and collective behavior and social movements. Each student, no matter their choice of specialty areas, in consultation with the doctoral committee develops a program of course work necessary for preparation of the major and minor areas.

At least 12 credits of course work are associated with the major area of specialization. Course work is subject to the following constraints: 1) at least three courses must be listed in the sociology department; 2) at least two courses must be in formal 500-level seminars; 3) no more than one course may be in Individual Studies (Sociology 596).

The minor area of specialization is developed in the same manner, in consultation with the doctoral committee and with the approval of the Graduate Officer and the graduate committee. Students are required to take at least 9 credits of course work in the area selected as their minor. Earlier-named specific course requirements, such as seminars in statistics, research methods, and theory, cannot be used to meet the nine-credit minimum for the minor area. The minor course requirements also are subject to the following constraints: 1) at least two courses must be in sociology; 2) at least one course must be in 500-level seminars. One course may be double-counted in the major and minor areas.

Comprehensive Examination
After completing all course work and before the period of intensive dissertation research begins, doctoral candidates must pass a comprehensive examination that includes written and oral components. Written components will be administered in a candidate's major and minor areas of concentration. Members of the doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The oral component of the comprehensive involves the defense of a dissertation prospectus.

Dissertation and Dissertation Defense
To earn the Ph.D. degree, doctoral students must also write a dissertation that contains original research and reflects their education in sociology. Upon completion of the doctoral dissertation, the candidate also must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

The Department of Sociology has no formal foreign language or communication requirement. However, students are encouraged to pursue additional training in statistics, computer science, foreign language, technical writing, specialized methods, or specialized theory that will further dissertation and career plans.

Dual-Title Doctoral Degree in Sociology and Demography

A special dual-title M.A. program is offered in Sociology and Demography. Details can be obtained from the Sociology graduate officer or director of the graduate program in Demography. Information is also available at http://www.pop.psu.edu/demography.

Admission Requirements
Students must apply and be admitted to the graduate program in Sociology and the Graduate School before they can be admitted to a dual-title degree program. Applicants interested in the dual-title degree program may note their interest in their applications to Sociology and include remarks in their personal statements, in which they address the ways in which their research and professional goals in sociology reflect related interests in Demographic research. Students admitted to the Sociology program will be admitted to the dual-title program in Demography upon the recommendation of a Demography Program faculty member in Sociology. Students must apply and be admitted to the dual-title degree program in Demography prior to taking the candidacy exam.

Degree Requirements

Course Work
Dual-title M.A. students must complete four courses in demography, one in each of the following pedagogic categories: 1) Demography Survey Course (if a population survey course was not completed as an undergraduate), 2) Demographic Methods Course, 2) Seminar in Demographic Processes, and 4) Population Studies Seminar. Multiple courses are offered in each of these categories each year, and many of the courses can be taken within the sociology department and counted toward sociology degree requirements. Dual-title M.A. students must write a thesis on a topic that draws on research questions and literature from both sociology and demography.

Students pursuing the dual-title Ph.D. in Sociology and Demography select demography as their major area of specialization. However, dual-title students must complete a total of 24 course credits (12 credits, or 4 courses, at the M.A. plus 12 additional credits distributed among pedagogic categories) in demography. Some of these courses must be completed in disciplines outside the Department of Sociology. All demography courses taken within the sociology department can count toward both the sociology and demography degrees.

Candidacy Committee and Exam
The candidacy examination committee will be composed in accordance with rules of the Sociology Ph.D. and will include an evaluation of at least one graduate faculty member from the Demography Program. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.
The dual-title degree will be guided by the Candidacy Exam procedure of the Sociology graduate program. The candidacy exam for the dual-title degree will occur as soon as possible after completion of the M.A. requirements. There will be a single candidacy examination to assess whether the student should be admitted into Ph.D. candidacy in both Sociology and Demography. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition
The doctoral committee must conform to all requirements of the primary program and the Graduate Council. The doctoral committee of a Sociology and Demography dual-title doctoral degree student must include at least four members of the graduate faculty, two of whom must be members of the Demography graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. If the chair of the committee representing Sociology is not also a member of the graduate faculty in Demography, one member of the committee representing Demography must be appointed as co-chair.

Comprehensive Exam
After completing all course work, doctoral candidates for the dual-title doctoral degree in Sociology and Demography must pass a comprehensive examination that includes written and oral components. Written components will be administered in a candidate's major sociology area of concentration in Demography and the chosen minor area. The Demography representative(s) on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. The oral component of the comprehensive involves the defense of a dissertation prospectus, which must contain substantial Demographic content.

Dissertation and Dissertation Defense
Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Sociology and Demography. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Doctoral Degree in Sociology and Social Data Analytics

Sociology doctoral students seeking to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with sociology, may apply to pursue a dual-title Ph.D. in Sociology and Social Data Analytics.

Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. program provides additional training with the aim of providing scientists with the skills required to expand the field of social data analytics, creatively to answer important social scientific questions, and communicate effectively with both academic and nonacademic audiences.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.
Students must apply and be admitted to the graduate program in Sociology and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may note their interest in the program on their applications to Sociology and include remarks in their personal statements, in which they address the ways in which their research and professional goals in sociology reflect related interests in Social Data Analytics-related research.

To apply to the dual-title doctoral Ph.D. in Sociology and Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Program. An applicant must have a minimum grade-point average of 3.0 (on a 4.0 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title Ph.D. in Social Data Analytics prior to obtaining candidacy in Sociology.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D. in Sociology. In addition, they must satisfy the requirements described below, as established by the Social Data Analytics Committee. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department adviser and Social Data Analytics.

Course Work

The minimum course work requirements for the dual-title Ph.D. in Sociology and Social Data Analytics are as follows:

- Course work and other requirements of the Ph.D. in Sociology.
- SODA 501 (3 credits)
- SODA 502 (3 credits)
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  - (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives. *(A Sociology Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Sociology Ph.D.)*
  - (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.
  - (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives.*(A Sociology Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Sociology Ph.D.)*
  - Cross-departmental distribution.
    - 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department. *(A Sociology. student would typically satisfy this distribution requirement as a function of completing the requirements of the Sociology Ph.D.)*
    - 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.
    - 6 or more credits in approved courses outside Sociology.
    - 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SO DA electives that also meet requirements of the primary program. In particular, the 12 elective credits can be met with as few as 6 credits of appropriately chosen course work. Within this framework, final course selection is determined by the student in consultation with academic advisers from Sociology and Social Data Analytics. There is no formal maximum number of credits from the primary SOC degree that can be double-counted toward the SO DA degree. For those meeting the SO DA elective requirement with the minimum of 12 credits, the outside-program minimum effectively limits the number of primary degree SOC credits that count toward SO DA at 6. Doctoral committees may limit the number of credits taken for the SO DA degree that can count toward home degree requirements.

Candidacy Committee and Exam

The candidacy examination committee will be composed in accordance with rules of the Sociology Ph.D. and will include an evaluation of at least one graduate faculty member from the Social Data Analytics Program. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.

The dual-title degree will be guided by the Candidacy Exam procedure of the Sociology graduate program. The candidacy exam for the dual-title degree will occur as soon as possible after completion of the M.A. requirements. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, with permission of the graduate officer, the candidacy examination of dual-title degree students may be delayed one semester beyond the normal period allowable. There will be a single candidacy examination to assess whether the student should be admitted into Ph.D. candidacy in both Sociology and Social Data Analytics.

Doctoral Committee Composition

The doctoral committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council policy, the doctoral committee of a Sociology and Social Data Analytics dual-title doctoral degree student must include at least one member of the Social Data Analytics graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role. If the chair of the committee

representing Sociology is not also a member of the graduate faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Sociology and Social Data Analytics must pass a comprehensive examination that includes written and oral components.

Written components will be administered in a candidate's major sociology area of concentration and Social Data Analytics (acting as the minor area). The Social Data Analytics representative(s) on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

The oral component of the comprehensive involves the defense of a dissertation prospectus, which must contain substantial Social Data Analytics content.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Sociology and Social Data Analytics. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the Graduate Bulletin, teaching assistantships support many students admitted to the program. Research assistantships also are available to qualified students through individual faculty members' grants and contracts. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*. A number of federal agencies also offer fellowships for graduate study in sociology.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

SOCIOLOGY (SOC) course list

Blue Sheet Item #: 44-07

Review Date: 6/28/2016

Faculty linked: 6/27/14

Social Data Analytics

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Degrees Conferred

Students electing this degree program through participating programs earn a degree with a dual title at the Ph.D. level, i.e., in (**graduate program name**) and Social Data Analytics.

The following graduate programs offer a dual degree in Social Data Analytics: Ph.D in **Human Development and Family Studies** and Social Data Analytics; Ph.D. in **Political Science** and Social Data Analytics; Ph.D. in **Sociology** and Social Data Analytics; Ph.D. in **Statistics** and Social Data Analytics

The Graduate Faculty

The Program

The Social Data Analytics dual-title degree program is administered by the Social Data Analytics Committee, which is responsible for the management of the program. The committee maintains program definition, identifies faculty and courses appropriate to the program, and recommends policy and procedures for its operation to the Dean of the Graduate School. The program enables students from diverse graduate programs to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with a home discipline. Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. To pursue a dual-title degree under this program the student must apply to the Graduate School and register through one of the approved graduate programs.

Admission Requirements

Students must apply and be admitted to the graduate program in their home department and The Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known on their applications to the major programs and include remarks in their statement of purpose that address the ways in which their research and professional goals in their chosen home field reflect an expanded interest in Social Data Analytics.

To be enrolled in the Dual Title Doctoral Degree Program in Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Admissions Committee. An applicant must have a minimum grade point average of 3.0 (on a 4 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title degree program in Social Data Analytics prior to obtaining candidacy in their home department.

General Graduate Council admissions requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

To qualify for the dual-title degree, students must satisfy the requirements of their major doctoral program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Social Data Analytics Committee.

The minimum course work requirements for the dual-title Ph.D. degree in Social Data Analytics are as follows:

- Course work and other requirements of the primary program.
- SODA 501 (3 credits)
- SODA 502 (3 credits)
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  - (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives.
  - (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.
  - (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives.
  - Cross-departmental distribution.
    - 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department.
    - 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.
    - 6 or more credits in approved courses outside the primary program.
    - 3 or fewer credits in approved courses at the 400-level.

Students or faculty may request that the Social Data Analytics Committee consider approval of elective designations for any course, including temporary approvals for experimental or variable-title courses. Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SoDA electives that also meet requirements of the primary program. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department and Social Data Analytics.

The Social Data Analytics Program maintains a list of background and skills that it recommends students have in place by the time they begin the interdisciplinary coursework required to complete the Social Data Analytics degree.

Candidacy Committee Composition

The candidacy committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council, the candidacy committee must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

Candidacy Exam

The dual-title degree will be guided by the Candidacy Exam procedure of the primary program and the Graduate Council. In accordance with Graduate Council, there will be a single candidacy examination, assessing candidacy for both primary program and the dual-title program. Because students must first

be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyondthe normal period allowable.

Doctoral Committee Composition

The doctoral committee must conform to all requirements of the primary program and the Graduate Council. In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Social Data Analytics dual-title doctoral degree student must include at least one member of the Social Data Analytics Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair.

Comprehensive Exam

The dual-title degree will be guided by the Comprehensive Exam procedure of the primary program. After completion of required course work, doctoral candidates for the dual-title doctoral degree must pass a comprehensive examination. In programs where this includes evaluation of a written exam, the Social Data Analytics representative on the student's doctoral committee will participate in the writing and evaluation of the exam, in accordance with procedures maintained by the primary program. In programs where the comprehensive exam involves defense of a dissertation prospectus, the Social Data Analytics representative on the student's doctoral committee will participate in the evaluation of the prospectus, including ensuring the proposed dissertation has substantial Social Data Analytics content.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in their home discipline and Social Data Analytics. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Social Data Analytics Doctoral Minor

Doctoral students may take a doctoral minor in Social Data Analytics. This is the appropriate option for doctoral students in programs that have not adopted the dual-title Ph.D. degree in Social Data Analytics, and for students otherwise pursuing an incompatible degree program, such as another dual-title.

As with all graduate minors, a student seeking a minor must have the approval of the student's major program of study, the Social Data Analytics program, and the Graduate School, and official requests to add a minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishing the doctoral committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from Social Data Analytics must serve on the candidate's doctoral committee.

The doctoral minor in Social Data Analytics requires at least 15 credits in approved courses, with at least 6 at the 500 level, and a minimum of 9 elective credits from a list of approved electives maintained by the Social Data Analytics program. Additional deviations from distribution minimums and maximums may be allowed, but must be approved by the Social Data Analytics program.

Last Revised by the Department: Spring Semester 2017

Blue Sheet Item #: 45-06

Review Date: 4/4/2017

Soil Science (SOILS)

Program Home Page

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Degrees Conferred:

Ph.D., M.S. Soil Science
Dual-Title Ph.D. (Soil Science and Biogeochemistry)
Dual-Title Ph.D. (Soil Science and International Agriculture and Development)
Dual-Title M.S. (Soil Science and International Agriculture and Development)

The Graduate Faculty

The Soil Science program is administered in the Department of Ecosystem Science and Management, College of Agricultural Sciences. Each student will be associated with an adviser who may provide financial support, research facilities, and/or office space. Applicants are encouraged to explore, study, and research opportunities in the Department by contacting faculty.

This program provides opportunities for candidates interested in soil and related water resources to become a professional leader and an independent scholar. Faculty in this program are competent to prepare candidates in the subfields of Soil Science including: soil genesis, soil classification, soil morphology, soil mapping, soil physics, soil biogeochemistry, soil mineralogy, soil microbiology, soil fertility, soil conservation, geographic information systems, computer mapping, watershed analysis, soil hydrology, soil and water management, resource inventory and assessment, remote sensing, land evaluation, land waste disposal, and land management.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission.

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination, are required for admission. At the discretion of the Graduate Programs Committee, a student may be admitted for graduate study in the program without these scores.

Prerequisites for major work in Soil Science vary with the area of specialization and the degree sought, but courses in chemistry, mathematics, physics, geology, and basic and applied biological sciences are required.

Applicants for the M.S. degree must have a baccalaureate degree including 76 credits of basic and applied natural sciences. Admission to the Ph.D. program usually requires an M.S. or equivalent degree with a minimum cumulative grade-point average of 3.25 (on a 4.00 scale). Applicants for the Ph.D. program will be evaluated on the quality of work completed in all previous degree programs. Students who lack some of the prerequisite courses may be admitted at the discretion of the faculty member who will serve as the student's adviser. The best-qualified applicants will be accepted up to the number of spaces available for new students. Generally students are not admitted into the program without a faculty member agreeing to serve as the adviser. Credits for prerequisite courses cannot be applied towards requirements for the degree.

Master's Degree Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

A minimum of 30 credits at the 400, 500, 600, or 800 level is required, with least 18 credits at the 500 and 600 level, combined. The department requires 12 credits of 400- or 500-level formal courses in Soil Science of which 6 must be 500-level, and 6 credits of 400- or 500-level courses in a minor or general studies area. A total of 6 credits, with at least 3 credits at the 500 level, must be taken in statistics. Participation in at least one colloquium course each semester is expected and students must complete at least 1 credit of colloquium (SOILS 590). In addition, M.S. students are required to complete 1 credit of Supervised Experience in College Teaching (SOILS 602); however, this 1 credit cannot be counted towards the degree requirements. Specific courses and requirements will be determined by the faculty adviser and advisory committee.

A thesis based on field or laboratory research is required for the M.S. degree and at least 6 credits in thesis research (600 or 610) must be taken in conjunction with completing the thesis. The thesis must be accepted by the advisers and/or committee members, the head of the graduate program, and the Graduate School, and the student must pass a thesis defense.

Doctoral Degree Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

While a minimum number of courses for the degree is not specified, the doctoral committee has the responsibility of specifying courses and credits essential for the education and development of the candidate. Students are expected to be educated in depth in a specific subfield of Soil Science and to have a perspective of the general field. Normally, students will have 50 to 60 credits in formal course work beyond the B.S. degree. A minimum of 12 credits of 500-level courses beyond the baccalaureate degree are required. Additional requirements include a minimum of 15 credits of 400- or 500-level courses in a minor or general studies area, 6 credits of statistical methods beyond the baccalaureate degree, of which a minimum of 3 will be at the 500 level, and 12 credits of 600 or 610 (thesis research).

Doctoral candidates are required to participate regularly in a departmental colloquium and to register for at least 1 credit of Colloquium (SOILS 590) during the Ph.D. program. Ph.D. students are required to complete two separate semesters of Supervised Experience in College Teaching (SOILS 602) for 2 credits total; however, these 2 credits cannot be counted towards the degree requirements. Doctoral students must pass a candidacy examination, a comprehensive written and oral examination, and a final oral examination (the dissertation defense). To earn the Ph.D. degree, doctoral students must also write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Ph.D. Degree in Soil Science (SOILS) and Biogeochemistry (BGC)

Doctoral students with research and educational experiences in soil science may apply to the Soil Science/Biogeochemistry Dual-Title Doctoral Degree Program. The goal of the dual-title Ph.D. degree in Soil Science and Biogeochemistry is to enable SOILS graduate students to acquire the knowledge and skills of their major area of specialization in SOILS, while at the same time gaining expertise and skills in biogeochemistry. Graduate study in this program seeks to provide students with the intellectual foundation for integrated and mechanistic understanding of interactions between microbes, soils, and plants in diverse environmental systems. Interdisciplinary training that includes biogeochemistry will prepare students for positions in academia, government, non-profit organizations, and the private sector. It will also prepare students for a wide array of research careers in the private sector, including agricultural and environmental sciences, energy industries, and the integrated study of the sustainability of biological systems.

Admission Requirements

For admission to the dual-title doctoral degree in Biogeochemistry, a student must first apply and be admitted to the Soil Science graduate program and The Graduate School. It is preferable but not necessary to discuss the dual-title interest beforehand with a major adviser who has been appointed to the Biogeochemistry program. Refer to the Admission Requirements section of the Biogeochemistry Bulletin page. After admission to the Soil Science program, students must apply for admission to the Biogeochemistry dual-title program by submitting an application to the Biogeochemistry Graduate Program

Coordinator. The application consists of a written personal statement describing the student's biogeochemistry research interests and career goals that can be met by earning a dual-title SOILS/BGC degree. The statement should be signed by the student's major advisor in support of the student's taking on the academic responsibilities of the dual title degree. The application will be reviewed by the BGC Program Coordinator, in consultation with the BGC Executive Committee, who will make the admission decision and notify the Graduate School. Students must be admitted into the BGC program prior to the candidacy exam.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the Soil Science Ph.D. degree requirements, listed above. In addition, students pursuing the dual-title Ph.D. in Soil Science and Biogeochemistry must complete the degree requirements for the dual-title Biogeochemistry Ph.D., listed on the Biogeochemistry Bulletin page. Students are required to have two advisers from separate disciplines: one individual serving as a primary adviser in their major degree program and a secondary adviser in an area within a field covered by the dual-title program who is a member of the Biogeochemistry graduate faculty. The major program adviser normally will also be a member of the Biogeochemistry graduate faculty. The two faculty advisers can represent different academic programs, but this is not required, as faculty from a scientifically diverse department could represent very different areas of expertise.

The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Soil Science and must include at least one Graduate Faculty member from the Biogeochemistry program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. There will be a single candidacy examination, containing elements of both Soil Science and Biogeochemistry. Dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Soil Science and Biogeochemistry dual-title doctoral degree student must include at least one member of the Biogeochemistry Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in Biogeochemistry, the member of the committee representing Biogeochemistry must be appointed as co-chair. The Biogeochemistry representative on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination.

Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Soil Science and Biogeochemistry. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Graduate Degree in Soil Science (SOILS) and International Agriculture and Development (INTAD)

Graduate students with research and educational interests in international education may apply to the Soil Science/INTAD Dual-Title Degree Program. The goal of the dual-title degree Soil Science and INTAD graduate program is to enable graduate students from Soil Science to acquire the knowledge and skills of their primary area of specialization in Soil Science, while at the same time gaining the perspective and methods needed for work in the international agriculture. Graduate study in this program seeks to prepare students to assume leadership roles in science, science education, outreach, and project management anywhere in the world. Students are required to write research proposals and expected to write grants to support their research activities, reflecting the dual-title degree. As part of their professional development presentations, publication of research articles and active participation in professional societies is expected. Emphasis is placed upon the professional development of the student. Students are able to specialize in the research program areas of soil genesis, classification, morphology, mapping, microbiology, chemistry, physics, mineralogy, fertility, geographic information systems, remote sensing, watershed analysis, hydrology, and land management. At the same time they will acquire a broad perspective about how to apply their research findings in the context of the broader international community. Thus, the dual-title will allow students to master their field of specialization from an international perspective so that they can compare practices and outcomes between countries and regions.

Admission Requirements

For admission to the dual-title graduate degree under this program, a student must first apply and be admitted to the Soil Science graduate program. Once accepted into the Soil Science program, the student can then submit an application to the INTAD Academic Program Committee for the dual-title degree program. Refer to the Admission Requirements section of the INTAD Bulletin page. The application consists of an application form, a written personal statement indicating the career goals that a student hopes to accomplish by earning a dual-title SOILS/INTAD degree, and a letter from the Soil Science academic adviser supporting the student's taking on additional academic responsibilities. The letter also must confirm that the student is in good standing and is capable of taking on the dual-title degree. The application will be reviewed by the INTAD Academic Program Committee, which will make all final admission decisions. Doctoral students must be admitted into the INTAD program prior to the candidacy exam.

Degree Requirements

To qualify for the dual-title degree, students must satisfy the degree requirements for the degree they are enrolled in Soil Science, listed above. In addition, students must complete the degree requirements for the dual-title in INTAD, listed on theINTAD Bulletin page.

Degree Requirements for SOILS/INTAD Dual-Title M.S.

To qualify for this dual-title degree, students must satisfy the requirements of the Soil Science Master of Science degree program, listed above under "Master's Degree Requirements." In addition, they must satisfy the INTAD program requirements for the dual-title master's degree. Refer to the Master's Degree Requirements section of the INTAD Bulletin page. Some courses may satisfy both the graduate primary program requirements and those of the INTAD program. The double counting of credits must be approved by the student's adviser(s), the head of the SOILS graduate program, and the INTAD Co-Chairs.

For the dual-title M.S. degree in Soil Science and INTAD, the thesis must reflect the student's education and interest in both Soil Science and INTAD. All members of the student's committee must be members of the Graduate Faculty. The master's committee must include at least one Graduate Faculty member from INTAD. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role.

Degree Requirements for SOILS/INTAD Dual-Title Ph.D.

To qualify for the dual-title degree, students must satisfy the degree requirements for the Ph.D. in Soil Science, listed above under "Doctoral Degree Requirements." In addition, students must complete the degree requirements for the dual-title in INTAD, listed on the INTAD Bulletin page. Some courses may satisfy both Soil Science and INTAD degree requirements. The double counting of credits must be approved by the student's adviser(s), the head of the SOILS graduate program, and the INTAD Co-Chairs.

Graduates of the dual-title INTAD master's degree program who wish to pursue an INTAD doctoral degree must re-apply to the INTAD program for admission. INTAD master's degree credits may be carried over to the doctoral program. Six additional INTAD credits will be required. INTAD master's degree graduates who pursue an INTAD Ph.D. are required to take the INTAD 820 International Agricultural Development Seminar a second time.

Candidacy

Candidacy procedures will be based on the procedures of the Soil Science graduate degree program, but will integrate the fields of Soil Science and International Agriculture and Development. Although not encouraged, the dual-title degree student may require an additional semester or more to fulfill requirements for the dual-title degree program. Therefore, under exceptional circumstances, the candidacy exam may be delayed at the discretion of the student's Soil Science adviser in consultation with the INTAD program coordinators. The candidacy examination committee for the dual-title Ph.D. degree will be composed of Graduate Faculty from Soil Science and must include at least one Graduate Faculty member from INTAD.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Soil Science and INTAD dual-title Ph.D. student must include at least one member of the INTAD Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the chair of the doctoral committee is not also a member of the Graduate Faculty in INTAD, the member of the committee representing INTAD must be appointed as co-chair.

Comprehensive Exam

At the end of the coursework, candidates for the dual-title doctoral degree in Soil Science and INTAD will be required to pass an oral and written comprehensive examination based on their dissertation proposal and area of specialization in Soil Science, while reflecting their dual-title curriculum. A separate comprehensive examination is not required by the INTAD program, but international agriculture must be one of the key areas of the comprehensive exam and the INTAD representative on the student's doctoral committee must have input into the development of and participate in the evaluation of the comprehensive examination.

Dissertation and Dissertation Defense

Ph.D. students enrolled in the dual-title degree program are required to write and orally defend a dissertation on a topic that reflects the integration of their original research and education in Soil Science and International Agriculture and Development. In order to satisfy the INTAD dissertation requirement, students may: 1) conduct all or part of their research in an international location, 2) conduct an analysis of a subject in an international context, 3) conduct an analysis of secondary data of international origin, or 4) incorporate another international dimension by approval of the INTAD committee member. Additionally, the dissertation should reflect the student's technical knowledge, knowledge of and sensitivity to a wide diversity of cultures and backgrounds, and the perspective needed to transfer their knowledge in other cultures, particularly in the developing world. The dissertation should contribute to the body of knowledge in soil science and global agricultural development and have potential application in both U.S and international contexts. A public oral presentation of the dissertation is required. Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Student Aid

Graduate assistantships and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

SOIL SCIENCE (SOILS) course list
INTERNATIONAL AGRICULTURE AND DEVELOPMENT (INTAD) course list

Last Revised by the Department: Summer 2018

Blue Sheet Item #: 46-07

Review Date: 6/26/2018

Faculty updated: 10/10/13

Spanish (SPAN)

Program Home Page

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Degrees Conferred:

Ph.D., M.A.
Dual-Title Graduate Degree in Spanish and Language Science

The Graduate Faculty

The program offers M.A. options in literature and linguistics, as well as doctoral emphasis in either of these two areas.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required of all students educated (high school and college) in the continental United States. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

The minimum requirement for admission normally will be 24 credits of post intermediate work in Spanish language and literature.

Students with a 3.00 junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests.

Degree Requirements

A candidate for the M.A. degree must take a minimum of 30 credits at the graduate level including 6 credits in a related minor field. An M.A. essay and a comprehensive written examination also are required. The M.A. degree (or equivalent) is normally a prerequisite to doctoral candidacy.

For the Ph.D. degree, a student must complete at least 60 credits (including M.A. credits) of graduate-level work, including a 15-credit minor. Other requirements include (1) a doctoral candidacy examination and written area examinations; (2) reading knowledge of two foreign languages or a comprehensive knowledge of one foreign language; and (3) a doctoral dissertation.

Dual-Title Graduate Degree in Spanish and Language Science

Graduate students with research and educational interests in Spanish may apply to the Spanish and Language Science Dual-Title Degree Program. The goal of the dual-title Spanish and Language Science is to enable graduate students from Spanish to acquire the knowledge and skills of their major area of specialization in Linguistics while at the same time gaining depth and methodological expertise in the areas associated with the language sciences.

Admission Requirements

To pursue a dual-title degree under this program, the student must first apply to the Graduate School and be admitted through the Department of Spanish, Italian and Portuguese (see above for admission requirements for the Graduate Program in Spanish). Upon admission to the Spanish Program and with a recommendation from a Language Science program faculty member in the Department of Spanish, Italian and Portuguese, the student's application will be forwarded to a committee that will include the Director of the Linguistics Program, one of the Co-Directors of the Center for Language Science, and a third elected faculty member within the Center for Language Science. All three committee members will be affiliated with the Program in Linguistics. Upon the recommendation of this committee, the student will be admitted to the dual-title degree program in Language Science.

Requirements for the Dual-Title Ph.D. Degree in Spanish and Language Science

The doctoral degree in Spanish and Language Science is awarded only to students who are admitted to the Spanish doctoral program and admitted to the dual-title degree in Language Science. The minimum course requirements for the dual-title Ph.D. degree in the Spanish and Language Science, in addition to the Spanish Program requirements, are described below.

Spanish/Language Science Proposed Requirements

Total number of required credits: 60

The minimum course requirements for the dual-title Ph.D. degree in Spanish and Language Science, in addition to the Spanish Program requirements, are as follows:

- Language Science proseminar courses (LING 521 and LING 522; 6 credits)
- Research Methods/Statistics (LING 525 or equivalent; 3 credits)
- Theoretical Linguistics (LING 500 or LING 504; 3 credits)
- Cognitive Neuroscience or Psycholinguistics (LING/PSY 520, PSY 511 or equivalent; 3 credits)
- Research internships with two different Language Science faculty mentors (CSD 596, GER 596, LING 596, PSY 596, SPAN 596; 6 credits)

Particular courses may satisfy both the Spanish requirements and those in the Language Science program. Final course selection is determined by the student in consultation with the dual-title program advisors and the major program advisors. Students who already hold a master's degree from another institution may petition to have equivalent course credits accepted.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

The department awards annually an Edwin Erle Sparks Fellowship in the Humanities. In the past several years, graduate students have received external NSF fellowships and awards such as Doctoral Dissertation Research Improvement grants.

Courses

*SPAN 001G. ELEMENTARY SPANISH FOR GRADUATE STUDENTS (3)
*SPAN 002G. ELEMENTARY SPANISH FOR GRADUATE STUDENTS (3)

*No graduate credit given for this course.

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

SPANISH (SPAN) course list

Last Revised by the Department: Spring Semester 2010

Blue Sheet Item #: 38-07-010

Review Date: 06/22/2010

Faculty linked: 6/27/14

Communication Arts and Sciences (CAS)

Program Home Page

DENISE SOLOMON, *Head of the Department*
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Degrees Conferred:

Ph.D., M.A.

The Graduate Faculty

Students may specialize in communication theory (communication sciences) or rhetoric (communication arts).

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

The minimum undergraduate preparation is 12 credits in communication studies/speech communication. Students who cannot meet this requirement in full may be admitted but must make up their deficiencies without credit toward the graduate degree.

Additionally, students with a 3.00 junior/senior grade-point average (on a 4.00 scale) and appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. A student must have completed the master's degree before being admitted as a doctoral candidate.

Master's Degree Requirements

Students pursuing the M.A. degree in Communication Arts and Sciences must schedule a review of their program of courses during the first year of residence and receive approval by a duly constituted advisory committee.

A total of 30 credits, including 6 for the master's thesis and at least 12 other 500-level credits, is required. Candidates must schedule a proposal meeting in which their research plan for their thesis is approved by their committee. They are also required to present an oral defense before their committee.

Although typically discouraged, students in unique circumstances may apply to complete a nonthesis track. Students must apply in advance for acceptance in the nonthesis track and additional course credits will be required, among other differences from the thesis track.

Doctoral Degree Requirements

The communication and foreign language requirement for the Ph.D. degree may be satisfied by options selected from designated areas including, but not restricted to, foreign languages. Doctoral candidates must schedule a candidacy evaluation during their first year. Following completion of the language requirement and all courses from the program of study, doctoral candidates must take a comprehensive examination to determine their mastery and competence in the discipline of communication. After successful completion of the written and oral component of the comprehensive exam, doctoral candidates must schedule a proposal meeting at which the research plan for their dissertation is approved by their committee. Doctoral candidates must present a final oral defense of their dissertation before their committee.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

EDWIN ERLE SPARKS FELLOWSHIPS IN THE HUMANITIES (8)
Available to beginning and continuing graduate students in one of the following graduate programs: Communication Arts and Sciences, Comparative Literature, English, French, German, History, Linguistics, Philosophy, and Spanish; stipend $15, 340 plus waiver of tuition. Apply to department before February 1.

Dual-Title Ph.D. in Bioethics (BIOET)

Degree Conferred Students electing to pursue this program will earn a degree with a dual-title at the Ph.D. level, i.e. Ph.D. in CAS and Bioethics.

Admission Requirements

Dual-title bioethics graduate students will first be admitted to their primary programs in accordance with the requirements stipulated by the Graduate School and the primary program. They will then be admitted to graduate study in the Bioethics program by an admissions committee consisting of faculty affiliated with the Bioethics program. Applicants should have a junior/senior cumulative average of at least 3.0 (on a 4.0 scale) and an appropriate background in undergraduate coursework. Prospective dual-title students will write a statement of purpose that addresses the ways in which their research and professional goals reflect an interest in interdisciplinary bioethics research. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Degree Requirements

To qualify for a dual-title degree, students must satisfy the requirements of the CAS program in which they are primarily enrolled. In addition, they must satisfy the requirements described below, as established by the Bioethics program committee. Within this framework, final course selection is determined by the student, their CAS and Bioethics advisors.

Additional required course work
Seven required credits (BIOET 501, BIOET 502, and BIOET 590). At least three additional BIOET credits at the 500 level.

Eight additional credits from a list of approved electives at the 400 and 500 level, with at least two credits at the 500 level.

Courses available to fulfill requirements

BIOETHICS Courses (BIOET)
501. PERSPECTIVES AND METHODS IN BIOETHICS (3)
502. PERSPECTIVES IN MACRO-BOETICS (3)
503. ETHICS AND THE RESPONSIBLE CONDUCT OF BIOMEDICAL RESEARCH (3)
590. BIOETHICS COLLOQUIUM (1)
594. RESEARCH TOPICS (1-15)

595. INTERNSHIP (1-3)
596. INDEPENDENT STUDY (1-9)
597. SPECIAL TOPICS IN BIOETHICS (1-9)

Elective Courses

The list of elective courses will be maintained by the Director of the Bioethics Graduate Program in consultation with the Bioethics Program Committee. The list currently includes the following courses:

ANTH/BIOL 460 HUMAN GENETICS (3)
ANTH/BIOL 460H HUMAN GENETICS (4)
ANTH 471H BIOLOGY, EVOLUTION AND SOCIETY (3)
BB H 501 BIOBEHAVIORAL SYSTEMS IN HEALTH AND DEVELOPMENT: THEORY AND PROCESSES (3)
BB H 504 BEHAVIORAL HEALTH INTERVENTION STRATEGIES (3)
BB H 551 WORLD HEALTH PROMOTION (3)
BMH 490 BIOETHICS AND MEDICAL HUMANITIES CAPSTONE (3)
BMMB 509 ETHICS IN BIOMEDICAL SCIENCE (1)
CAS 453 HEALTH COMMUNICATION THEORY AND RESEARCH (3)
CAS 557 HEALTH COMMUNICATION (3)
CAS 562 QUALITATIVE METHODS (3)
FRNSC 561 ETHICS IN FORENSIC SCIENCE (1)
H ADM 539 HEALTH SYSTEMS ORGANIZATION (3)
H ADM 540 HEALTH ADMINISTRATIVE POLICY FORMULATION (3)
H ADM 541 HEALTH ECONOMICS AND POLICY (3)
H ADM 542 HEALTH CARE POLITICS AND POLICY (3)
H ADM 543 LONG-TERM CARE ADMINISTRATION AND POLICY (3)
H ADM 551 HEALTH CARE LAW (3)
H P A 401 (IL) COMPARATIVE HEALTH SYSTEMS (3)
H P A 510 HEALTH SERVICES FINANCING AND POLICY (3)
H P A 511 RESEARCH SEMINAR ON HEALTH SERVICES FINANCING AND POLICY (3)
H P A 520 INTRODUCTION TO HEALTH SERVICES ORGANIZATION AND DELIVERY (3)
H PA 521 RESEARCH SEMINAR ON HEALTH SERVICES ORGANIZATION AND DELIVERY (3)
H P A 540 EPIDEMIOLOGICAL APPLICATIONS IN HEALTH SERVICES RESEARCH (3)
H PA 541 POVERTY, RACE, ETHNICITY AND CHILD HEALTH (3)
H P A 545 INTRODUCTION TO HEALTH ECONOMICS (3)
H P A 822 CLINICAL ISSUES FOR HEALTH SERVICES MANAGEMENT (3)
H P A 836 HEALTH LAW (3)
HLHED 516 EVALUATION OF HEALTH EDUCATION AND PROMOTION PROGRAMS (3)
HLHED 552 CURRENT HEALTH EDUCATION ISSUES (3)
HLHED 553 MULTICULTURAL HEALTH ISSUES (3)
IBIOS 591 ETHICS IN THE LIFE SCIENCES (1)
NURS 464 (US;IL) DYING AND DEATH (3)
NURS 501 ISSUES IN NURSING AND HEALTH CARE (3)
NURS 580 EPISTEMOLOGY OF NURSING SCIENCE (3)
NURS 581 DEVELOPING THEORETICAL CONSTRUCTS RELEVANT TO NURSING (3)
NURS 587 ETHICS IN NURSING RESEARCH (1)
NUTR/S T S 430 (IL) GLOBAL FOOD STRATEGIES: PROBLEMS AND PROSPECTS FOR REDUCING WORLD HUNGER (3)
PHIL 403 ENVIRONMENTAL ETHICS (3)
PHIL 418 ETHICS (3)
PHIL/STS 432: MEDICAL AND HEALTH CARE ETHICS (3)
PHS 570 HEALTH ECONOMICS AND ECONOMIC EVALUATION (3)
S T S 555 HUMAN DIMENSIONS OF NATURAL RESOURCES (3)
S T S 589 ETHICS AND VALUES IN SCIENCE AND TECHNOLOGY (3)
WMNST/BB H 458: CRITICAL ISSUES IN REPRODUCTION (3)

Candidacy

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by the CAS program. During the candidacy process, the student will also be assessed for candidacy to the Bioethics program, and at least one member of the candidacy committee must come from the Bioethics program. Faculty members who hold appointments in both programs may serve in a combined role.

Committee composition

In accordance with the Graduate Council's requirements, the doctoral committee shall contain at least four members. At least one of the committee members must be a faculty-member affiliated with the Bioethics Program, but graduate students are encouraged to have a second committee member so qualified. Faculty members who hold appointments in both programs may serve in a combined role. If the committee chair does not serve in this combined role, the faculty member representing the Bioethics Program must be designated as co-chair of the committee. The Bioethics program representative(s) will be expected to participate in constructing and grading comprehensive examination questions that cover the secondary area of study. The outside member will be appointed in accordance with the Graduate School's Graduate Student Committee Procedures. The Graduate Council's current policy is that the Outside Member cannot have more than a 25% budgetary connection with either the graduate major program or the dual-title degree program.

Comprehensive exam

The faculty member (or members) affiliated with the Bioethics Program will be responsible for administering a portion of the comprehensive exam that will require the student to demonstrate an understanding of various theoretical and methodological approaches to bioethics, and an ability to apply them to issues and problems (including, where appropriate, practical problems) in their primary field.

Dissertation and dissertation defense

A dissertation on a bioethics-related topic or with a substantial bioethics component is required of students in the dual-title Ph.D. program. The bioethics-related topic of the dissertation or the bioethics component will be approved by the student's committee.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

COMMUNICATION ARTS AND SCIENCES (CAS) course list

Last Revised by the Department: Summer Session 2011

Blue Sheet Item #: 39-07-011

Review Date: 10/31/13

Faculty linked: 6/5/14

Special Education (SPLED)

Program Home Page

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Degrees Conferred:

Ph.D., M.S., M.Ed.

The Graduate Faculty

The Program

Exceptional children are those who deviate so far from average in physical, intellectual, emotional, or social characteristics that they require highly specialized instruction and related services. The purpose of the M.Ed. program in Special Education is to prepare educational service providers of exceptional children in advanced training in academic and behavior management strategies. . M.Ed. students are trained in behavior management and instructional design, implementation, and evaluation appropriate for effective work with children and youth who qualify for services for intellectual, behavioral, or physical disabilities at all age levels and degrees of severity. The purpose of the M.S. and Ph.D. programs is to prepare researchers and college and university teachers in areas encompassing the education of the children and youth who qualify for services for intellectual, behavioral and/or physical disabilities. The former program is professional in nature; the latter two, academic.

Admission Requirements

Applicants for master's and doctoral programs must present evidence of superior academic achievement, complete a personal statement, and provide professional references. Applications for the M.S. and Ph.D. programs must also present GRE verbal and quantitative test scores. Minimum GPA for master's and doctoral applicants are, respectively, 3.00 for M.Ed. and M.S., and 3.50 for Ph.D. Minimum GRE test scores are (verbal and quantitative combined): 290 for M.S., and 300 for Ph.D. Applicants for doctoral study must have had at least three years of relevant experience with special-needs children or youth. International applicants whose first language is not English must submit TOEFL (Test of English as a Foreign Language) scores. Exceptions to the admissions criteria may be made only for highly qualified students with special backgrounds, abilities, and interests. At the discreation of a graduate program, a student may be admitted provisionionally for graduate study in a program wihtout these scores. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

Master's Degree Requirements

Prerequisites for the M.Ed. program include 10 credits basic to the education of exceptional children (courses comparable to SPLED 400, SPLED 403A or 403B, and SPLED 418). M.Ed. candidates are expected to complete the core: SPLED 525, SPLED 573 and SPLED 521 or the equivalment. Of the remaining credits required to complete the degree, at least 21 must be taken in special education and include courses selected by students in conjunction with their adviser. M.Ed. students must submit a master's paper.

M.S. candidates are expected to complete the core: SPLED 573, EDPSY 400, and SPLED 600 (6 credits). Of the remaining 18 credits, 6 must be taken from one discipline outside of education. Students must complete a total of 18 credits in special education; and 18 credits at the 500 level or above. M.S. students must submit a master's thesis and pass a comprehensive examination.

All requirements for either the M.Ed. or the M.S. degree must be met within six years or a period spanning seven consecutive summers.

Doctoral Degree Requirements

The communication and foreign language requirement for the Ph.D. degree is prescribed by each student's committee. Minimum requirements for the Ph.D. degree include 24 credits of research methods; 18 credits in a cognate area such as psychology, sociology, or child development; and 36 credits in education. The student also must enroll in SPLED 500 each semester prior to successful completion of the comprehensive examinations. A candidacy examination is required after the first semester of full-time study; written and oral comprehensive examinations also are required. A student is required to complete the program within seven years from the date of acceptance as a candidate.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, the following award typically has been available to graduate students in this program:

U.S. OFFICE OF EDUCATION ASSISTANTSHIPS OR TRAINEESHIPS IN SPECIAL EDUCATION. Open to graduate students being prepared as leadership personnel in special education; stipend varies, depending on conditions of existing grants. Other graduate assistantships also may be available. Apply to the Graduate Admissions Committee, 125D CEDAR Building.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

SPECIAL EDUCATION (SPLED) course list

Last Revised by the Department: Spring Semester 2015

Blue Sheet Item #: 43-07-000

Review Date: 06/30/2015

Faculty linked: 6/27/14

Statistics (STAT)

Program Home Page

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Degrees Conferred:

- M.A.S.
- M.S.
- Ph.D.
- Dual-title Ph.D. and M.S. in Statistics and Operations Research
- Dual-title Ph.D. in Statistics and Social Data Analytics
- Integrated B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.)
- Integrated B.S. in Statistics and Master of Applied Statistics (M.A.S.)

The Graduate Faculty

The Program

Graduate instruction and research opportunities are available in most areas of statistics and probability, including linear models, nonparametric statistics, robustness, statistical computing, analysis of count data, multivariate analysis, experimental design, reliability, stochastic processes and probability (applied and theoretical), distribution theory, statistical ecology, and biometrics.

Graduate students can gain practical experience in the application of statistical methodology through participation in the department's statistical consulting center and collaborative research activities. In addition, collaborative projects with other departments provide longer term experience and support for selected students. Most students gain valuable teaching experience by assisting in the teaching and grading of courses. In addition, Ph.D. students with proper qualifications can receive support for teaching undergraduate courses.

The Master of Applied Statistics (M.A.S.) program is a professional degree designed to provide training in statistics focused on developing data analysis skills, and exploration of all core areas of applied statistics, without going deeply into the mathematical statistics foundations. It aims to provide its graduates with broad knowledge in a wide range of statistical application areas.

The Doctor of Philosophy (Ph.D.) and Master of Science (M.S.) degrees in Statistics are designed for advanced studies in applied and theoretical statistics. Special emphases include biostatistics, statistical ecology, environmental statistics, genometrics, biometrics and statistical computation. The M.S. degree is appropriate preparation for the department's Ph.D. degree.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Scores from the Graduate Record Examinations (GRE), or from a comparable substitute examination accepted by the Statistics graduate program, are required for admission.

While applications from all students (including those who already have done graduate work) are reviewed, completion of a standard calculus sequence is regarded as a prerequisite. Students with a 3.00 or better junior/senior average (on a 4.00 scale) and with appropriate course backgrounds will be considered for admission. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Students hoping to earn a Ph.D. in statistics may apply directly to the Ph.D. program without need for a master's degree.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Professional Master of Applied Statistics Requirements

For the M.A.S. degree, a minimum of 30 credits and a minimum grade-point average of 3.0 are required for graduation. Of the 30 credits, 24 must be courses from the Statistics department and 21 must be at the 500 level. The student must complete 6 credits in applied statistics (STAT 501, STAT 502), 6 credits in mathematical statistics (STAT 414, STAT 415) and 3 credits in statistical consulting (STAT 580 and 581). For all M.A.S. students, the STAT 581 course will have a comprehensive written project report required as part of the course, which serves as the culminating experience. To complete the remaining credit requirements, a student can select 9-15 credits from the following applied statistics courses: STAT 464, STAT 480, STAT 500, STAT 503, STAT 504, STAT 505, STAT 506, STAT 507, STAT 509, and STAT 510. In addition, students with suitable backgrounds may choose up to 6 credits from a departmental list of additional courses with approval from their adviser.

Master of Science Degree Requirements

For the M.S. degrees, a student must complete at least 30 credits, including at least 27 at the 500 or 600 level; 21 of the 27 500-level credits must be formal course work from the department of Statistics. A student must complete 6 credits in applied statistics (STAT 511, STAT 512), 6 credits in mathematical statistics (STAT 513, STAT 514), 3 credits in stochastic processes (STAT 515) and 3 credits in statistical consulting (STAT 580 and 581). The student must also pass a written master's qualifying examination taken at the end of the first year. Finally, an M.S. student must register for at least 6 credits of thesis research (600 or 610) and submit a thesis. The thesis must be accepted by the advisers, a second reader, the head of the graduate program, and the Graduate School.

Doctoral Degree Requirements

The Department of Statistics requires a minimum total of 48 postbaccalaureate credits for the Ph.D. At least 42 credits, exclusive of the dissertation, must be in Statistics. Course work accepted for the M.S. in Statistics at Penn State will count toward the department's 48-credit requirement. In the case of students who have earned credits in an advanced degree program at another university or in another department at Penn State, a maximum of 24 credits may count toward the 48-credit departmental requirement, subject to departmental approval.

For the Ph.D. degree, a student in Statistics must complete at least 48 credits, of which at least 42 must be STAT and at most three credits can be at the 400 level. In addition to the 18 credits of core course requirements from the first year (STAT 511, STAT 512, STAT 513, STAT 514, STAT515, STAT 553), a Ph.D. student in Statistics must complete an additional 12 credits in advanced probability (STAT 517, 3 credits), statistical inference (STAT 561, 3 credits), statistical consulting (STAT 580, 2 credits, and STAT 581, 1 credit), colloquium (STAT 590, 2 credits) and teaching statistics (STAT 592, 1 credit), as well as

18 credits of electives taken from STAT 518, STAT 544, STAT 552, STAT 562, STAT 565, or other courses approved by the Graduate Studies Committee. The student also must pass a written Ph.D. candidacy exam, typically at the end of the first year, and a comprehensive exam given at the end of the third year. There are two ways for students to complete their comprehensive examination. Typically, both written and oral components of the comprehensive involve the defense of a dissertation proposal evaluated by the doctoral committee. Alternatively, the student may have a written and oral comprehensive exam focusing on at least two key areas in Statistics. The examination focuses on the dissertation prospects and the student's preparation to undertake dissertation research, and is evaluated by the doctoral committee. A written and oral defense of a dissertation proposal would then occur at a later stage as per committee's recommendation. Students must have their dissertation proposal approved as specified in the Department of Statistics Graduate Student Handbook. The candidate then must submit an acceptable Ph.D. dissertation and pass a final oral examination (the dissertation defense). The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

The Ph.D. in Statistics offers concentrations in Biometrics, Biostatistics, Environmental Statistics, and Genometrics. The course and the examination requirements remain the same under these concentrations, however, the student must take 15 credits of electives from a list of courses identified by the concentration.

Doctoral Minor in Statistics Requirements

The Department of Statistics has three possible paths for a Doctoral Minor in Statistics:

- **Path 1**: STAT/MATH 414 and 415 and at least three 500-level courses from the department.
- **Path 2**: Five or more courses totaling 15 credits at the 500-level from the department. Stat 464 may also count toward the 15 credits.
- **Path 3**: Four 500-level courses totaling 12 credits from the department and one additional course of 3 credits approved by the department head or graduate studies chair.

Please note: STAT 500 will not be counted toward the Doctoral Minor in Statistics under any path.

For all paths, a 3.5 GPA is required in the courses to be counted toward the minor. Completion of one of the paths listed above, with the specified grade-point average, and the signature on theGraduate Minor Program form constitutes approval of the Minor in Statistics. Official requests to add a minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishment of the doctoral committee and prior to scheduling the comprehensive examination. At least one graduate faculty member from the minor field must be on the candidate's doctoral committee.

Dual-Title Ph.D. and M.S. in Statistics and Operational Research

The Operations Research dual-title degree program is administered by an Operations Research committee, which is responsible for management of the program. The program enables students from diverse graduate programs to attain and be identified with the tools, techniques, and methodology of operations research, while maintaining a close association with areas of application. Operations research is the analysis--usually involving mathematical treatment--of a process, problem, or operation to determine its purpose and effectiveness and to gain maximum efficiency. To pursue a dual-title degree under this program option the student must apply to the Graduate School and register through one of the approved graduate programs.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.
Students must apply and be admitted to the graduate program in Statistics and the Graduate School before they can apply for admission to the dual-title degree program. Students must apply for enrollment into the dual-title Ph.D. in Operations Research prior to taking their candidacy exam in Statistics. Students are encouraged to submit their application forms as early as possible, and not later than at least two semesters before their intended date of graduation. The "Request for Dual-Title Degree in Operations Research" form must be filled out in consultation with the Graduate Coordinator in the Statistics Department and submitted to the Chair of the Operations Research Program.
For the M.S. dual-title degree in Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 140, MATH 141, MATH 220; CMPSC 101; and 3 credits of probability and statistics. The "Request for Masters Dual-Title Degree in Operations Research" form must be filled out.
For the Ph.D. dual-title degree in Operations Research, in addition to those prescribed by the graduate major program, prerequisites for acceptance to the program without deficiency include the following or their equivalent: MATH 401, MATH 436; CMPSC 101; and 3 credits of probability and statistics. The "Request for PH.D. Dual-Title Degree in Operations Research" form must be filled out.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.
To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D. in Statistics. In addition, they must satisfy the requirements described below, as established by the Operations Research committee.
For the M.S. dual-title degree in Operations Research, the minimum requirements are: 6 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes; 6 credits in optimization, including a minimum of 3 credits in linear programming; 3 credits in computational methods; and 3 credits in applications/specialization. A minimum of 9 credits must be in the 500 series. Particular courses may satisfy both the graduate major program requirements and those in the Operations Research program. The supervisor of the master's thesis must be a member of the graduate faculty recommended by the chair of the program granting the degree and approved by the Operations Research committee as qualified to supervise thesis work in operations research.
The minimum requirements for the Ph.D. dual-title degree in Operations Research are: 9 credits in stochastic/statistical methods, including a minimum of 3 credits in each of the areas of statistical methods and stochastic processes; 9 credits in optimization, including a minimum of 3 credits in linear programming; 6 credits in computational methods, including a minimum of 3 credits in simulation; and 12 credits in applications/specialization. A minimum of 18 credits must be in the 500 series, and particular courses may satisfy both the graduate major program requirements and those in the Operations Research program.
Candidacy Exam
The dual-title degree will be guided by the Candidacy Exam procedure of the Statistics graduate program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyondthe normal period allowable. Operations Research must be integrated into the student's candidacy examination, and it may require additional examination beyond the one required by Statistics in order to assess whether the student should be admitted into Ph.D. candidacy in both Statistics and Operations Research. In accordance withGraduate Council policy, the candidacy committee must include at least one member of the Operations Research graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.

Doctoral Committee Composition

The doctoral committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council policy, the doctoral committee of a Statistics and Operations Research dual-title doctoral degree student must include at least one member of the Operations Research graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.

If the chair of the committee representing Statistics is not also a member of the graduate faculty in Operations Research, the member of the committee representing Operations Research must be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Statistics and Operations Research must pass a comprehensive examination that includes written and oral components.
There are two ways for students to complete their comprehensive examination.
Typically, both written and oral components of the comprehensive examination involve the defense of a dissertation proposal, which must contain core Statistics content and substantial Operations Research content, and is evaluated by the doctoral committee. The Operations Research representative(s) on the student's doctoral committee will participate in the evaluation of the comprehensive examination.
Alternatively, the student may have a written and oral comprehensive exam focusing on at least two key areas in Statistics with content from Operations Research (acting as a first minor field). The examination focuses on the dissertation prospects and the student's preparation to undertake dissertation

research, and is evaluated by the doctoral committee. The Operations Research representative(s) on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. A written and oral defense of a dissertation proposal would then occur at a later stage as per committee's recommendation.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Statistics and Operations Research. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Dual-Title Doctoral Degree in Statistics and Social Data Analytics

Statistics doctoral students seeking to attain and be identified with an interdisciplinary array of tools, techniques, and methodologies for social data analytics, while maintaining a close association with statistics, may apply to pursue a dual-title Ph.D. in Statistics and Social Data Analytics.
Social data analytics is the integration of social scientific, computational, informational, statistical, and visual analytic approaches to the analysis of large or complex data that arise from human interaction. The dual-title Ph.D. aims to enable scientists who expand the capability of social data analytics, and use those capabilities creatively to answer important social scientific questions and to address grand social challenges, in both academic and nonacademic settings.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.
Students must apply and be admitted to the graduate program in Statistics and the Graduate School before they can apply for admission to the dual-title degree program. Applicants interested in the dual-title degree program may make their interest in the program known clearly on their applications to Statistics and include remarks in their statement of purpose that address the ways in which their research and professional goals in statistics reflect an expanded interest in Social Data Analytics-related research.
To apply to the dual-title doctoral Ph.D. in Statistics and Social Data Analytics, a student must submit a letter of application and transcript, which will be reviewed by the Social Data Analytics Program. An applicant must have a minimum grade-point average of 3.0 (on a 4.0 point scale) to be considered for enrollment in the dual-title degree program. Students must apply for enrollment into the dual-title Ph.D. in Social Data Analytics prior to obtaining candidacy in Statistics.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.
To qualify for the dual-title degree, students must satisfy the requirements of the Ph.D. in Statistics. In addition, they must satisfy the requirements described below, as established by the Social Data Analytics Committee. Within this framework, final course selection is determined by the student in consultation with academic advisers from their home department and Social Data Analytics.

Course Work

The minimum course work requirements for the dual-title Ph.D. in Statistics and Social Data Analytics are as follows:

- Course work and other requirements for the Ph.D. in Statistics.
- SO DA 501 (3 credits)
- SO DA 502 (3 credits)
- 12 or more elective credits in Social Data Analytics from a list of courses maintained by the Social Data Analytics Committee. Collectively the elective credits must satisfy the following requirements:
  - (A) Core analytics distribution. 3 or more credits in courses focused on statistical learning, machine learning, data mining, or visual analytics. Courses approved as meeting this requirement are designated (A) on the list of approved electives.
  - (Q) Quantification distribution. 6 or more credits in courses focused on statistical inference or quantitative social science methodology. Courses approved as meeting this requirement are designated (Q) on the list of approved electives. *(A Statistics Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Statistics Ph.D.)*
  - (C) Computational / informational distribution. 6 or more credits in courses focused on computation, collection, management, processing, or interaction with electronic data, especially at scale. Courses approved as meeting this requirement are designated (C) on the list of approved electives.
  - (S) Social distribution. 6 or more credits in courses with substantial content on the nature of human interaction and/or the analysis of data derived from human interaction and/or the social context or ethics or social consequences of social data analytics. Courses approved as meeting this requirement are designated (S) on the list of approved electives.*(A Statistics Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Statistics Ph.D.)*
  - Cross-departmental distribution.
    - 3 or more credits in approved courses with the prefix STAT or that of a primarily social science department. *(A Statistics Ph.D. student would typically satisfy this distribution requirement as a function of completing the requirements of the Statistics Ph.D.)*
    - 3 or more credits in approved courses with the prefix IST, GEOG, or that of a primarily computer science or engineering department.
    - 6 or more credits in approved courses outside Statistics.
    - 3 or fewer credits in approved courses at the 400-level.

Students are encouraged to take interdisciplinary courses that carry multiple (A), (Q), (C), (S) designations, as well as to select SO DA electives that also meet STAT requirements. In particular, the 12 elective SO DA credits can be met with as few as 6 credits of appropriately chosen course work. Conversely, 6 credits of SO DA course work, including SO DA 501 and SO DA 502, can be used to meet the STAT elective requirement. Within this framework, final course selection is determined by the student in consultation with academic advisers from Statistics and Social Data Analytics. (There are no formal maxima for the number of double-counted credits. For those meeting the SO DA elective requirement with the minimum of 12 credits, the outside-program minimum effectively limits the number of primary degree STAT credits that count toward SO DA at 6. For those meeting STAT elective requirements with the minimum of 18 credits, the 12 credit STAT minimum effectively limits the number of SO DA credits that count toward STAT at 6.)
Candidacy Exam
The dual-title degree will be guided by the Candidacy Exam procedure of the Statistics graduate program. The candidacy exam for the dual-title degree may be given after at least 18 postbaccalaureate credits have been earned in graduate courses. Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable. There will be a single candidacy examination to assess whether the student should be admitted into Ph.D. candidacy in both Statistics and Social Data Analytics. In accordance with Graduate Council policy, the candidacy committee must include at least one member of the Social Data Analytics graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.

The Social Data Analytics Program maintains a list of recommended background and skills that it recommends students have in place by the time they begin the interdisciplinary course work required to complete the Social Data Analytics degree. The candidacy exam is the appropriate setting for assessing the student's preparation for the interdisciplinary work of the dual-title Ph.D. in Statistics and Social Data Analytics.

Doctoral Committee Composition

The doctoral committee must conform to all requirements of the primary program and the Graduate Council. In accordance with Graduate Council policy, the doctoral committee of a Statistics and Social Data Analytics dual-title doctoral degree student must include at least one member of the Social Data Analytics graduate faculty. Faculty members who hold appointments in both programs' graduate faculty may serve in a combined role.

If the chair of the committee representing Statistics is not also a member of the graduate faculty in Social Data Analytics, the member of the committee representing Social Data Analytics must be appointed as co-chair.

Comprehensive Exam

After completing all course work, doctoral candidates for the dual-title doctoral degree in Statistics and Social Data Analytics must pass a comprehensive examination that includes written and oral components.
There are two ways for students to complete their comprehensive examination.
Typically, both written and oral components of the comprehensive examination involve the defense of a dissertation proposal, which must contain core Statistics content and substantial Social Data Analytics content, and is evaluated by the doctoral committee. The Social Data Analytics representative(s) on the student's doctoral committee will participate in the evaluation of the comprehensive examination.
Alternatively, the student may have a written and oral comprehensive exam focusing on at least two key areas in Statistics with content from Social Data Analytics (acting as a first minor field). The examination focuses on the dissertation prospects and the student's preparation to undertake dissertation research, and is evaluated by the doctoral committee. The Social Data Analytics representative(s) on the student's doctoral committee will develop questions for and participate in the evaluation of the comprehensive examination. A written and oral defense of a dissertation proposal would then occur at a later stage as per committee's recommendation.

Dissertation and Dissertation Defense

Upon completion of the doctoral dissertation, the candidate must pass a final oral examination (the dissertation defense) to earn the Ph.D. degree. Students enrolled in the dual-title program are required to write and orally defend a dissertation on a topic that reflects their original research and education in Statistics and Social Data Analytics. The dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School.

Integrated B.S. in Statistics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.S. in Statistics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career-oriented students to obtain training in statistics focused on developing data analysis skills and exploration of core areas of applied statistics at the undergraduate and graduate levels. The M.A.S. degree is a professional master's degree that emphasizes applications and does not provide as much training in the mathematical and statistical theory. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data-intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process

The number of openings in the integrated B.S./M.A.S. program is limited. Students must apply to and meet the admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master's degree. Admission will be based on specific criteria and the recommendation of faculty. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Applicants to the integrated program:

- Must be enrolled in the Statistics B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program, including the two courses: STAT 414 and STAT 415.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
- Must be recommended by the chair of the department's undergraduate program committee.
- Must be accepted into the M.A.S. program in Statistics.

Degree Requirements

Students in the IUG program must satisfy the requirements for both the B.S. and M.A.S. degrees; 120 credits are required for the B.S. and 30 credits for the M.A.S. The following twelve credits (number of credits in parentheses) can apply to both B.S. and M.A.S. degrees; six of these are at the 500 level:

STATISTICS (STAT)
414. Introduction to Probability Theory (3)
415. Introduction to Mathematical Statistics (3)
501. Regression Methods (3)
502. Analysis of Variance and Design of Experiments (3)

If students accepted into the IUG program are unable to complete the M.A.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Integrated B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.)

The Integrated Undergraduate-Graduate (IUG) degree with B.A./B.S. in Mathematics and Master of Applied Statistics (M.A.S.) is designed to be completed in five years. This integrated degree will enable a select number of highly qualified and career-oriented students to obtain training in statistics focused on developing data analysis skills, and exploration of core areas of applied statistics at the graduate levels in addition to an undergraduate degree in Mathematics. The M.A.S. degree is a professional master's degree that emphasizes applications. The degree prepares students with interests in mathematics, computation, and the quantitative aspects of science for careers in industry and government as statistical analysts. Research divisions in the pharmaceutical industry, quality control, and quality engineering divisions in manufacturing companies, clinical research units, corporate planning and research units, and other data intensive positions require persons with training in mathematics, computation, database management, and statistical analysis, which this program will provide.

Application Process

The number of openings in the integrated B.A./B.S. and M.A.S. program is limited. Students must apply to and meet the admission requirements of the Graduate School, as well as the graduate program in which they intend to receive their master's degree. Admission will be based on specific criteria and the recommendation of faculty. Students shall be admitted to an IUG program no earlier than the beginning of the third semester of undergraduate study at Penn State (regardless of transfer or AP credits accumulated prior to enrollment) and no later than the end of the second week of the semester preceding the semester of expected conferral of the undergraduate degree, as specified in the proposed IUG plan of study. Applicants to the integrated program:

- Must be enrolled in the Mathematics B.A./B.S. program.
- Must have completed at least 60 credits of the undergraduate degree program including the two courses: STAT 414 and STAT 415.
- Must submit a transcript and a statement of purpose.
- Must present a departmental approved plan of study in the application process in consultation with the M.A.S. program director. The plan should cover the entire time period of the integrated program, and it should be reviewed periodically with an adviser as the student advances through the program.
- Must be recommended by the chair of Mathematics Department's undergraduate program committee. Two additional recommendation letters must be sent to the M.A.S. admissions committee.
- Must be accepted to the M.A.S. program in Statistics.

Degree Requirements

Students in the IUG program must satisfy the requirements for both the B.A./B.S. and M.A.S. degrees; 120 credits are required for the B.A./B.S. and 30 credits for the M.A.S. The following twelve credits (number of credits in parentheses) can apply to both B.A./B.S. and M.A.S. degrees, six of these are at the 500 level:

STATISTICS (STAT)
414. Introduction to Probability Theory (3)
415. Introduction to Mathematical Statistics (3)
501. Regression Methods (3)
502. Analysis of Variance and Design of Experiments (3)

If students accepted into the IUG program are unable to complete the M.A.S. degree, they are still eligible to receive their undergraduate degree if all the undergraduate degree requirements have been satisfied.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*. GRE scores are required for consideration for assistantships. Students on graduate assistantships must adhere to the course load limits set forth in the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

STATISTICS (STAT) course list

Last Revised by the Department: Summer 2016

Blue Sheet Item #: 44-07-000

Review Date: 6/28/2016

IUG PROGRAM - B.S. in Statistics and Master of Applied Statistics
Last Revised by the Department: Summer Session 2003
Blue Sheet Item #: 31-05-138

IUG PROGRAM - B.A./B.S. in Mathematics and Master of Applied Statistics
Last Revised by the Department: Fall Semester 2006
Blue Sheet Item #: 34-06-361 and 34-06-361A
Review Date: 4/11/06

REVISED BY SENATE: 1/5/06 [course number update]

Facuty linked: 6/27/14

Software Engineering (SWENG)

Program Home Page

JAMES A. NEMES, *Interim Chancellor*
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30 E. Swedesford Road
Malvern, PA 19355-1443
610-725-3335

COLIN J. NEILL, Associate Professor and Director of Engineering Programs
School of Graduate Professional Studies
Penn State Great Valley, Engineering Division
610-648-3277
www.sgps.psu.edu

The Graduate Faculty

- Adrian Barb, Ph.D. (University of Missouri) *Assistant Professor of Information Science*
- Joanna Defranco, Ph.D. (New Jersey Institute of Technology) *Assistant Professor of Software Engineering*
- Mohamad Kassab, Ph.D. (Concordia) *Assistant Professor of Software Engineering*
- Phillip A. Laplante, Ph.D. (Stevens Institute of Tech) P.E. *Associate Professor of Software Engineering*
- Colin J. Neill, Ph.D. (Wales) *Associate Professor of Software and Systems Engineering; Director of Engineering Programs*
- Sally S. Richmond, M.S.I.S. (Penn State) *Lecturer in Information Science*
- Raghvinder Sangwan, Ph.D. (Temple) *Associate Professor of Software Engineering*
- *Satish M. Sriinivasan, Ph.D. (Nebraska, Omaha) Assistant Professor of Information Science*
- *Pamela Vercellone-Smith, Ph.D. (Penn State) Assistant Professor of Software Engineering*

This professional master's degree program, available at Penn State Great Valley, focuses on various aspects of software engineering. The primary goal of the program is to prepare students to develop the next generation of software products and services for consumers, industry, and government. The curriculum includes comprehensive, intensive coverage of modern software concepts and techniques, and emphasizes a holistic approach, encompassing financial, legal, and presales issues; technical concepts; software design techniques; methods; and project management.

The program is constituted by four, 9-credit modules of study. Each module is designed for in-depth coverage of a specific area of study (e.g., modem software methods, algorithms, information science). Two of the modules are required; one centers on professional, skill-based topics such as software project management or business communications, and includes the option to select a professional paper or the advanced software studio. The second required module comprises 9 credits of advanced software engineering course work. Graduate instruction is under the direction of a faculty committee.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the Graduate Bulletin.

The Master of Software Engineering (M SE) program is designed for students with technical backgrounds. Admission will be granted if the applicant has the necessary program prerequisites and a faculty member in the student's interest area agrees to serve as adviser. Candidates lacking in a modem programming language can meet that requirement by scheduling the 400-level software engineering studio. Scores from the Graduate Record Examinations (GRE) are not an entrance requirement unless the applicant has a junior/senior grade-point average below 3.00 (on a 4.00 scale).

Students with a 3.00 junior/senior average in an appropriate technical degree program will be considered for admission. The best-qualified applicants will be accepted. Exceptions to the minimum 3.00 grade-point average may be made for students with special backgrounds, abilities, and interests. Entering graduate students for whom English is not their first language are required to have a score of at least 550 on the TOEFL (Test of English as a Foreign Language

Program Requirements

All candidates must complete two required 9-credit core modules, for a total core curriculum of 18 credits, and two other 9-credit modules. At least 15 credits of selected courses must be at the 500 level.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

DATE LAST REVIEWED BY GRADUATE SCHOOL: 6/1/04

Faculty updated: 12/10/13

Systems Engineering (SYSEN)

Program Home Page

JAMES A. NEMES, *Professor and Director of Academic Affairs*
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610-725-3335

COLIN J. NEILL, Associate Professor and Director of Engineering Programs
School of Graduate Professional Studies
Penn State Great Valley, Engineering Division
610-648-3277
www.sgps.psu.edu

Degree Conferred:

M.Eng. in Systems Engineering

The Graduate Faculty

- Joanna Defranco, Ph.D. (New Jersey Institute of Technology) *Assistant Professor of Software Engineering*
- Nil H. Ergin, Ph.D. (University of Missouri-Rolla), *Assistant Professor of Systems Engineering*
- Kathryn Jablokow, Ph.D. (Ohio State) *Associate Professor of Mechanical Engineering*
- Mohamad Kassab, Ph.D. (Concordia) *Assistant Professor of Software Engineering*
- John I. McCool, Ph.D. (Temple) *Distinguished Professor of Industrial and Manufacturing Engineering*
- Allan Moser, Ph.D. (Purdue) *Associate Professor of Systems Engineering*
- Colin J. Neill, Ph.D. (Wales) *Associate Professor of Software and Systems Engineering; Director of Engineering Programs*
- James A. Nemes, D.Sc. (George Washington University) *Professor and Director of Academic Affairs*
- Michael J. Piovoso, Ph.D. (Delaware) *Professor of Electrical Engineering*
- David W. Russell, Ph.D. (CNAA, London) *Professor of Electrical Engineering*
- Kailasam Satyamurthy, Ph.D. (Clemson) *Assistant Professor of Engineering*
- Pamela Vercellone-Smith, Ph.D. (Penn State) *Assistant Professor of Software Engineering*

This professional master's degree program, available at Penn State Great Valley, deals with the various aspects of systems engineering. The primary goal of the program is to prepare engineers to develop the next generation of engineering products, systems, and services for industry and government.

The curriculum integrates the traditional engineering disciplines in a synergistic manner. Course work includes four 9-credit modules of study with each module designed for in-depth coverage of a specific area of study (e.g., systems and control, robotics). Two of the four modules, the Skill-Based module and the Systems Engineering module, are required and constitute an 18-credit core. To complete the program, students choose an additional 18 credits of electives in two modules of professional interest. As part of the 18-credit core curriculum, students who are nearing the end of their program complete a capstone research experience. Graduate instruction is under the direction of an interdisciplinary faculty committee and the departments participating in the program. The graduate faculty consists of members who have teaching and research interests in the area of systems engineering. Maximum flexibility is maintained by the program in an effort to meet both the professional needs of the individual students and academic quality standards.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

The M.Eng. in Systems Engineering program is designed for students with backgrounds in science or engineering. Admission will be granted if the applicant has the necessary program prerequisites and a faculty member in the student's interest area agrees to serve as adviser. Normal admission requirements include mathematics through differential equations. Scores from the Graduate Record Examinations (GRE) are not an entrance requirement unless the junior/senior grade-point average is below 3.00 (on a 4.00 scale). There is no foreign language requirement.

Students with a 3.00 junior/senior GPA in an appropriate technical degree program will be considered for admission. The best-qualified applicants will be accepted. Exceptions to the minimum 3.00 GPA may be made for students with special backgrounds, abilities, and interests. Entering graduate students for whom English is not their first language are required to have a score of at least 550 (paper) or 213 (computer) on the Test of English as a Foreign Language (TOEFL).

Degree Requirements

All candidates must take two required 9-credit core modules for a total core curriculum of 18 credits and two other 9-credit elective modules. At least 15 credits of selected courses must be at the 500 level.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

SYSTEMS ENGINEERING (SYSEN) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 6/1/04

Faculty updated: 12/10/13

Teaching and Curriculum (T & C)

Program Home Page

DEBORAH BETH SCOTT, *Coordinator of the Graduate Program in Teaching and Curriculum*
Penn State Harrisburg
Middletown, PA 17057
717-948-6213

Degree Conferred:

M.Ed.

The Graduate Faculty

The Program

The Master of Education in Teaching and Curriculum is designed to enhance the skills of teachers for public and private schools. The program focuses on three essential components--curriculum, instruction, and assessment--that contribute to the organization's philosophy of learning. The Teaching and Curriculum program is unified by its vision of critical thinking, democracy, diversity, lifelong learning, nurturance, and scholarship. Courses are designed to reflect the standards of the National Council for Accreditation of Teacher Education (NCATE) and the National Board for Professional Teaching Standards (NBPTS). The program is offered at Penn State Harrisburg and other selected Penn State campuses.

Specifically, the goals of the program are to develop in students (1) the ability to communicate effectively either with school-age students and their parents or with co-workers and/or clients; (2) the ability to conduct an instructional program that provides a sound intellectual and emotional climate for learning; (3) competence in a variety of teaching methods and in the utilization of materials and content appropriate for an effective instructional program; (4) the ability to interpret and to evaluate educational literature and research; and (5) the ability to describe and to evaluate major issues and current trends in instructional curriculum practice and development.

Certification programs are also available in the areas of early childhood education, English as a second language, and principalship.

Admission Requirements

Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

The M.Ed. Program in Teaching and Curriculum has four important admission requirements.

First, candidates must have achieved an overall junior/senior grade point average of 3.00 or higher. For candidates applying for admission who have completed credits beyond the baccalaureate degree, we will evaluate the last (approximately) 60 credits completed.

Second, candidates must submit two letters of recommendation. These letters must be from former professors or professionals who can attest to the academic ability and potential of the candidate.

Third, candidates must submit a 200-300 word personal statement that addresses their career goals and reasons for pursuing a graduate degree.

Fourth, candidates must submit test scores from one of the following: Graduate Record Examination, Miller Analogies Test, or Praxis examinations completed for certification.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for IELTS is 6.5.

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

Retention

Candidates must maintain a minimum 3.00 grade point average in courses approved by the program, satisfactorily complete all required key assessments, attain a grade "C" or better in all required core courses. Candidates who do not make satisfactory progress will be notified in writing noting the specific deficiencies and requesting that they meet with the program coordinator to develop a remediation plan. Failure to meet or to satisfactorily complete the remediation plan will result in termination from the program.

In compliance with the National Council for the Accreditation of Teacher Education (NCATE) requirements, all persons enrolled in Teacher Education Programs at Penn State Harrisburg are expected to demonstrate the professional dispositions that are aligned with the unit's vision statement. The faculty shall evaluate the approved dispositions demonstrated by the candidates in class and during field experiences. Candidates may be rated as exemplary, acceptable, or unacceptable. Candidates are expected to attain acceptable or exemplary ratings in order to graduate.

Degree Requirements

The Master of Education degree in Teaching and Curriculum provides students with two alternatives to meet the required culminating or capstone experience : (1) course work with a master's project (EDUC 587) or (2) course work that includes a capstone course (EDUC 591). Students may complete the degree requirements for either of the two alternatives with the approval of their adviser.

A total of 30 credits must be completed: 18 credits in core courses and 12 credits in electives. At least 18 credits must be at the 500 level or higher. A minimum grade-point average of 3.00 for work done at the University and acceptable or higher ratings on the professional dispositions are required for graduation.

Prescribed Core Course Requirements (18 credits)

Learning Theory: EDUC 520(3)
Curriculum Development and Instructional Design: EDUC 506(3) or EDUC 403(3) (Early Childhood only)
Educational Assessment: EDUC 539(3) or EDUC 404(3) (Early Childhood only)
Educational Foundations: EDUC 505(3)
Educational Research Designs: EDUC 586(3)
Culminating Course: EDUC 587 Master's Project or EDUC 591 Education Seminar

Electives

Students are required to take up to 12-15 credits of elective course work. Students may take all of those credits in education or, with the approval of their adviser, select up to 9 credits of electives in a field other than education.

Options

Language Arts Option: The goal of the language arts option is to provide students an in depth understanding of how research in theory in the language arts are related to language acquisition and growth; the knowledge and skills necessary for conducting informal assessments in the language arts and required to implement a variety of instructional procedures for the language arts; and an awareness of the role that literature can have in an effective language arts program at any level.

Mathematics Education Option: The objective of the mathematics education option is to provide courses that will emphasize current research and curriculum shifts related to the teaching of mathematics in K - 12 classrooms. This option requires completion of four EDMTH courses (a total of 12 credits): EDMTH 441, 442, 443, 444 in addition to the other program requirements.

Transfer Credits

Subject to the limitations given below, a maximum of 10 credits of high-quality graduate work done at a regionally accredited institution may be applied toward the requirements for the master's degree. However, credits earned to complete a previous master's degree, whether at Penn State or elsewhere, may not be applied to a second master's degree program at Penn State. The student should distinguish carefully between the transferability of credit and its applicability in a particular degree program. Approval to apply any transferred credits toward a degree program must be granted by the student's academic adviser, the program head or graduate officer, and the Graduate School. Transferred academic work must have been completed within five years prior to the date of the first degree registration at the Graduate School of Penn State, must be of at least B quality (grades of B- are not transferable), and must appear on an official graduate transcript of an accredited university. Pass-fail grades can be substantiated by the former institution as having at least B quality.

A maximum of 15 graduate credits taken as a nondegree student prior to admission to a graduate degree program may be applied to a graduate program, with departmental approval. The credits must have been earned within five years preceding entry into the degree program.

Forms for transfer of credit can be obtained from the graduate program office.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit courses below the 400 level in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

EDUCATION (EDUC) course list

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-107

Review Date: 01/10/2012

Editorial updates: 11/27/12

Facuty linked: 8/14/14; coordinator updated: 7/27/15

Teaching English as a Second Language (TESL)

Program Home Page

ROBERT W. SCHRAUF, *Department Head*
240 Sparks Building
814-865-7365

Degree Conferred:

M.A.

The Graduate Faculty

The Program

The M.A. program in Teaching English as a Second Language is designed to provide professional development for teachers and administrators in English as a second or foreign language. The program is problem focused, integrating theory and practice from the fields of applied linguistics and teaching English as a second language to address issues of second language acquisition/teaching and program development, with special focus on English in a wide range of both domestic and international contexts. Requirements include 36 credit hours, a M.A. paper, and a teaching e-portfolio. The department offers two paths to the MA/TESL. Students may complete the entire program in residence at University Park, or they may pursue a hybrid path to the degree, including 12 credits of 800-level online courses, followed by 24 credits (plus M.A. paper and teaching e-portfolio) in residence at University Park. Students pursuing the residential path to the degree may also take the department's 800-level online offerings, and these count as electives in their program of study.

Completion of this degree program does not automatically provide teacher certification in the Commonwealth of Pennsylvania. Further information on teaching certification is available from the College of Education. Students who desire to continue their studies in ESL at Penn State may apply to the Ph.D. program in Applied Linguistics through the Department of Applied Linguistics.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

The language of instruction at Penn State and online is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 60 0 for the paper-based test, or a total score of 100 with a 23 on the speaking section for the Internet-based test (iBT). The minimum acceptable composite score for the IELTS is 7.0 .

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

All applicants are also required to arrange for three letters of reference to be submitted along with a one- to two-page statement written by the applicant describing the applicant's goals and professional objectives.

Degree Requirements

The M.A. in TESL requires 36 credits, of which 18 credits must consist of 500-level courses. In lieu of a thesis, students must prepare a M.A. paper and compile a teaching e-portfolio. The following courses are required:

Foundations: 9 credits, including: APLNG 484, APLNG 491, APLNG 493

Professional Core: 6 credits from among the following: APLNG 410, APLNG 412, APLNG 482W, and APLNG 583 [required in the Hybrid Path]

Field Experience: 6 credits, including; APLNG 500, APLNG 595;

Research Methods: 3 credits from among the following courses: APLNG 577, APLNG 581, APLNG 582, APLNG 586, APLNG 592, and APLNG 593

Electives: 12 credits from among the following courses: APLNG 510, APLNG, 511, APLNG 512, APLNG 570, APLNG 572, APLNG 575, APLNG 576, APLNG 584, APLNG 587, APLNG 588, APLNG 589, APLNG 591, or other courses with approval of the adviser

Residential Path: With guidance from their advisers, students who are enrolled in the Residential Path take 12 credits in electives. Any 500-level 3-credit course not taken as a requirement of Research Methods can be counted as an elective in the resident MA/TESL program.

Resident Path students are allowed to take any or all of the APLNG 800-level courses as electives in any sequence during the MA/TESL program. If 12 credits of APLNG 800-level courses are taken, resident path students are required to take APLNG 583 and, in consultation with their academic advisor, substitute two 500-level electives (6 credits) for appropriate courses listed under Foundations and/or Professional Core.

Hybrid Path: Students who choose to take the hybrid path to the degree will have already taken APLNG 802, APLNG 804, APLNG 806, and APLNG 808 online, and these online courses take the place of the 12 credits of elective courses. Hybrid path students are required to take APLNG 583 and, in consultation with their academic advisers, substitute two 500-level electives (6 credits) for appropriate courses listed under Foundations and/or Professional Core.

Capstone Projects. All students must also complete a M.A. paper and teaching e-portfolio.

Student Aid

Graduate Assistantships that may be available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

APPLIED LINGUISTICS (APLNG) course list

Last Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-05

Review Date: 02/25/2014

Faculty linked: 6/5/14

Theatre (THEA)

Program Home Page

WILLIAM DOAN, *Head of the Graduate Program in Theatre*
123 Theatre Building
814-865-0591

Degree Conferred:

M.F.A.

The Graduate Faculty

The Program

The master of fine arts degree program in Theatre pursues the following objectives: (1) to assist each student in acquiring discriminating taste and critical judgment in theatre; (2) to help each student attain skills and proficiencies in theatre; (3) to provide the training, discipline, and opportunities essential to the development of a professional ability in at least one area of theatre; and (4) to prepare each student for an active career in academic and/or professional theatre or other areas within the entertainment industry.

Facilities include the Playhouse, a 450-seat proscenium theatre; the Pavilion, a 249-seat thrust theatre; a 150-seat proscenium theatre in the heart of downtown State College; theatre production studios for scenic, property, and costume preparation; two computer-assisted design laboratories; a lighting laboratory; a sound and media studio; and rehearsal and dance studios.

Admission Requirements

Graduate Record Examination (GRE) scores, or comparable examination scores, are not required for admission to the School of Theatre. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Requirements for admission to the M.F.A. program are (1) a broad undergraduate preparation in theatre, including 3 credits each in acting, directing, stagecraft, and theatre history; and 6 credits of dramatic literature; (2) 12 credits in related subject areas such as communications, oral interpretation, art, business, music, and dance; and (3) submission of a vita and at least three letters of recommendation.

Additional requirements for M.F.A. candidates are (1) submission of evidence of professional potential in the proposed area of specialization-auditions, prompt books, portfolios, manuscripts, and other appropriate presentations-to the applicable study program(s) by arrangement with the department; and (2) a personal interview to be arranged by the student.

Master of Fine Arts Degree Requirements

The program entails specialized professional training in one of the following areas: acting, directing, scene design, costume design, costuming, lighting design, and technical direction. Six semesters in residence are normally required to complete the minimum 60-credit degree.

Students are evaluated on a semester-by-semester basis on academic progress, creative achievement, and professional potential. The M.F.A. is a professional degree and is granted by the Graduate Faculty on the basis of academic and creative excellence over and above the fulfillment of requirements. Satisfactory academic progress does not guarantee continuance in the program, nor does continuance in the program imply the automatic granting of a degree. M.F.A. candidates are required to participate in the School of Theatre productions in positions of responsibility. Additionally, each student must complete a committee-approved monograph project in the area of specialization. An international residency is required and is funded by the school.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

THEATRE (THEA) course list

DATE LAST REVIEWED BY GRADUATE SCHOOL: 5/17/04

Faculty linked: 6/5/14; Program head updated: 9/29/15

Master of Professional Studies in Turfgrass Management

ANDREW S. MCNITT, *In Charge of Master of Professional Studies in Turfgrass Management Graduate Program*
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Degree conferred:

Master of Professional Studies (M.P.S.)

The Graduate Faculty

The Program

The Master of Professional Studies in Turfgrass Management (MPS-TM) is a 30-credit terminal master's degree program that emphasizes a systems approach to turfgrass management. The program balances theory and practice. Courses taught in MPS-TM use web-based lessons, quizzes, exams, and team projects and exercises to provide a balance between individualized study and interactive learning. Individuals who currently work as managers of turfgrass facilities, including golf courses and professional sports complexes, would benefit from this program. The MPS-TM program requires the completion of four core courses in which students learn to apply scientific concepts to fundamental problems encountered in the management of complex turfgrass ecosystems. Additionally, a capstone individual studies in turfgrass management course is a project that integrates theory and practice in addressing real problems encountered in turfgrass facility management.

Degree Requirements

The professional master's degree requires 30 credits including a final integrative project. All students complete the required MPS-TM core program of turfgrass courses. The MPS-TM turfgrass courses consist of TURF 850 (Turfgrass Physiology), AGRO 851 (Applied Plant Population Biology), TURF 852 (Turfgrass Health Management), TURF/PPATH 853 (Turfgrass Science Literature), and AGRO 596 (Individual Studies in Agronomy). An integrative project is required in which the student demonstrates the capability to integrate and apply concepts, principles, analytical techniques, and interpretation skills learned in the program to a real problem faced in turfgrass facility management. In consultation with their advisor, students also take an additional 15 credits of elective coursework to focus on their particular interest within turfgrass facility management. A total of 18 credits must be 500-level or higher, with at least 6 credits of 500-level course work; this Graduate School requirement is met through the required courses, the project, and at least one 500-level elective course.

List of required courses in proposed program*

AGRO 596 Individual Studies in Agronomy (3) Used by students to work with an advisor on their capstone project.

AGRO 851 Applied Plant Population Biology (3) Lectures and exercises designed to develop student competency in plant selection to promote ecological diversity and genetically superior plants.

TURF 850 Turfgrass Physiology (3) Lectures, reading assignments, and exercises designed to develop student competency in plant physiology as it relates to turfgrass management strategies.

TURF 852 Turfgrass Health Management (3) Lectures and exercises designed to develop student competency in solving turfgrass pest problems, as well as disease resistance in turfgrasses.

TURF/PPATH 853 Interpreting Turfgrass Science Literature (3) Introduction to turfgrass research publications, interpretation of the data, and discussion of the significance of the results.

*See Appendix B for elective courses

Admission Requirements

Applicants must submit a letter of professional introduction in which they describe their professional experiences and education, delineate their career goals, and discuss how the MPS-TM program will enable them to meet their objectives. Applicants must also provide three letters of reference and recommendation. The best-qualified applicants will be accepted up to the number of spaces that are available for new students. Scores from Graduate Record Examination (GRE), or from a comparable substitute examination accepted by a graduate program are required for admission; however, exceptions may be considered on a case-by-case basis. The language of instruction at Penn State is English. International applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test. International applicants are exempt from the TOEFL/ELTS requirement who have received a baccalaureate or a master's degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales. Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires an institutional test of English proficiency upon first enrollment and, if necessary, remedial course work. The minimum composite score for the IELTS is 6.5. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.*

Transfer Credits

If students have successfully completed courses from another institution that are equivalent to the elective turfgrass courses (TURF 425, 434, 435, and 436) with grades of B or better, these can be applied toward satisfying the MPS-TM degree requirements. Transferred academic work must have been completed within five years prior to the date of first degree registration at the Graduate School, must be equivalent to "B" quality (grades of B- are not transferable) on Penn State's grading system, and must appear on an official graduate transcript.

Student Aid

Students in this program may receive financial assistance from their workplace or bear the cost of the degree personally. Other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin.* The forms of financial aid noted in the bulletin available to residential graduate students are not available to students studying via the World Campus, e.g., assistantships, fellowships. The other common form of financial aid is loans.

Typical Schedule

Flexibility is a key principle of the design of this program. Each course will be offered once each academic year. Sequencing of courses is determined by the semester the student begins the program. Students and their advisor will develop a plan of study upon completion of the second course taken in the program or the end of the first year, whichever occurs sooner. Many students may take three or four courses per year while others may only take one or two. Because of this, the time to degree will average three years and one semester. The typical schedule for offering the required MPS-TM courses is shown in

Table 1.

Table 1. MPS-TM REQUIREMENTS (30 credits)

REQUIRED COURSES (12 credits)

FALL SEMESTER	SPRING SEMESTER
AGRO 851 (3) Applied Plant Population Biology	TURF 852 (3) Turfgrass Health Management
TURF 850 (3) Turfgrass Physiology	TURF/PPATH 853 (3) Turfgrass Science Literature

INTEGRATIVE PROJECT (3 credits)

AGRO 596 (3) Individual Studies

ELECTIVES (15 credits)

See list of approved elective courses available through Penn State. All electives listed are offered online. Must include at least one 500-level (3 credit) course.

Elements of Residency

We propose several strategies to meet the elements of residency in MPS-TM. We describe these strategies and then indicate how each contributes to various elements of residency. Table 2 provides a summary of the program strategies that contribute to each element of residency. These elements will be phased into the program over the first five years the program is in existence. The elements will be evaluated for their effectiveness and modifications made, as necessary, to ensure a quality educational experience. This section is organized by the strategies we plan to use to meet the elements of residency.

Strategy A–Seminars and discussions: CSS offers departmental seminars during Fall and Spring Semesters. Topics that are relevant to MPS-TM students will be made available for students to view using appropriate technology. We then would offer chat-room time and threaded discussion opportunities for the students to interact with each other and with the presenter and/or a faculty facilitator. Faculty and graduate students in the program will be invited to participate in the discussions. We will explore the use of real-time teleconferencing for students to join the seminars, but the geographical (time zone) distribution of our students may make this difficult. Strategy A contributes to residency elements 1, 2, 4 and 7. Strategy A provides opportunity for interaction among students and faculty outside of direct instruction (1); offers students a chance to interact with each other on the topic (2); provides broader exposure to and socialization to the field and to related fields (crop science, soil science, horticulture, plant pathology, entomology) (4); and it increases student identification with Penn State (7) by giving students the opportunity to discuss topics with faculty and graduate students in the other two graduate programs in the department (i.e., Agronomy, Soil Science). It also will increase student awareness of the department and the breadth of its substantive expertise. We expect that at least one seminar per semester will be made available in this way and we expect all students currently enrolled in the program to take part in one of these seminar/discussion opportunities each academic year. Strategy A will be phased in during year 1 of the new program

Strategy B–Student seminar or discussion of their capstone project in the program: An important part of socialization and sharing of information is student-led seminars and discussions. Each student in the program will be required to offer a seminar and/or to lead a discussion about their capstone project. This is the integrative experience in the program and will be a required element for completion of the program. As part of this, the student will post the presentation and the full project report prior to the seminar/discussion. The student will work with their faculty advisor and the MPS-TM program coordinator to develop the content of the seminar and/or discussion questions. The faculty advisor and the MPS-TM program coordinator will provide support to the student during the seminar and/or discussion. This will give other students an opportunity to become familiar with the requirements of the integrative experience as well as allowing for sharing of the experiences of the student completing the program. We will evaluate the feasibility of video conferencing for those students interested in giving a formal seminar, and recording the presentation for distribution to students and others unable to participate in real-time. Alternatives to video conferencing include a threaded discussion format based on the written document, and/or specific times for students and faculty to visit a chat room for a guided discussion led by the student. Strategy B contributes to residency elements 1, 2, 4, 6 and 7. Strategy B offers an opportunity for interaction between students and faculty outside the course context (1); encourages interaction among students with student led discussions (2); provides students an opportunity to explore substantive or socialization issues in the field (4); allows students to contribute their own insights, knowledge and expertise and to share those with other students and faculty in the program, the department, college and university (6); and increases identification with Penn State through participation in university-sponsored discussions (7). This strategy will be phased in as the first cohorts of students in MPS-TM complete their programs.

Strategy C: Informal discussions. An online ‘coffee room’ will be set up as a space for informal discussions among students and faculty. Topics may be proposed by students and faculty. A threaded discussion format will be used, although the ‘coffee room’ also will be available for chat rooms for a particular meeting or discussion group. Participation will be voluntary and we expect different students and faculty to take part depending on the topics. Strategy C fulfills residency elements 1, 2, 4, 6 and 7. Informal student interaction with faculty is encouraged (1), as is interaction among students (2). The topics are likely to include issues of socialization in the field and practical application of course content and so will contribute to residency element (4). The discussions and interactions will allow students to contribute their expertise and experiences, shaping faculty knowledge of applications in the field and providing ideas for applied research. Thus, these discussions will enable students to contribute to the program, college and university (6). Participation will increase identification with Penn State (7). Strategy C will be phased in during year 1 of the program.

Strategy D: Students as experts. The CSS department has an established undergraduate major in Turfgrass Science (TS) that has important conceptual and practice overlap with MPS-TM. We plan to provide opportunities for students in MPS-TM to participate as experts in the field or as video conference presenters on certain topics in the undergraduate classes. Again, the practical, real world experiences of MPS-TM students will be invaluable in helping the undergraduates to understand how the information from classes translates into application. This interaction also will provide undergraduate students opportunities to interact with professionals in the field about the nature of their careers, the kinds of tasks they do on a daily basis, and the relevance of program/course content. Strategy D contributes to residency elements 1, 2, 4, 6 and 7. In developing the undergraduate course presentation, MPS-TM students will work with the faculty member in the course to develop content and instructional strategies thus providing socialization and experience with instruction (1, 4); if a panel is used then MPS-TM students on the panel will need to interact to organize the presentation (2). MPS-TM students would make a clear and strong contribution to the program, college, and university by participating as experts, panel members in undergraduate courses related to their coursework and professional experiences (6). Such participation will increase the identification with Penn State (7). Students will be encouraged to participate in one such activity during their program.

Strategy E: Students as mentors. MPS-TM students will be asked to serve as mentors in two capacities. First, ‘senior students’ will be asked to serve as mentors to new students in the MPS-TM program. This will include providing advice, responding to questions that new students in the program might have, and helping new students to navigate the somewhat less-structured world of online courses (where there is no formal class meeting time). Since many students are already practitioners, these mentoring relationships should help to build networks among students on which they can draw in their professional careers, not just in the program context. Second, MPS-TM students will be asked if they would be interested in volunteering to mentor one or two undergraduate students in the TS program. This provides MPS-TM students with experience in mentoring and providing leadership to those with less knowledge and experience, and it enhances the experiences of the undergraduate students to have a practitioner to whom they can turn with substantive/career-related questions. Strategy E contributes to residency elements 2, 4, 5, 6 and 7. This strategy encourages interaction among students (2), provides a socialization/professionalization experience guided by faculty (4), it provides a student perspective on the program and courses in terms of advising (5), allows students in MPS-TM to make invaluable contributions to the program, college and university through involvement in undergraduate education (6), and increases student involvement in and identification with Penn State and its programs (7). Strategy E will be phased in during years 2 and 3 of the MPS-TM program and the Turfgrass Science undergraduate program, as feasible.

Strategy F: Annual Turfgrass Management Institute. One element often missing from online programs is face-to-face interaction. We propose to offer an

Annual Institute for one week during the fall Penn State Golf Turf Conference to bring faculty and students together at University Park. The Institute would include substantive topics or short courses that would describe recent developments in different areas of turfgrass science and management, and would provide opportunities for informal discussions and socializing among students and faculty. Because of the costs involved, this will not be a required element, but we will strongly encourage students to participate at least once during their program. In addition, we would plan to invite new students to participate in the Institute prior to taking their first course. We also would invite alumni to attend and to participate in organizing/presenting some of the sessions. Student and alumni mentors could then meet those they are mentoring. Opportunities for advising sessions on coursework and an introduction to the program would be included for students new to the program. Times also would be available for students to set up meetings with their academic advisors to discuss their integrative experience. Some sessions in the Institute may be made available to those unable to attend in person. The Annual Institute contributes to all of the elements of residency. The institute provides opportunities for face-to-face interaction among faculty and students (1); among students (2); will increase access to information and instructional resources of the program, department and University (3); offer opportunities for socialization to the field (4); provide face-to-face academic and program advising (5); enable students to contribute by helping to organize sessions and use their expertise (6); and a visit to University Park is generally always a good way to increase identification with Penn State (7). We view the Institute as an important element of the program, and will work to develop funding mechanisms to assist students and alumni in covering the costs of travel to and living expenses while visiting Penn State. We expect to offer the first institute during the second fall following the approval of the MPS-TM program.

Strategy G: Academic advising and support services. Academic advising is provided initially by the Graduate Program Coordinator who is a tenure-line faculty member in the program. Students will be encouraged to identify a permanent faculty advisor as soon as possible in the program and will work through a proposed schedule of courses and a tentative timeline within the first year. This process will be facilitated by the Graduate Program Coordinator. Advising is conducted by email and phone. Once a faculty advisor is identified, the student can seek advice from the faculty advisor, the Graduate Program Coordinator, or from other faculty and students in the program. Advising also will be available through an online advising ‘coffee room,’ the Annual Institute, and the use of senior students in MPS-TM as mentors/peer advisors. Materials providing specific information on program requirements, the unique aspects and responsibilities of participating in an online program, identifying a faculty advisor and committee, and the integrative experience are being developed and will be available on the program web site. Support for MPS-TM will be provided by a staff assistant in CSS and through initial contact with World Campus personnel/advisors. Students will apply for admission directly to the MPS-TM program in the academic department. Strategy G meets residency elements 1, 3, 4 and 5.

Strategy H: MPS TM program web site. We view the MPS-TM program web site as an essential element in creating a ‘home and identity’ for the MPS-TM program. The web site will contain the typical elements of an educational program with information on application guidelines, course offerings, requirements for the degree, information on faculty in the program, and links to broader Penn State resources. We also propose to develop elements of the web site that will provide opportunities for interaction (formal and informal), program and course review and evaluation, professional networking, and building program identity. Interaction linked through the web site would be the opportunities to participate in organized chat rooms or threaded discussions related to the departmental or student seminars or discussion (Strategies A and B) informal discussion chat-rooms and threaded discussions (Strategy C), and the ‘coffee room’ (Strategy C, E and F). The ‘coffee room’ also can be used for course review and evaluation where access would be restricted to students in a particular course and the faculty peer evaluator of the course. One page on the web site would include links to professional organizations, nationally and within states, that provide training and conferences for practitioners and researchers in topics related to community and economic development. We plan to identify these through searches, but also by the organizations in which our students and alumni participate. This site also will include a link to a discussion area about insights obtained from student/faculty/alumni participation in particular conferences. Another element would be a restricted access site that includes information on former and current students in MPS-TM. This would include information on current positions, locations, and areas of expertise of the students and alumni; lists of the capstone projects completed by the students with links to electronic copies, and a map showing locations of current and former students. We see this information as building identity with the program and Penn State and encouraging continued participation in the program by alumni. This alumni/student/faculty space would include access to chat rooms, threaded discussions, and coffee rooms on organized topics and informal discussion topics introduced by members. The web site contributes to all elements of residency. It offers opportunities for interaction among faculty and students (1), interaction among students and among students and alumni (2), provides access to information and instructional resources (3), increases exposure to substantive issues in the field and to professional networks and experiences (4), provides access to advising information and support services (5), offers a means for students and alums to stay connected with the program and contribute substantively both formally and informally (6), and creates a location and reason for continuing active participation in and identification with the Penn State community. We plan to develop a new website for the MPS-TM program and to phase in various elements within the first three years of the program.

Ultimately, we would like to employ all of the above strategies to increase participation and interaction available to alumni of the MPS-TM program. The alumni of this program are practitioners in the field or work in related areas and can provide an invaluable resource to current graduate and future undergraduate students, the program, and Penn State. We would hope to use the ‘friends of Penn State’ accounts to provide access to the web sites and associated activities. Recent efforts by the Penn State Alumni Association and University Libraries to offer some restricted access to library resources to members of the Alumni Association also will increase the benefits to alumni of retaining their contact and interaction with the program and with Penn State. The special interaction elements related to community and economic development offered to alumni and students should increase the attractiveness to alumni of staying involved.
Another element would be a virtual coffee room for informal discussions with and among students. We will maintain alumni and former student lists. As we develop the program website, we will consider an electronic newsletter for alums and a special alums page on the web site.

Last Revised by the Department: Summer Session 2010

Blue Sheet Item #: 38-04-099

Review Date: 01/12/2010

Faculty linked: 8/14/14

Wildlife and Fisheries Science (W F S)

Program Home Page

MICHAEL G. MESSINA, *Director of the School of Forest Resources and Professor of Forest Resources*
121 Forest Resources Building
814-863-7093

Degrees Conferred:

Ph.D., M.S.

The Graduate Faculty

The Program

Programs are designed to give students an understanding of the biology and management of terrestrial or aquatic wildlife species and their environments, and include training in fish and wildlife ecology, nutrition, physiology, behavior, and pathology of wildlife species; study of successional stages, land use, and management of various habitats and their impact on fish and wildlife populations; population dynamics and manipulation of animal numbers; and studies of recreational, aesthetic, and socioeconomic values of fish and wildlife. Most programs of study are strengthened by including appropriate courses offered by related departments.

Admission Requirements

Scores from the Graduate Record Examinations (GRE) are required for admission. A student may be admitted provisionally without GRE scores. Requirements listed here are in addition to general Graduate School requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

Application materials should be submitted before February by those who want to begin in summer or fall. For admission, an applicant should have at least a 2.75 grade-point average, a 3.00 junior/senior average, and courses that are basic to the individual's field of specialization. Ordinarily these include 12 credits in communication, 12 credits in social sciences and humanities, 10 credits in quantification including calculus and statistics, 8 credits in chemistry and/or physics, 8 credits in biological sciences, and 18 credits in fish, wildlife, forestry, or related courses. Three reference reports (forms supplied on request), and a brief statement describing the applicant's academic goals, career interests, and special qualifications are required. The best-qualified applicants will be accepted up to the number of spaces available. Exceptions to admission requirements may be made for students with special backgrounds, abilities, and interests.

Admission to the Ph.D. program in Wildlife and Fisheries Science requires a master's degree in wildlife and fisheries science or a closely related field, or a bachelor's degree with a minimum grade-point average of 3.30 and demonstrated research ability.

Master's Degree Requirements

M.S.: In addition to Graduate School requirements, 6 credits of statistics and 2 credits of colloquium are required.

Doctoral Degree Requirements

Doctoral students would normally emphasize either wildlife or fisheries in their course selection. Course work shall include at least 15 graduate credits beyond those required for an M.S. in Wildlife and Fisheries Science. At least 9 of these credits must include courses at the 500 level with a Wildlife and Fisheries Science designation.

An international communications or cultural requirement is required for the Ph.D. degree. This requirement may be satisfied by demonstrating competence in one foreign language equivalent to passing two or three college-level courses. It also may be met by two courses in one or two contemporary foreign cultures. With approval of the doctoral committee, a student may petition the Graduate Faculty of the school for waiver of the international communications or culture requirement.

Students must pass the candidacy examination during their first year of residence and a comprehensive examination which is given after all course requirements have been completed. The final examination is oral; all doctoral students are required to present a public seminar on their dissertation prior to the final examination.

Watershed Stewardship Option

The Graduate Option in Watershed Stewardship is intended to provide enhanced educational opportunities for students with an interest in water resources management who are enrolled in a graduate degree program within Wildlife and Fisheries Science. The objective of the Graduate Option in Watershed Stewardship is to educate students to facilitate team-oriented, community-based watershed management planning directed at water resources problems encountered in Pennsylvania communities, especially nonpoint source water pollution. The Graduate Option in Watershed Stewardship requires 22 credits of graduate course work: 12 credits of breadth courses, 2 credits of Watershed Stewardship Seminar courses (FOR 591A and 591B or LARCH 510.2), and 8 credits of Watershed Stewardship Practicum I and II courses (FOR 570 and FOR 571 or LARCH 540.2 and LARCH 550.2). One credit of FOR 591 would count as a colloquium course toward degree requirements, but at least 1 additional credit of FOR 590 is required. Breadth courses will consist of three graduate credits of course work from each of four subject matter areas: (1) water resources science, (2) social science, public policy and economics, (3) humanities, and (4) communications and design. In the watershed stewardship practicum courses students work in teams with community, government and business leaders to analyze and understand natural resources problems and creatively synthesize appropriate solutions in the form of a written watershed management plan.

A representative pattern of scheduling for the Graduate Option in Watershed Stewardship in addition to a student's other degree requirements might be:

First Year:

Fall Semester
Breadth electives--6 credits
FOR 591A or LARCH 510.2,
Watershed Stewardship
Issues Colloquium--1 credit

Spring Semester
Breadth electives--6 credits
FOR 591B or LARCH 510.2,
Watershed Colloquium--1 credit

Second Year:

Fall Semester
FOR 570 or LARCH 540.2,
3 credits
Keystone Project

Spring Semester
FOR 571 or LARCH 550.2,
5 credits
Keystone Project

A list of acceptable breadth courses from each discipline is provided in the Graduate Option in Watershed Stewardship Handbook. Students will be allowed to petition to the Center for Watershed Stewardship to substitute higher level or equivalent courses in a major field to suit their specific backgrounds and goals. Courses taken for the Graduate Option in Watershed Stewardship may be used to satisfy other equivalent (400- or 500-level) degree requirements with concurrence of their adviser and graduate committee. The graduate committee for a student enrolled in the Option in Watershed Stewardship must include a faculty representative from the Center for Watershed Stewardship.

Students enrolled in M.S. or Ph.D. degree programs within Wildlife and Fisheries Sciences may apply to participate in the Graduate Option in Watershed Stewardship.

Other Relevant Information

Each entering student receives individual guidance from an adviser, and later from his or her committee, in designing a program of studies and research based on his or her own interests. The student is responsible for conforming to all requirements summarized in the "Graduate Studies Handbook" of the School of Forest Resources, and for completing the degree program within a reasonable time, i.e., two years for a master's degree and three years for a Ph.D.

Student Aid

In addition to the fellowships, traineeships, graduate assistantships, and other forms of financial aid described in the STUDENT AID section of the *Graduate Bulletin*, the following awards typically have been available to graduate students in this program:

Forest Resources: Jesse Rossiter Rapp Memorial Scholarship
Available to graduate students in the School of Forest Resources who are not holding assistantships as graduate students. Apply to the School of Forest Resources' Scholarships, Loans, and Awards Committee.

Roger M. Latham Memorial Award
Awarded to outstanding graduate students specializing in wildlife or fisheries after at least one semester in residence.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

WILDLIFE AND FISHERIES SCIENCE (W F S) course list

See also Forest Resources.

Last Revised by the Department: Fall Semester 2016 (Joint Degree Removed)

Blue Sheet Item #: 40-05-081

Review Date: 02/21/2012

Faculty linked: 6/5/14

Workforce Education and Development (WF ED)

Program Home Page

SUSAN LAND, *Director of Graduate Studies*
310D Keller Building
814-863-5990
WorkforceEdUP@psu.edu

Degrees Conferred:

Ph.D., M.S., M.Ed.

The Graduate Faculty

The Program

The general focus of the program is preparation for entry into professional positions within the broadly conceived field of workforce education and development, including human resource development in industry, secondary and postsecondary technical education, and employability programs for special populations. Emphases within the program include: training and development/human resources, leadership/administration, school-to-work, and postsecondary technical and community college leadership.

Admission Requirements

Admission to graduate programs in Workforce Education and Development (WF ED) is based on the faculty's evaluation of a candidate's prior undergraduate and graduate work, relevant prior work experience including military service, and career goals. A minimum undergraduate GPA of 2.50 is required for admission to the master's degree program. A GPA of 3.00 in prior graduate course work is required for admission to the doctoral program.

Degree Requirements

Master's Degrees Requirements

M.Ed. and M.S. degrees are offered in Workforce Education and Development, both of which require a minimum of 30 credits beyond the baccalaureate degree. M.S. candidates must complete a master's thesis or paper. Candidates for the M.Ed. degree must complete a written comprehensive examination.

Doctoral Degrees Requirements

The Ph.D. degree is offered in Workforce Education and Development. Two or more years of prior full-time work experience that is relevant to WF ED is an important consideration in evaluating applications for the doctoral program. Students are admitted only for the fall semester. Beginning students are not formally granted candidate status for a doctoral degree until successfully completing the candidacy exam given in the spring semester. Please see WF ED Web site for further details.

Student Aid

A limited number of graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the *Graduate Bulletin*.

Courses

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

WORKFORCE EDUCATION AND DEVELOPMENT (WF ED) course list

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-109

Review Date: 01/10/2012

Faculty linked: 6/5/14

Women's Studies (WMNST)

Program Home Page

MELISSA WRIGHT, *Head, Department of Women's Studies*
LISE NELSON, *Graduate Officer*

133 Willard Building
814-863-4025; fax: 814-863-3578

Degrees Conferred

Students electing this program through participating departments will earn a degree with a dual title at both the Ph.D. and M.A./M.S. levels, i.e., Ph.D. in (graduate program name) and Women's Studies, or M.A./M.S. in (graduate program name) and Women's Studies.

The following graduate programs offer dual degrees in Women's Studies: Art Education, Curriculum and Instruction, English, French, Geography, History, Philosophy, Political Science, Psychology, and Rural Sociology.

The Graduate Faculty

Women's Studies-affiliated faculty include individuals with budgeted appointments in Women's Studies and individuals with courtesy joint appointments.

The Program

Dual-title degrees grounded both in Women's Studies and a given discipline will acknowledge and foster scholarly work across disciplines. A dual-title degree program will increase the intellectual rigor and breadth of graduate work through immersion of candidates in Women's Studies and their discipline. The dual-title degree will also provide a context in which students can learn to synthesize knowledge within and across disciplinary boundaries. In addition, a dual-title degree program provides students with an opportunity for increased work within a pedagogical framework that also encourages an interdisciplinary approach to teaching.

The primary advantages of dual-title degrees include the intellectual and academic advantages of interdisciplinary, strengthening the reputation of individual programs/departments through innovative degree programs, increased recruitment of quality graduate students, and improved placement of doctoral graduates.

The dual-title degree programs do not duplicate other degree programs in the University.

Admission Requirements

In addition to the admission requirements set forth by the Graduate School and the cooperating department, students will be admitted to graduate study in Women's Studies by an admissions committee of Women's Studies-affiliated faculty. The Women's Studies program will follow the timetable and admission requirements of the cooperating department. Applicants should have a junior/senior cumulative average of at least 3.00 (on a 4.00 scale) and appropriate course background should be considered for study. It is required that prospective students seeking admission to a dual-title degree program will write a statement of purpose that addresses the ways in which their research and professional goals will reflect an interest in interdisciplinary and feminist research.

Degree Requirements

The dual-title degree will have requirements above those for the graduate minor, which currently requires 9 credit hours for the M.A./M.S. and 15 credit hours for the Ph.D. The requirements for the dual-title degree include increased course work, additional components to the comprehensive exams at the doctoral level, and the completion of women's studies related theses at both the master's and doctoral level. Degree requirements for dual-title degrees in Political Science, French, History, English, Education, Geography, Curriculum and Instruction, and Philosophy will be added to the Women's Studies Graduate Handbook.

Master's Degree

9 required credits (WMNST 501, WMNST 502, WMNST 507)
3 additional credits of Women's Studies course work
Thesis on a Women's Studies-related topic, or another 3 additional credits of Women's Studies course work and a master's essay will be approved by the student's committee

Ph.D. Degree

9 required credits (WMNST 501, WMNST 502, WMNST 507)
9 additional credits of Women's Studies course work (at least 6 of these should be at the 500 level)
Comprehensive examination in Women's Studies and the disciplinary field
Dissertation on a Women's Studies-related topic will be approved by the student's committee

Foreign Language and English Competency Requirements

The student will fulfill the language requirement specified by the cooperating department through which the student is admitted to the dual-title degree program.

Candidacy

In order to be admitted to doctoral candidacy in the dual-title degree program, students must meet the Ph.D. candidacy requirements specified by the cooperating department. In addition, the student will be required to present a portfolio of work in Women's Studies to their committee. Such a portfolio would include a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's work in Women's Studies.

Committee Composition

For a dual-title M.A./M.S., the recommended student's committee will include at least one Women's Studies-affiliated faculty member.

For a dual-title Ph.D., 2 out of 4 members of the committee will be Women's Studies-affiliated faculty members.

Comprehensive Exams

The Women's Studies affiliated faculty members on the student's committee are responsible for administering a comprehensive examination in Women's Studies that constitutes a portion of the student's comprehensive exams. The women's studies portion of the exam will focus on the following areas: feminist theory, feminist methodology, global feminism, and feminist studies in the student's discipline.

Dissertation

A dissertation on a women's studies topic is required of students in the dual-title degree program. The women's studies-related topic of the dissertation will be approved by the student's committee.

Women's Studies Minor

An interdisciplinary dual-degree graduate minor is available, administered by the Women's Studies program. Each student's major and minor is planned by the student and the Women's Studies graduate adviser in consultation with the student's graduate adviser in his or her major field.

Master's Minor Requirements: Master's-level dual-title degree students are required to take 9 credits of course work in Women's Studies: WMNST 501 Feminist Perspectives on Research and Teaching (3 credits); WMNST 502 Global Feminism (3 credits); and WMNST 507 Feminist Theory (3 credits). Students also must complete 3 additional credits in Women's Studies, chosen in consultation with the Women's Studies graduate adviser.

Doctoral Minor Requirements: Doctoral-level dual-title degree students are required to take 9 credits of course work in Women's Studies: WMNST 501 Feminist Perspectives on Research and Teaching (3 credits); WMNST 502 Global Feminism (3 credits); and WMNST 507 Feminist Theory (3 credits). Students also must complete 9 additional credits of Women's Studies course work (at least 6 of which should be at the 500 level), chosen in consultation with the Women's Studies graduate adviser.

9 credits required credits of Women's Studies courses for master's level
15 credits required credits of Women's Studies courses for doctoral level

The above credits are in addition to the requirements for the student's major. Six credits consist of required courses in feminist theory (3) and feminist methodology (3). The remaining credits may include a combination of WMNST 400- and 500-level courses, as well as special topics courses (numbered 497 and 597) and independent/individual studies (496 and 596).

Prescribed courses (6 credits): WMNST 507 Feminist Theory; WMNST 501 Feminist Perspectives on Research and Teaching

Additional courses (a minimum of 3 credits at the 500 level)

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the STUDENT AID section of the Graduate *Bulletin.*

Last Revised by the Department: Fall Semester 2001

Blue Sheet Item #: 29-07-048

Review Date: 9/2/03

3/28/08 (moved minor description into program description, per Graduate School)

Faculty linked: 6/5/14; Department head updated: 10/1/15

Informatics (INMAC)

Program Home Page

ANDREW SEARS, *Dean, College of Information Sciences and Technology*
MARY BETH ROSSON, *Associate Dean for Graduate and Undergraduate Studies*

Office of the Dean
College of Information Sciences and Technology
The Pennsylvania State University
E397 Westgate Building, University Park, PA 16802-6823
Dean's office: 814-865-3528

Degree Conferred

Ph.D.

The Graduate Faculty

Program Description

The graduate program in Informatics offers advanced graduate education for students contemplating careers in academic teaching and research, or research in a non-academic setting. The program is interdisciplinary in nature and expects scholarship at the highest level exhibiting depth of competency in at least one of the core areas of informatics, and an understanding of the integration of the critical constructs that drive the field: people, information, and technology.

Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants to the program are required to submit scores from the general portions of the Graduate Record Examinations (GRE), three letters of reference, a current resume (including present position and any publications), a 1 to 3 page statement of research background and goals related to pursuing an advanced degree and career in informatics, which also briefly discusses personal motivation for obtaining a Ph.D., and a sample of the applicant's writing (e.g., technical paper, etc.).

Because the program is multidisciplinary in nature, students from many different disciplines may be accepted for entry into the program. A bachelor's degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics, as well as computer and information technology. Related work experience can be used to demonstrate such competency. A student may be accepted into the program with provisional status for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study and/or graduate-level study. However, accomplishments demonstrated through work experience and recommendation letters from the applicant's academic adviser or employer will also play an important role in making the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The doctoral degree in Informatics requires a minimum of 32 credits, including 8 required core credits in IST 501 (3); either IST 510, IST 520, or IST 530 (3); and IST 590 (2). In addition, doctoral students must take 12 credits of research methodology courses and 12 credits of specialization courses.

To complete a Ph.D. degree, students must in their first semester take the 3-credit introduction to interdisciplinary research methods (IST 501) and one credit of graduate colloquium (IST 590). In their second semester, students must take a second credit of graduate colloquium. During their first two semesters, students must take at least one of the three foundations courses (IST 510, IST 520, or IST 530).

In addition to these first-year requirements, doctoral students must complete 12 credits of research methodology courses selected to introduce or increase proficiency in methods relevant to their doctoral research agenda, and 12 credits of specialization courses, also selected to reinforce their research training. In addition, all candidates must be competent in the English language and must have demonstrated skills in the communication of ideas both verbally and in writing commensurate with the requirement of scholarly and professional work. The candidacy examination will be used as an occasion to assess English proficiency and plan for remediation (including additional courses, mentoring, or experiences) for all students. A brief critical literature review in three complementary research areas will be included as part of the candidacy assessment process. Students must have completed 18 graduate credits before taking the candidacy exam and must pass the candidacy exam within three semesters. Students must pass the Ph.D. comprehensive examination after completion of most of the course work, usually at the end of the student's second year in the program. A research-based dissertation must be completed under the direction of the doctoral committee, with the student submitting a dissertation proposal and defending that proposal in the defense examination. To earn the Ph.D. degree, doctoral students must write a dissertation that is accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

INFORMATICS Course List

Last Revised by the Department: Summer 2018
Review Date: 6/26/2018

Information Sciences (INSCI)

Program Home Page

ANDREW SEARS, *Dean, College of Information Sciences and Technology*
MARY BETH ROSSON, *Associate Dean for Graduate and Undergraduate Studies*

Office of the Dean
College of Information Sciences and Technology
The Pennsylvania State University
E397F Westgate Building, University Park, PA 16802-6823
Dean's office: 814-865-3528

Degree Conferred

M.P.S. in Information Sciences

The Graduate Faculty

Program Description

The Master of Professional Studies in Information Sciences (MPS-INSCI) is an innovative program that targets professionals and organizational leaders who seek a professional education and training program. The purpose of the professional master's program is to produce professionals and organizational leaders who not only can select and draw upon the necessary foundations within the information sciences and information technology areas, test the applicability of these foundations for addressing a given issue, and apply the resulting solutions, but also can be aware of the multitude of technological trends and environmental factors that organizations must address in the changing global economy.
The MPS-INSCI equips students to:

1. Understand and analyze the profound information and technological changes sweeping the world;
2. Meet challenges by developing innovative solutions using the foundations of information sciences and technology; and
3. Have a clear advantage in today's highly competitive and dynamic environment by continuously learning new trends, issues, and innovations.

Admission Requirements

Requirements listed here are in addition to general Graduate Council requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. Applicants apply for admission to the program via the Graduate School application for admission.

Applicants to the program are required to submit scores from the general portions of the Graduate Record Examinations (GRE) or the Graduate Management Admissions Test (GMAT), three letters of reference, and a one-three page personal statement of relevant experience and goals. The GRE or GMAT requirement may be waived for applicants to the Master of Professional Studies Program at the discretion of the program if the student has five or more years of relevant information sciences and technology working experience.

Because the program is multidisciplinary in nature, students from many different disciplines may be accepted for entry into the program. A bachelor's degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the degree. It is expected that students will have a basic level of competency in statistics, as well as computer and information technology. Related work experience can be used to demonstrate such competency. A student may be accepted into the program with provisional status for no more than one year while work is completed to meet these expectations.

It is expected that the successful applicant will have an overall grade point average of 3.00 (on a 4.00 scale) or higher for his or her undergraduate study and/or graduate-level study. However, accomplishments demonstrated through work experience and recommendation letters from the applicant's academic adviser or employer will also play an important role in making the admission decision. The most qualified applicants will be accepted into the program until all spaces for new students are filled.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

The MPS-INSCI program requires a minimum of 33 credits, 24 of which must be earned at Penn State. A maximum of 9 transfer credits of high-quality graduate work may be applied toward the requirements for the degree, subject to restrictions outlined in the Transfer Courses section of the *Graduate Bulletin*. At least 18 credits must be courses at the 500 or 800 level, with at least 6 credits at the 500 level. A student can choose to be in the Base Program or in the Cybersecurity and Information Assurance (CIA) Option. The 33 credits are distributed among the following requirements. A student first takes 9-credits of core courses. The student then takes 12 credits of prescribed courses for either the base program or the Cybersecurity and Information Assurance Option. An additional 9 credits are elective courses. Lastly, the student must complete a master's project guided by the student's adviser and completed while enrolled in IST 594.

Core Courses (9 credits). The core of the MPS-IS consists of three courses -- IST 852, IST 554, and IST 816. These courses represent the core technical foundations to study Information Sciences and Technology.

The Base Program (12 credits of prescribed courses and 9 credits of electives). The base program consists of four required courses - IST 815, IST 521, IST 532, and IST 564 - and 9 credits of elective courses, in addition to the 9-credit core and 3-credit capstone course. It is designed for students who do not have a special interest in mind. The elective courses are chosen in consultation with the student's adviser. Hence, it offers the flexibility that enables the student to build an in-depth knowledge and skills about information sciences tailored to his/her interests and background. Students from the Harrisburg region can also select courses from Penn State Harrisburg to fulfill the prescribed courses (by substitution) and 9 credits of electives.

Cybersecurity and Information Assurance (CIA) Option (12 credits of prescribed courses and 9 credits of electives). The CIA option consists of four prescribed courses, IST 815, IST 555, IST 456, and IST 885, and 9 credits of elective courses selected from a list of approved electives available from the program office, in addition to the 9-credit core and 3-credit capstone courses. These courses enable the student to focus on developing knowledge and skills for information analysis, information assurance, and decision support including theories, techniques, and applications of data mining, data fusion, information search, information security, and intelligent resource allocation.

Master Project (3 credits). The project requires all students in the MPS-IS to focus on a well-defined issue or problem relevant to the information sciences and technology. The student will submit a project proposal to his/her faculty adviser for approval. Upon completion of the project, the student will share or present the project results at a final presentation as a component of IST 594.

Student Aid

Graduate assistantships available to students in this program and other forms of student aid are described in the Student Aid section of the *Graduate Bulletin*. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit

these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

INFORMATION SCIENCES AND TECHNOLOGY (IST) course list

Last Revised by the Department: Summer 2018

Review Date: 6/26/2018

Faculty linked: 6/20/14; Deans updated: 7/1/15; Program home page link: 7/16/15

Management and Organizational Leadership

DR. BRIAN H. CAMERON, *Associate Dean for Professional Graduate Program*
The Smeal College of Business
220S Business Building
814-863-1460

Degree Conferred:

M.P.S.

The Graduate Faculty

Master of Professional Studies in Management and Organizational Leadership

The Master of Professional Studies in Management and Organizational Leadership prepares graduates to stand out in a competitive job market by studying at a highly-reputed business school with some of the world's leading academic thinkers and industry experts. This program provides students with the business, leadership, and organizational skills needed for effective change management, strategic management, and high-performance team development. Students will acquire the business skills needed to succeed in today's dynamic work environments, gain a firm understanding of business issues and problems, and be prepared to become successful leaders. The program is taught by the same world-class professors who teach our M.B.A. students. A solid foundation in strategy, decision analysis, management, accounting, marketing, operations, and finance will make graduates more attractive to hiring managers and enable them to advance more rapidly into management and leadership positions. These learning outcomes are achieved by a combination of lectures by faculty, invited guest lecturers, reading of key literature, individual and team projects, and practical involvement in a leadership immersion capstone experience.

Admission Requirements

Educational Background

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*.

The student cohort reflects today's international business environment, with selective admittance. With this in mind, the following are the admission requirements:

- Undergraduate bachelor's degree from a regionally accredited institution
- GMAT or GRE scores
- Submission of a completed Graduate School Application for Admission, including:
  - Statement of Purpose: a 600 word essay articulating career and educational goals that demonstrate strong written communication skills
  - Résumé
  - Two letters of recommendation that attest to readiness for graduate study
- Official transcripts from all post-secondary institutions attended
- Work experience post-undergraduate graduation of 18 months or less
- Visa Application (International Candidates)

Candidates who have demonstrated a strong academic background may apply for a waiver of the GMAT/GRE requirement, which may be granted at the discretion of the program.

Language of Instruction

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Management and Organizational Leadership program applicants must have minimum TOEFL scores of:

- Internet-Based: 100
- Speaking Section: 20
- Paper-Based: 600

The minimum acceptable composite score for the IELTS for applicants to the Management and Organizational Leadership program is 7.0

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin*.

Total required credits for the Master of Professional Studies in Management and Organizational Leadership program is 30 credits.

Required courses: (30 credits)

Number	Name	Credits
B A 800	Marketing Management	2
B A 801	Management	2
B A 802	Team Process & Performance	1
B A 804	Ethical Leadership	2
B A 810	Supply Chain & Operations	2
B A 811	Financial Accounting	2
B A 512	Risk and Decisions	2
B A 815	Statistics	2
B A 817	Communication Skills for Management	4 (1 per mod)
B A 821	Managerial Accounting	2
B A 831	Finance	2
B A 832	Global Business Environment	1
B A 533	Economics for Managers	2

B A 571	Strategic Management	2
B A 880	Leadership Immersion	2

Culminating Experience: 2 credits

- B A 880 Leadership Immersion

Employers need future leaders. Our Leadership Immersion course provides practical and hands-on exposure to leadership training and exercises that can be applied in a diverse range of professional environments and business settings. Leadership Immersion programs take students out of their comfort zones to experience leadership and teamwork from a different perspective. The Capstone course provides an opportunity to apply and integrate the knowledge and skills that were gained throughout the Master of Professional Studies in Management and Organizational Leadership program with strategic management and leadership concepts. A capstone paper is one of the major deliverables in this course.

Student Aid

Refer to the STUDENT AID section of the Graduate Bulletin. Students in this program are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Strategic Communications

Frank E. Dardis, *Lead Faculty of Strategic Communications*
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814-863-7993
fed3@psu.edu

Degree Conferred

Master of Professional Studies (MPS)

The Graduate Faculty

Master of Professional Studies in Strategic Communications

The MPS degree in Strategic Communications is a 30-credit program of study for individuals who are in the early and middle stages of their strategic communications careers, currently in or aspiring to managerial positions. The content of the program will be appropriate for such individuals employed in a wide range of functional specialties and industry sectors, including advertising, public relations, and strategic communications.
The MPS degree in Strategic Communications examines the process and application of purposive mass communication that is delivered to specific target audiences through varied mass media and other communications channels. Program content exposes the student to a broad range of strategic communications theory, research, and practical application related to developing and implementing effective communications plans for companies and organizations of all types. Courses examine how persuasive communication functions through mass media and other communication channels; how specific communications goals are developed based on theory and rationale; how strategic communications plans and campaigns are created and executed; and how the effectiveness of communications plans is measured and evaluated.

Admission Requirements

Requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* Applicants apply for admission to the program via the Graduate School application for admission.

Educational Background

A minimum 3.00 junior/senior grade-point average (on a 4.00 scale) is recommended. Students also are expected to have some industry work experience prior to admission.

Language of Instruction

The language of instruction at Penn State is English. English proficiency test scores (TOEFL/IELTS) may be required for international applicants. Consult the English Proficiency section of the Graduate Bulletin Application and Admission Procedures page for more information.

Core Application Packet

- Completed official online Graduate School application and payment of nonrefundable application fee.
- Statement of purpose: a 2-3 page essay articulating career and educational goals that demonstrates the student's written communication skills.
- A current vita or résumé.
- Three letters of recommendation that attest to the student's readiness for graduate study and document the requisite industry experience. Letters must be submitted through the online application. Within the online application you will be asked to enter the names and email addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via email asking them to complete a brief form that will serve as your recommendation. Please inform all recommenders they must submit the form in order for your application to be complete.
- Official transcripts from all post-secondary institutions attended.

Degree Requirements

Requirements listed here are in addition to requirements stated in the DEGREE REQUIREMENTS section of the *Graduate Bulletin.*

Total required credits for the MPS: at least 30 credits at the 400, 500, or 800 level; at least 27 must be at the 500 or 800 level, with at least 6 at the 500 level.

1. Student must take the following 21 required credits (7 courses)

Course Number	Course Title	Credits
COMM 530	Research Methods in Strategic Communications	3
COMM 531	Strategic Communications: Theory and Implementation	3
COMM 830	Strategic Communications Industry	3
COMM 831	Digital Media Analytics	3
COMM 832	Multimedia Content Development and Delivery	3
COMM 833	Ethics and Decision Making in Strategic Communications	3
COMM 834	Strategic Communications Campaigns (Capstone Course)	3

2. Student must take at least an additional 6 elective credits (2 courses) from the list below:

Course Number	Course Title	Credits
COMM 835	Social Media Communications	3

COMM 836	Strategic Communications Leadership	3
COMM 837	Reaching Multicultural Populations with Strategic Communications	3
COMM 838	Strategic Communications Law	3
COMM 839	Advanced Digital Media Analytics	3

3. Student must take at least an additional 3 elective credits from any World Campus course(s), which can be at 400-level (this includes all elective courses listed above).

Culminating Experience: (3 credits)

- COMM 834 -- Strategic Communications Campaigns (Capstone Course)

The culminating experience provides students with an opportunity to apply their knowledge of the theories and principles concerning strategic communications to a practical campaign project. Specific campaign clients and scope can vary, but all representative aspects of each project would include: setting effective communications goals; identifying proper target audiences to best achieve the goals; developing specific, effective messages for each target audience; creating the message content across multiple media platforms; implementing a message-delivery plan that optimizes effectiveness and efficiency; and evaluating campaign performance against predetermined, measurable benchmarks.

Course Substitutions

Substitutions for the above prescribed courses, either with resident-education courses, alternate online courses, or courses from other institutions, will be considered on a case-by-case basis subject to restrictions outlined in the Transfer of Nondegree and Certificate Graduate Credits, and must be petitioned and approved in advance by the program administrator, with input from the student's adviser.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. World Campus students in graduate degree programs may be eligible for financial aid. Refer to the Tuition and Financial Aid sectionof the World Campus website for more information.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer Session 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/17

Visual Studies (VSTUD)

Program Homepage

Daniel Purdy, *Professor of German Studies*
Department of Germanic and Slavic Languages and Literatures
Burrowes Building
dlp14@psu.edu

Christopher Reed, *Liberal Arts Research Professor of English and Visual Culture*
Department of English
Burrowes Building
865-4242
creed@psu.edu

Degree Conferred

Students electing this program through partnering departments earn a degree with a dual-title at the Ph.D. level, i.e. Ph.D. in (graduate program name) and Visual Studies.

The Graduate Faculty

The Program

The dual-title Ph.D. in Visual Studies fosters an interdisciplinary approach to humanistic study, which, spurred by technological dynamics that increasingly integrate text and image, engages analysis of specific images, physical and virtual environments, and visual sign systems; histories of visual modes of communication, apprehension, and aesthetic pleasure; and conceptions of the nature of visuality itself. Students in this program analyze and assess visual media that, integrated with texts, are integral to humanistic scholarship and pedagogy today. Dual-title degree programs increase the intellectual rigor and breadth of graduate work and provide a context in which students learn to synthesize knowledge within and across disciplinary boundaries in both scholarship and teaching. Drawing from knowledge and practices produced across the humanistic disciplines while responding to ongoing challenges to conventional disciplinary boundaries, this degree highlights existing strengths of graduate training in the humanities at Penn State, structures the continuing development of these programs, and credentials our graduates' training and work with visual forms, environments, and media.

Admission Timing and Process

Students must apply and be admitted to their primary graduate program and The Graduate School before they can apply for admission to the Visual Studies dual-title degree program. Applicants interested in the dual-title degree program may make their interest known on their applications to their primary graduate program, and should ensure their personal statements reflect their interest in the Visual Studies dual-title graduate program. After admission to their primary program, students must apply for admission to and meet the admissions requirements of the Visual Studies dual-title program. Doctoral students must be admitted into the dual-title degree program in Visual Studies prior to obtaining candidacy in their primary graduate program.
With the approval of the Director of Graduate Studies in their primary graduate program, students already enrolled in a co-operating graduate program at Penn State may apply to the Visual Studies program at any time after they are admitted as graduate students in their primary graduate programs. Applicants must submit the following materials to the Visual Studies Academic Advisory Committee, which will determine admission to the program:

- A letter of approval from the Director of Graduate Studies in your primary graduate program
- A copy of your Graduate School Application which was originally submitted to your primary graduate program
- Official transcripts from previous coursework, including transcripts that accompanied application to the Graduate School and transcripts of coursework completed at Penn State (Photocopies of transcripts sent from the home department are acceptable)
- Official GRE scores (Photocopies of GRE scores sent from the home department are acceptable)
- A writing sample
- A personal statement that describes how the dual degree program fits with your scholarly interests
- 1 letter of recommendation from a Visual Studies faculty member at Penn State

Degree Requirements

To qualify for the dual-title degree, students must satisfy the requirements of their primary graduate program. In addition, they must satisfy the requirements described below, as established by the Visual Studies dual-title degree program.

Course work

The minimum course requirements for this dual-title Ph.D. degree are as follows:

- 15 credits of course work related to Visual Studies, all at the 500- or 800-level. In certain circumstances, a 400-level course may be substituted with the approval of the Director of the Visual Studies graduate program and the student's adviser. Such approval must be granted in writing before the course is taken and will require work supplementing the syllabus, such as a culminating research paper. Of the 15 credits required for the Visual Studies dual-title, 6 must come from the two required core courses in the Visual Studies program: VSTUD 501 "Visual Culture Theory and History" and VSTUD 502 "Visual Studies in Digitality."
- Students must also take 9 elective credits from courses approved by the Visual Studies Academic Advisory Committee. In order to promote interdisciplinarity, at least 3 of these credits must be from a college, department, or program outside the student's home department or program. Students may complete the courses contributing to the Visual Studies degree in any sequence.

A list of courses approved to count towards the Visual Studies dual-title degree requirements will be maintained by the program office.

Candidacy Examination

The dual-title field will be fully integrated into the candidacy exam for the doctoral program. The candidacy examination committee for the dual-title Ph.D. degree must include at least one Graduate Faculty member from the Visual Studies program. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. In addition, students in the dual-title Ph.D. degree program in Visual Studies will be required to present to their candidacy committee a portfolio of work in Visual Studies, including a statement of the student's interdisciplinary research interests, a program plan, and samples of writing that indicate the student's interest in questions related to the Visual Studies.

Because students must first be admitted to a graduate major program of study before they may apply to and be considered for admission into a dual-title graduate degree program, dual-title graduate degree students may require an additional semester to fulfill requirements for both areas of study and, therefore, the candidacy examination may be delayed one semester beyond the normal period allowable.

Doctoral Committee Composition

In addition to the general Graduate Council requirements for doctoral committees, the doctoral committee of a Visual Studies dual-title doctoral degree student must include at least one member of the Visual Studies Graduate Faculty. Faculty members who hold appointments in both programs' Graduate Faculty may serve in a combined role. If the committee chair does not represent Visual Studies, the committee member representing Visual Studies must be appointed as co-chair.

Comprehensive Exam

After completion of required course work, doctoral candidates for the dual-title doctoral degree must pass a comprehensive examination. The Visual Studies Graduate Faculty member on the candidate's committee is responsible for developing and administering the Visual Studies portion of the candidate's comprehensive exam. The exam must incorporate written and oral components addressing Visual Studies based on the student's areas of interest and specialization in Visual Studies.

Dissertation and Final Oral Examination

The candidate must complete a dissertation on a topic that reflects his or her original research and education in both the primary graduate program and Visual Studies. In order to earn the dual-title Ph.D. degree, the dissertation must be accepted by the doctoral committee, the head of the graduate program, and the Graduate School, and the student must pass a final oral examination (the dissertation defense).

Student Aid

Graduate assistantships and other forms of student aid are described in the Student Aid section of the Graduate Bulletin. Students on graduate assistantships must adhere to the course load limits set forth in the Graduate Bulletin.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Last Revised by the Department: Summer Semester 2017

Blue Sheet Item #: 46-01-000

Review Date: 8/22/2017

Graduate Minors

A graduate minor may be taken in one of the approved graduate degree programs offered at Penn State. However, some formal graduate minors have been approved by the Graduate Council, such as the minors listed on this page. A minor at the graduate level must represent curriculum and study that reflect graduate-level concepts and scholarship, with a preponderance of courses at the 500 level.

A student seeking a minor must have the approval of the student's major program of study, the minor program, and the Graduate School. A student may not pursue more than three minors at one time. If a student pursues more than one minor, each minor must have a separate group of courses to support it (i.e., none of the courses may be used concurrently).

A doctoral minor consists of no fewer than 15 graduate credits of integrated or articulated work in one field related to, but different from, that of the major with a preponderance of courses at the 500 level; however, at a minimum, 6 credits must be at the 500 level. Official requests to add a minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishing the doctoral committee and prior to scheduling the comprehensive examination. For more information regarding minors, please see the following web pages.
---For doctoral students:
http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm
---For Ph.D. candidates:
http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq2
For D.Ed. candidates:
http://bulletins.psu.edu/bulletins/whitebook/degree_requirements.cfm?section=degreeReq3

A master's minor consists of no fewer than 6 credits of integrated or articulated work in one field related to, but different from, that of the major; however, at a minimum, 3 credits must be at the 500 level. Official requests to add a master's minor to a student's academic record must be submitted to Graduate Enrollment Services at least one semester prior to the semester the student intends to graduate.

Updated: 12/14/11

Computational Materials

The use of computational modeling tools is ubiquitous in materials research. The Computational Materials minor provides a fundamental graduate education in materials simulation techniques. The coursework 1) provides foundational courses in materials modeling, offered at various length scales, 2) integrates both broad foundational courses for students interested in a wide range of modeling techniques and/or specialized courses allowing students to develop depth in a specific modeling technique/scale, and 3) provides a flexible set of electives that will assure students are exposed to materials-related phenomena in their area of expertise. The minor provides students the recognition of having built a background in Computational Materials, as well as the access and oversight of faculty in the minor to help them integrate these concepts with their doctoral research.

Admission to the minor will require completion of a first core course in the minor, approval from the student's major Graduate Program Head/Graduate Program Chair/Director of Graduate Studies or Professor-in-Charge, and submission of a minor plan of study (listing intended courses by semester and approved by the student's intended minor faculty doctoral committee member) submitted to the MATSE department graduate program coordinator. A form for the minor plan of study and its approval will be included on the minor website, accessible from the MATSE department webpage and the CoMET website. Graduate students in good standing (with current graduate GPA at or above 3.0) who have approval and who have completed a minor core course with a grade of B or higher will be admitted to the minor.

The doctoral minor consists of no fewer than 15 credits, 9 credits of which must be from a list of core minor courses, and 6 credits of which are elective courses. A minimum of 6 credits must be at the 500 level. The core minor courses are:

CHEM 565 (3) Quantum Chemistry I

CHEM 566 (3) Quantum Chemistry II

PHYS 561 (3) Quantum Mechanics I

PHYS 512 (3) Quantum Theory of Solids I

MATSE 419 (3) Computational Materials Science and Engineering

MATSE 544 (3) Computational Materials Science of Soft Materials

MATSE 580 (3) Computational Thermodynamics

MATSE 581 (3) Computational Materials Science II: Continuum, Mesocale Simulations

A list of elective courses is maintained on the minor webpage of the Department of Materials Science and Engineering (www.matse.psu.edu). The minor website also provides a list of faculty who may represent the minor on doctoral committees. The minor is only available to doctoral students. Official requests to add a minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishment of the doctoral committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from the minor field must serve on the candidate's doctoral committee.

Last Revised by the Department: Spring Semester 2017

Blue Sheet Item#: 45-06

Review Date: 4/4/2017

Computational Science

The Department of Aerospace Engineering administers this interdisciplinary minor. Each student's program is planned by the student and a designated computational science adviser, in consultation with the graduate adviser in the student's major field.

The minor offers an opportunity for students in all colleges and majors to pursue a focused set of courses that emphasize computational science. The minor requires 9 credits in computational science courses for a master's degree and 15 credits for a doctoral minor. All students must take at least one of these: AERSP 424, CMPSC 450, NUC E 530, or CSE 557 *and* at least one of these: MATH 523, MATH/CSE 550, STAT 500, or STAT/IST 557. The additional credits will be chosen from a list of approved courses on the CSCI website (www.csci.psu.edu). In addition, for the Master's Minor and Ph.D. Minor the students can use at most 6 and 9 credits, respectively, from (or cross-listed with) their home department.

More information can be found on the CSCI website: http://www.csci.psu.edu.

Last Revised by the Department: Spring Semester 2011

Blue Sheet Item #: 39-04-588

Review Date: 01/11/2011

Electrochemical Science and Engineering Minor

This graduate minor is highly relevant to numerous graduate degree programs associated with energy, materials, and environmental sciences offering a unique set of skills that will benefit graduate students to develop expertise in electrochemical systems that complements their primary focus in batteries, fuel cells, or structural design. The minor will also help expand the students' knowledge and capabilities in important topics relating to electrochemical and renewable energy fundamentals, devices and systems.

The doctoral minor will consist of no fewer than five 3-credit courses (15 credits) of integrated or articulated work in electrochemical science and engineering, related to but different from, that of the major, drawn from the two lists (500-level courses and 400-level courses) below, with a preponderance of courses at the 500 level. A minimum of 6 credits must be at the 500 level for the doctoral minor.

500-level courses:
EME 541. Electrochemical Science and Engineering Fundamentals
CHEM 524. Electroanalytical Chemistry
E SC 501. Solar Cell Devices
CH E 510/MATSE 510. Surface Characterization of Materials
CH E 528. Colloidal Forces and Thermodynamics
MATSE 560/MN PR 507. Hydrometallurgical Processing
MATSE 501. Thermodynamics of Materials
MATSE 503. Kinetics of Materials Processes

400-level courses:

EGEE 420. Hydrogen and Fuel Cells
EGEE 437. Design of Solar Energy Conversion Systems
EGEE 441. Electrochemical Engineering Fundamentals
EME 407. Electrochemical Energy Storage
E SC 455. Electrochemical Methods Engineering and Corrosion Science
MATSE 421. Corrosion Engineering
M E 403. Polymer Electrolyte Fuel Cell Engines

The master's minor will consist of no fewer than two 3-credit courses (6 credits) of integrated or articulated work in electrochemical science and engineering, related to but different from, that of the major, drawn from the two lists above. A minimum of 3 credits must be at the 500 level for the master's minor.

A student enrolled in this graduate minor must receive a grade of B- or better in all minor courses.

Admission Requirements

Any graduate student enrolled at Penn State in a related field of study may be admitted to the Electrochemical Science and Engineering graduate minor.

A representative from the Graduate Faculty in the graduate minor (i.e., a "Minor Field Member") must be appointed to the doctoral committee of each student enrolled in the doctoral minor in Electrochemical Science and Engineering.

Last Revised by the Department: Summer Session 2014

Blue Sheet Item #: 42-07-000

Review Date: 06/10/2014

Gerontology

The interdisciplinary graduate minor in Gerontology is administered by a committee of faculty appointed by the Gerontology Center Advisory Board. The committee members represent diverse programs within the University. Students admitted to the minor will develop a course of study that includes both prescribed course work and additional course work suited to the student's interests. The minor course of study will be developed jointly by the student, the student's academic adviser, and one member of the graduate minor gerontology committee. Contact the Gerontology Center (S-105 Henderson) for information regarding the committee membership.

The minor requires a minimum of 10 credits of the master's level and 15 credits at the doctoral level, 10 of which are prescribed. The prescribed courses are: BIOL 409 Biology of Aging (3); HD FS/PSYCH 445 Development throughout Adulthood (3); HD FS 590 Gerontology Colloquium (1); and SOC 435/HD FS 434 or SOC 535 (3). Doctoral students must select a minimum of 5 additional credits from among the following courses: ADTED 460, 505, CN ED 415, EDPSY 527, HD FS 446, 447, 579, H P A 442, KINES 481, 482, NURS 464, 500, SOC 535, and gerontology-related special topics courses (SUBJ 497, 597) or independent studies (SUBJ 496, 596).

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-06-540

Review Date: 4/10/07

Latin American Studies

The Latin American Studies graduate minor is administered by the Latin American Studies committee. The minor offers students the ability to study the region of Latin America from an interdisciplinary perspective and is open to students from across the University. It is housed in three departments: History; Comparative Literature; and Spanish, Italian and Portuguese. Graduate students from across the University are encouraged to participate. Students who are admitted to the minor will develop courses of study suited to their special interests. The minor for each student will be planned jointly by the student, the student's doctoral adviser, and an adviser designated by the Latin American Studies committee. Any change in the plan must be approved by both advisers. A minimum of 15 credits must be completed, with a minimum of 6 credits at the 500-level. Per graduate school regulations for the minor, a representative of the minor will participate on the student's doctoral committee.

Last Revised by the Department: Fall Semester 2009

Blue Sheet Item#: 37-07-034

Review Date: 0616/2009

Latina and Latino Studies

The Latina and Latino Studies graduate minor is an interdisciplinary minor that will be administered by a faculty committee appointed by the dean of Liberal Arts and made up of faculty in English, Comparative Literature, Spanish, and other appropriate disciplines. Graduate students from across the university are encouraged to participate. Students who are admitted to the minor will develop courses of study suited to their special interests. The minor for each student will be planned jointly by the student, the student's doctoral adviser, and an adviser designated by the Latina and Latino Studies committee. Any change in the plan must be approved by both advisers.

A minimum of 15 credits must be completed. Per graduate school regulations for the minor, a representative of the minor will participate on the student's doctoral committee. This representative may be a member of the Latina and Latino Studies committee or any other faculty member approved by that committee.

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-06-540

Review Date: 4/10/07

Literary Theory, Criticism, and Aesthetics

This is an interdisciplinary doctoral minor that is administered by two designated advisers, one from the Department of Comparative Literature and one from the Department of Philosophy. Students who are admitted to the minor will develop courses of study suited to their special interests. The minor for each student will be planned jointly by the student and the two advisers, in consultation with the student's doctoral adviser in his or her major field. Any change in the plan must be approved by all of the advisers. A minimum of 15 credits must be selected from among the following courses (including at least 3 credits each in comparative literature and philosophy, chosen from the asterisked courses): ART H 410, CMLIT 502*, 503*, 580, ENGL 581, 582, 583, FR 571, GER 591, PHIL 413, 414*, 516*, 581, 582, SPAN 587, SPCOM 503, 505, 507, or THEA 503, 504. Note 1: 3 credits of SUBJ 596 in one of the nine subject areas indicated may be substituted for one of the non-asterisked 3-credit courses. Note 2: A student majoring in one of the nine subject areas may not include any courses in that field as part of the minor. Appropriate courses may be substituted.

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-06-540

Review Date: 4/10/07

Last updated by Publications: 12/18/06

Linguistics

The doctoral minor provides interested students with an opportunity to complete a program of scientific study focused on the nature, structure, and use of human language. The minor is designed to cover the foundations of the discipline of linguistics by reviewing fundamental core areas such as phonology and syntax. Course work is also available in many additional areas of linguistics such as semantics, morphology, language variation, historical linguistics, and discourse analysis.

The minor requires a minimum of 15 credits, 6 of which must be at the 500 level. Nine credits are prescribed in syntax (LING 400), phonology (LING 404), and a general introduction to linguistics (LING 401), although a linguistics course at the 500 level may be substituted for LING 401 with the approval of the director of the program in Linguistics.

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-06-540

Review Date: 4/10/07

Medieval Studies

The graduate minor in Medieval Studies offers graduate students in the humanities an interdisciplinary field of study in an important era in European development. The minor provides students with a broader historical and cultural background for their major discipline. Graduate status is required for admission to the minor.

The graduate minor in Medieval Studies requires 9 credits of course work (of which 3 credits are at the 500 level) for a master's candidate and 15 credits of course work (of which 6 credits are at the 500 level) for a doctoral candidate; the courses will be selected in consultation with an adviser for the minor, who will normally be a member of the Liberal Arts Medieval Studies Committee; and with the chair of the student's graduate committee. The courses for the minor will be chosen from at least two of the following areas outside the students' area of specialization: arts; history; literature and language; medieval studies; philosophy and religious studies; and other areas as available. The sequence of the courses will be determined by the student's major department.

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-06-540

Review Date: 4/10/07

Science, Technology, and Society

This interdisciplinary graduate minor is administered by the Science, Technology, and Society Program. Each student's program will be planned by the student and designated S T S graduate adviser, in consultation with the graduate adviser in the student's major field.

The goal of the graduate minor in Science, Technology, and Society is to complement graduate and professional students' major programs through study of the interactions among science, technology, and society. More specific objectives are to promote scholarship in the humanities and social sciences concerning the social and ethical dimensions of science and technology; to inform those training in the scientific and technical professions about the social and ethical dimensions of their professional practice; and to develop research and rhetorical skills used in shaping public discourses about, and public policies regulating, science and technology.

The minor requires 9 credits in S T S courses for a master's and 15 credits for a doctoral minor. Six credits consist of S T S 589 Ethics and Values in Science and Technology and S T S 591 Research and Writing in S T S. The remaining credits may include 400- and 500-level, special topics (S T S 497 and 597), and independent study (S T S 496 and 596) courses.

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-06-540

Review Date: 4/10/07

Second Language Acquisition

This interdepartmental doctoral minor draws upon the opportunities that various departments offer to study the processes of language acquisition and pedagogy, and to conduct research in these fields. Developments in the theories of language acquisition, the practices in language instruction, and the technical innovations provide a wide range of resources for secondary specializations in second language acquisition theory. The minor provides an official credential for doctoral students who complete an organized program of study.

The minor requires a minimum of 15 credits at the 400, 500, or 600 levels (beyond credits used for degree requirements in the student's field of study), consisting of one or two methodology courses totaling 3 credits and 12 additional credits selected from an interdepartmental list of eligible courses, with approval both by the student's doctoral committee in his or her major field, and by the person in charge of the minor. A maximum of 6 credits may be taken at the 400 level, and no more than 3 credits of 602 may count toward the minor. Courses in at least two departments must be included. Further, students must complete at least two semesters' experience in supervised teaching of either a foreign language or ESL, or alternative equivalent practicum if approved by the doctoral committee and the person in charge of the Minor.

In general, students whose major field of study in the Ph.D. is a concentration in foreign language acquisition or ESL are not eligible for this minor, as their field of specialization already includes this area. However, students in English as a Second Language may do the minor with a focus on foreign language acquisition or a student with a specialty area in forced language acquisition may complete the minor with a specialty area in English as a Second Language.

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-06-540

Review Date: 4/10/07

Social Thought

The purpose of the Social Thought minor is to enable graduate students in a variety of fields to study theories of society across conventional disciplinary boundaries. The minor enables qualified students to enrich their own chosen fields of study with readings and discoveries from other, contiguous fields. The minor requires at least 15 credits of courses with social thought content. These are courses taught by STP Affiliated Faculty or those approved by the STP Advisory Committee. Those 15 credits must include the following: at least 9 credits of courses from outside the student's major discipline and SOCTH 501 -- Introduction to Social Thought. In addition, at least one member of the student's dissertation committee must be an STP Affiliated Faculty and preferably be from outside the student's major discipline.

Last Revised by the Department: Summer Session 2007

Blue Sheet Item #: 35-06-540

Review Date: 4/10/07

Information and Communication Technologies for Development

The inter-college graduate minor in ICT4D provides doctoral and master's students with exposure to the multidisciplinary theoretical and methodological foundations of ICT4D and opportunities for scholarly engagement with communities of practice in the discipline. It will challenge students to simultaneously develop new concepts, theories, and methods for the study of ICT4D, and to apply this knowledge to socially relevant projects and programs.

The ICT4D Consortium will provide organizational support for the proposed graduate minor. The Consortium currently includes faculty from the Colleges of Agriculture, Business, Communication, and Information Sciences and Technology. Courses for the minor are drawn from these colleges, the College of Engineering and the School of International Affairs.

Students in any doctoral and master's degree program at Penn State may enroll in the doctoral or master's minor respectively with the consent of the student's major adviser, the faculty coordinator of the ICT4D Consortium, and the Graduate School.

The doctoral minor will require the completion of a minimum of 15 credits of integrated or articulated course work in information and communication technologies for development, related to but different from that of the student's major, chosen from the list provided below, with a preponderance of courses at the 500 level. A minimum of 6 credits must be at the 500 level for the doctoral minor. At least 3 credits must be from information and communications technologies and at least 3 from development, as identified in the list of courses maintained by the Belisario College of Communications. Official requests to add the minor to a doctoral candidate's academic record must be submitted to Graduate Enrollment Services prior to establishment of the doctoral committee and prior to scheduling the comprehensive examination. At least one Graduate Faculty member from the minor field must serve on the candidate's doctoral committee.

The master's minor requires a minimum of 6 credits of integrated or articulated course work in information and communication technologies for development, related to but different from, that of the student's major, chosen from the list below, with a preponderance of courses at the 500 level. A minimum of 3 credits must be at the 500 level for the master's minor. At least 3 credits must be from information and communications technologies and at least 3 from development, as identified in the list of courses maintained by the Belisario College of Communications.

A list of courses approved to count towards this minor is maintained by the Bellisario College of Communications. Note: A competitive enrollment process might be instituted for any course or sequence of courses for which there is significant enrollment demand from the ICT4D minor, beyond the capacity of the offering College/School to fulfill.

Postbaccalaureate and Graduate Credit Certificate Programs

Postbaccalaureate and graduate credit certificate programs are innovations that reflect emerging academic areas, and may be supplements or enhancements to existing degree programs. These credit certificate programs are designed to foster development of an area of specialty or competency within a discipline and flexibility is essential to accommodate the parameters of the discipline as well as the educational needs of the students. The programs consist of a sequence, pattern, or group of courses developed, supervised, and evaluated by the faculty members of the academic unit offering the program.

Applied Demography

Graduate Credit Certificate Program

Alexis R. Santos
303 Oswald Tower
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The primary goal of the program is to provide an introduction to concepts, measures, data, software, and methods used in applied demography with an emphasis on applications in the public and private sectors. Professionals who complete this 12-credit program will be able to apply demographic analysis in their careers. This certificate will allow them to support organizations and better understand and anticipate the effects of population change. This program is ideal for those interested in careers as applied demographers, data analysts, market research analysts, marketing specialists, and local, state, and regional planners.

Admission Requirements:

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* All international applicants must meet the Graduate School's English proficiency requirements.

Applicants must have successfully completed at least an undergraduate-level statistics course with a grade of C or better.

Applicants are expected to submit the following:

(1) Completed official online Graduate School application and payment of a nonrefundable application fee.

(2) Statement of purpose: a 2-3 pages essay articulating career and educational goals that demonstrate the student's written communication skills and basic statistical knowledge.

(3) A current curriculum vitae (vita) or résumé.

(4) Three letters of recommendation that attest to the student's readiness for graduate study and document the requisite minimum of two years of work experience. Letters must be submitted through the online application system. Within the online application you will be asked to enter the names and e-mail addresses of three individuals who will be providing your recommendation. Those individuals will receive a note via e-mail asking them to complete a brief form that will serve as your recommendation. Please inform all recommenders they must submit the form in order for your application to be complete.

List of Courses Included in the Certificate:

APDEM 801: Principles of Demography; 3 credits

SOC 573: Demographic Techniques; 3 credits

APDEM 802: Data, GIS, and Applied Demography; 3 credits

APDEM 803: Applications in Applied Demography; 3 credits

Effective Semester: Fall 2016

Expiration Semester: Summer 2021

Community and Economic Development

Graduate Credit Certificate Program

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The Graduate Certificate in Community and Economic Development (CEDEV Certificate) requires 15 credits, consisting of five 3-credit courses. The CEDEV Graduate Certificate is designed to build a basic level of knowledge and skills required for practitioners to address the important issues in community and economic development.The Graduate Certificate in Community and Economic Development (CEDEV) provides needed skills and knowledge to practitioners in community and economic development through the flexible learning environment of the World Campus. The program introduces key concepts and practical strategies useful to individuals new to the field of community development and to those with experience working with communities and development organizations. The program also meets the needs of those who are considering a career in community and economic development and want to find out if this profession is right for them. The CEDEV Graduate Certificate is designed to build a basic level of knowledge and skills required for practitioners to address the important issues in community and economic development.

Entrance Requirements:

Admission to the certificate requires applicants to provide evidence of completion of a baccalaureate degree from a regionally accredited institution. Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Official transcripts from all post-secondary institutions attended must accompany the application. Students with a 3.00 average (on a 4.00 scale) for the most recent two years of college/university education, or with an advanced degree, and with appropriate course or experiential backgrounds will be considered for admission.

Required Courses
CEDEV 430(3), CEDEV 452(3), CEDEV 500(3), CEDEV 509(3), CEDEV 575(3)

Effective Semester: SP 2017
Ending Semester: SP 2022

Corporate Innovation and Entrepreneurship

Graduate Credit Certificate Program

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The Smeal College of Business proposes to establish a graduate certificate in Corporate Innovation and Entrepreneurship (CIENT_GCT). This certificate will be designed to meet the needs of individuals in industry who have at least a bachelor's degree, but lack awareness, understanding, and competency in the areas of corporate innovation, new venture creation, and entrepreneurship. The knowledge and skills associated with innovation and entrepreneurship are of tremendous value in many different contexts and industries, including the areas of leadership, strategic planning, business model development, managing or launching new ventures, developing new products, improving services and business processes, technology commercialization and technology transfer initiatives, customer development, and starting a business. This degree will specifically target individuals in the corporate sector where product/service innovation and continuous improvement are imperative, however, students interested in launching startup companies will also find this program beneficial. In general, those students who have a science or engineering background, are in management roles involving innovation, desire to launch new venture in or outside a given organization, or have job responsibilities involving innovation and creativity, will find this degree helpful. This 12 credit certificate program will provide students a solid foundation in innovation and entrepreneurship necessary to advance in their chosen career fields, but may also be extended to a master's degree (Master of Professional Studies program in Corporate Innovation and Entrepreneurship) by taking an additional 21 credits associated with the field. The curricular design of both the 12 credit certificate and the 33 credit MPS are based on a recent market study conducts by Penn State's World Campus, and by soliciting input from a variety of industry experts.

Entrance Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must also satisfy the English proficiency requirement. Along with the submission of the online application and the nonrefundable application fee, the following is required: Official Transcripts and Grade Point Average (GPA) – Applicants must submit official transcripts from all post-secondary institutions attended. A Grade Point Average (GPA) of 3.00 on a 4.00 scale in the final two years of undergraduate studies, or in your most recent graduate degree, is required. Statement of Purpose - Applicants must upload a 1–2 page (double-spaced) statement of purpose describing how professional experience and goals potentially align with the certificate.

REQUIRED COURSES

MBADM 531(3), ENTR 810(3), ENTR 502(3), ENTR 820(3)

Effective Semester: Spring 2018
Expiration Semester: Spring 2023

Psychology: Applications in Clinical Psychology

Graduate Credit Certificate Program

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The graduate certificate in Psychology: Applications in Clinical Psychology is treatment oriented and intended to prepare mental health counselors to work in community mental health settings. The four courses provide exposure to major subfields of applied clinical psychology, to enhance training received in a traditional master's degree program. This program helps enhance mental health professionals' skills in providing services for individuals and families coping with psychological issues such as relationship difficulties, depression, decision making, trauma, anxiety, child custody, or adjustment.

Admission Requirements (including completion of a baccalaureate degree) as Applicable: Students must have obtained a master's degree from a regionally accredited institution of higher education in clinical or counseling psychology, or be concurrently enrolled as a degree student in Penn State Harrisburg's Applied Clinical Psychology master's program. For students currently enrolled in the master's program in Applied Clinical Psychology at Penn State Harrisburg, the certificate will be awarded upon completion of the 12 credits required for the certificate. The certificate cannot be awarded prior to completion of the master's degree. Course work counting for a graduate or undergraduate degree may not also be used to fulfill the requirements for the certificate.

Required Courses

COUNSELOR EDUCATION (CN ED)

- 505. Foundations of Career Development and Counseling Information (3)

PSYCHOLOGY (PSYC)

- 515. Clinical Health Psychology (3)
- 525. Forensic Psychology (3)
- 572. Neuropsychological Assessment (3)

If one of the required subdisciplines of applied clinical psychology was included in a student's master's program, the program will permit the student to select a substitute course that would provide the student with exposure to an area to which the student was not exposed in her or his master's program. Students, with program permission may substitute a 500-level psychology course, such as those listed below, for a required course she or he had previously taken in a master's program.

Graduate courses carry numbers from 500 to 599. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

- COUNSELOR EDUCATION (CN ED) course list
- PSYCHOLOGY (PSYC) course list

Effective Semester: Spring Semester 2006
Expiration Semester: Summer Semester 2016

Operations and Supply Chain Management

Graduate Credit Certificate Program

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The goal of this 12 credit certificate program is to better prepare operations and supply chain management professionals with those contemporary skills and concepts necessary for the effective and efficient management of the physical, informational, and financial flows that collectively form the networks that add value to firms competing on a global scale. Students will learn to analyze, develop, and implement those functions related to sourcing materials, producing goods and services, delivering products, returning residuals, and planning how these are combined into a network.

Admission Requirements:

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* International applicants must satisfy the English proficiency requirement.

This curriculum is designed for working operations and supply chain management professionals. Successful applicants will normally have, before the start of their first semester, at least two years' post baccalaureate work experience in operations management, supply chain management, project management, or a closely allied field.

An applicant must have received, from a regionally accredited institution, a baccalaureate degree under residence with credit conditions substantially equivalent to those required by Penn State. Additionally, the applicant's baccalaureate degree should be in business, engineering, economics, information sciences, or a related field and the applicant should have completed a college-level course in microeconomic principles with a course in supply operations and/or chain management strongly recommended. A minimum undergraduate GPA of 2.8 is required unless the student has earned a graduate degree from an accredited university.

Ideally, the applicant should have a working knowledge of Microsoft Excel and business statistics, plus a basic understanding of accounting principles.

List of Courses* Included in the Certificate:

1. Required foundation course (select one of the following):
    1. MNGMT 522 Operations and Supply Chain Management (3 cr.)
    2. MNGMT 523 Service Operations Management (3 cr.)
2. Electives courses (select two of the following):
    1. MANGT 510 Project Management (3 cr.)
    2. SC&IS 540 Transportation and Distribution Management (3 cr.)
    3. SC&IS 546 Procurement and Supply Management (3 cr.)
    4. SC&IS 570 Supply Chain Engineering (3 cr.)
3. Required capstone course:
    1. SC&IS 565 Supply Chain Strategy (3 cr.)

Effective Semester: Spring 2016

Expiration Semester: Spring 2021

Counterterrorism

Graduate Credit Certificate

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The Graduate Credit Certificate in Counterterrorism provides working professionals and others with social science based training to understand and address terrorism and other threats to U.S. homeland security. The Certificate emphasizes the development of core skills such as threat analysis, management, and reporting; basic data usage and presentation; the preparation of counterterrorism briefings and reports; and the assessment of anti-terrorism strategies. Through the Certificate coursework, students learn about the motives, threats, recruitment strategies, and operational tactics of terrorist organizations. The courses focus on key elements within counterterrorism, such as diagnosing the root causes of terrorism, identifying and using sources of data, critical data gathering and analysis skills, and radicalization processes. Certificate recipients will develop the capacity to identify conditions likely to encourage terrorism; define, evaluate, and assess counterterrorism techniques and operations; and turn collected data into actionable information. In this way, they will be prepared for leadership and supporting roles in the homeland security professional workforce. The Certificate is based around four courses that in turn form the core requirements for the Counterterrorism option within the online Intercollege Master of Professional Studies in Homeland Security.

Entrance Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Applicants must submit the following items with their application for admission to the Counterterrorism certificate program: • official transcripts from all post-secondary institutions attended; • resume/CV; and • one-page statement of purpose or rationale for seeking a Graduate Certificate in Counterterrorism. Applicants are expected to have a 3.0 or higher GPA in their undergraduate work.

REQUIREMENTS FOR THE CERTIFICATE: (12 Credits)

REQUIRED COURSES (12 credits)

PLSC 569 (3), PLSC 836 (3), PLSC 837 (3), PLSC 838 (3)

Effective Semester: Summer 2018
End Semester: 2023

Corporate Accounting Foundations

Graduate Credit Certificate Program

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The Graduate Certificate in Corporate Accounting Foundations (CORAC-GCT) is a twelve-credit program for those seeking a solid foundation in accounting. Accounting systems collect and organize data about business transactions and activities. These systems also measure performance, communicate business plans and outcomes, and support decision-making. Topics covered include: (1) structure and content of financial reports, tax returns, and regulatory filings, (2) use of internal controls to protect an organization's resources and the integrity of its records, (3) purposes and procedures of auditing, (4) assembly and use of accounting information to plan and coordinate operations, and to make decisions. Prior knowledge of accounting is not required. Because the program covers the core topics of a baccalaureate accounting program and is delivered at a pace and depth appropriate to graduate students, the program is intensive. The program is not suitable for those having accounting as their baccalaureate major.

Applicants must apply for admission to the certificate program via the Penn State Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Applicants are generally expected to have a minimum combined junior/senior grade-point average of 3.00 (B) on a 4.00 scale. Official transcripts from all post-secondary institutions attended must accompany the application.

Additional Items - The following are also required:

- a resume of work experience and skills acquired since the baccalaureate degree, and
- two professional or academic letters of reference
- A GMAT score is encouraged, but not required

List of Courses Included in the Certificate:

MBADM 811 - Financial Accounting (3)
ACCTG 812 - Taxation (3)
ACCTG 813 - Auditing (3)
ACCTG 814 - Managerial Accounting (3)

Effective Semester: Fall 2018
Expiration Semester: Fall 2023

Cyber Threat Analytics and Prevention

Graduate Credit Certificate Program

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This 12-credit certificate helps students understand the core of diverse and global cyberattacks, cyber laws and regulations, vulnerabilities, threats, and surveillance systems, while gaining certain fundamental skills to plan, prevent, protect, detect, analyse, respond, mitigate, and recover from threats and attacks in a sophisticated and large-scale basis. Students must maintain a minimum grade point average of 3.0 (B) throughout the program.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

List of Courses* Included in the Certificate

Required two courses:
IN SC 561
IST 554

At least two elective courses:
IST 454
DAAN 871
IN SC 846

Effective Semester: Summer: 2018
Expiration Semester: Summer: 2023

Geospatial Programming and Web Map Development

Graduate Credit Certificate Program

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The Graduate Certificate in Geospatial Programming and Web Map Development helps geospatial professionals become skillful developers of software for the GIS and mapping industries. These skills include the ability to script the automation of geospatial business processes, to develop custom user interface tools on top of existing desktop applications, and to author web-based mapping applications that support the exploration and analysis of geospatial datasets. Such skills are in high demand in the geospatial industry. This program is designed specifically for geospatial practitioners who seek formal education in geospatial programming and web mapping for the purposes of advancing their professional development or seeking a career change. It covers software development in the uniquely geospatial context using a mixture of proprietary and open source languages and technologies. The core learning objectives for students in this program are:

- Apply contemporary programming principles to automate geospatial analysis and mapping processes.
- Design and implement custom user interfaces to support mapping and spatial analysis.
- Create interactive web-based mapping applications that support spatial data exploration and analysis.

The certificate is offered online through Penn State's World Campus, and students earn the certificate by completing three prescribed courses and two elective courses. Students who successfully complete the program earn 15 academic credits. Students admitted to the Department of Geography's Master of GIS degree program may count up to 15 credits of certificate program courses toward the M.G.I.S. degree, subject to restrictions outlined in the Transfer of Nondegree and Certificate Graduate Credits. Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program. Admission to a graduate degree program is a separate step and is not guaranteed.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Intermediate-level experience with professional applications of geographic information systems is expected as pre-requisite knowledge. Coursework to establish that pre-requisite knowledge is available through the related Postbaccalaureate Certificate in GIS program.

List of Courses* Included in the Certificate:

Prescribed Courses (9 credits)

GEOG 485: GIS Programming and Software Development
GEOG 863: Web Application Development for the Geospatial Professional
GEOG 585: Open Web Mapping

Electives (choose 6 credits from):

GEOG 486: Cartography and Visualization
GEOG 489: GIS Application Development
GEOG 868: Spatial Database Management for the Geospatial Professional
GEOG 865: Cloud and Server GIS

Effective Semester: Summer 2018
Expiration Semester: (maximum of 5 years from effective date) Summer 2023

Gerontology

Postbaccalaureate Credit Certificate Program

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In conjunction with the Center of Geriatric Nursing Excellence, the Penn State College of Nursing offers a Gerontology Graduate Certificate program. The primary goal of the program is to prepare individuals with a Bachelor's or higher degree in Nursing or a related health discipline in gerontology. The curriculum includes 6 credits (two 3 credit courses) of didactic content in geriatric assessment and interventions for common health issues in the elderly and 3 credits (one 3 credit course) in primary palliative care. All courses will be delivered using distance technology.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Official transcripts from all post-secondary institutions attended must accompany the application. Prior to an applicant's admission, transcripts are evaluated by the Director of the Center to ascertain the applicant's potential for successful completion of the core nursing courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and Research prior to making an offer of admission to this certificate program.

REQUIRED COURSES

NURS 522(3), NURS 523(3), NURS 824(3); NURS 825(3)

EFFECTIVE DATE: Fall Semester 2017
EXPIRATION DATE: Fall Semester 2022

Global Health

Graduate Credit Certificate Program

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The purpose of this 12-credit graduate certificate in Global Health is to provide students with foundational graduate-level course work in global health. All course work will be at the 500 or 800 level. Upon completion of the Public Health certificate, students will be able to:
1. Demonstrate their knowledge of the major players and issues in global health, how global health systems interact, and the social, political, and cultural determinants related to health and health systems.
2. Apply their skills to assessing global health issues and developing solutions.

Certificate course work may be transferable to the Penn State Master of Public (M.P.H.) graduate degree program should a student wish to continue public health training at the graduate level. Students who wish to pursue the M.P.H. degree must apply separately to that degree program. Admission into the M.P.H. program, and credit towards a graduate degree for specific courses is not guaranteed based on acceptance into or completion of the certificate program.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

Applicants must submit the following items with their application for admission to the Public Health certificate program:
· official transcripts from all post-secondary institutions attended.
· Resume/CV
· Statement of Purpose or Rationale for seeking a Graduate Certificate in Global Health
· Two letters of recommendation

Admission decisions are made by a faculty committee and are based on the quality of the applicant's professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

Students must complete each course with a grade of B or better in order to receive the certificate.

All global health courses in the certificate program may be applied to the M.P.H. degree program. Students must earn a grade of B or better for a course to be applied to the M.P.H. degree program. Certificate program students who wish to have the certificate courses applied to the M.P.H. degree program must formally apply and be admitted to the Penn State MPH degree program. Admission into the Penn State M.P.H. degree program is a separate step and is not guaranteed. Students who are interested in the Penn State M.P.H. degree program should contact the program at 717-531-1502 or pennstatepublichealth@phs.psu.edu, or visit med.psu.edu/mph. Once a certificate program student is admitted to the Penn State M.P.H. degree program and enrolls on a degree basis, certificate courses completed with a B or better may be applied toward the M.P.H. degree.

REQUIRED COURSES (12 credits)

PHS 501(3) or PHS 577 (3) for DrPH Students
PHS 803(3)
AND six credits from the following courses: PHS 551(3) (Epidemiology and Biostatistics Track students only); PHS 557(3); PHS 804(3); PHS 890(3); PHS 895 A, B, C or D(1-6 credits); HLHED 501(3); HLHED 553(3)

EFFECTIVE DATE: Spring 2018

EXPIRATION DATE: Spring 2023

Last Revised by the Department: Spring 2018

Adult Basic Education

Post-baccalaureate Credit Certificate Program

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The goal of the program is to build educators' capacity to provide high-quality, research-based instruction in adult basic education (ABE), especially literacy and numeracy. The program is intended for people who are working, or wish to work, with adults who struggle with reading, writing, math, and/or English language proficiency. ABE instruction typically occurs in adult literacy, family literacy, GED, English as a second language (ESL), or developmental education classes offered by community-based organizations, community colleges, school districts, libraries, and alternative schools, among others. Delivered online through the World Campus, the 12-credit certificate includes three required courses and one elective, which allows students to tailor the program to their specific interests, such as ESL, program planning and administration, distance education, educational technology, adult learning, or other topics.

Admission Requirements:

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized, degree-granting institution in the country in which it operates.

List of Courses* Included in the Certificate:

ADTED 460: Introduction to Adult Education (3 credits)

ADTED 560: Teaching Reading to College Students and Adults (3 credits)

ADTED 480: Teaching Math and Numeracy to Adults (3 credits)

Students must choose one 3-credit elective from the following list of courses:

ADTED 470: Introduction to Distance Education (3 credits)

ADTED 505: The Teaching of Adults (3 credits)

ADTED 506: Program Planning in Adult Education (3 credits)

ADTED 507: Research and Evaluation in Adult Education (3 credits)

ADTED 531: Course Design and Development in Distance Education (3 credits)

ADTED 542: Perspectives on Adult Learning Theory (3 credits)

ADTED 575: Administration of Adult Education (3 credits)

LDT 415B: Systematic Instructional Development for Teachers (3 credits)

APLNG 802: Focus on Language: Learning and Teaching Additional Languages (3 credits)

APLNG 804: Focus on Learners: Identity, Community and Language Learning (3 credits)

APLNG 806: Focus on Classrooms: Planning and Supporting Language Learning (3 credits)

APLNG 808: Focus on Instruction: Teaching and Assessing Language Learning (3 credits)

Effective Semester: Fall 2015
Expiration Semester: (maximum of 5 years from effective date) fall 2020

Accounting

Graduate Credit Certificate Program

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The 12-credit graduate certificate program supplements the body of knowledge and educational credit requirements necessary for licensure as a Certified Public Accountant (CPA) in most states. The 12-credit curriculum is intended for students who have completed an undergraduate degree in accounting (or equivalent course work). All candidates are required to take ACCT 504*Auditing Theory and Practice* (3) and three additional 3-credit courses from a list of elective courses.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. International applicants must satisfy the English proficiency requirement.

Ordinarily, an entering student will have successfully completed a baccalaureate degree in accounting or comparable accounting coursework. If the undergraduate major was not accounting, an applicant should have completed the following minimum core of accounting coursework (or equivalent): financial and managerial accounting principles, intermediate financial accounting I and II, cost accounting, federal taxation, and auditing.

With program approval, all four courses in the certificate may be applied to the online Master of Professional Accounting degree. Certificate program students who wish to have the certificate courses applied to the master's degree program must formally be admitted to the master's degree program. Admission into the master's degree program is a separate step and is not guaranteed. Upon admittance to the master's degree program, certificate courses completed with a grade of B or better will be transferred into the program.

List of Courses Included in the Certificate:

PRESCRIBED COURSE (3 credits)

ACCT 504 Auditing Theory and Practice (3)

ELECTIVE COURSES (9 credits) (Choose 3 from the following 7 courses)

ACCT 510 Business Tax Planning Theory and Practice (3)

ACCT 532 Accounting Information and Decision Systems (3)

ACCT 545 Strategic Cost Management (3)

ACCT 550 Professional Responsibilities and Ethics in Accounting (3)

ACCT 561 Financial Statement Analysis II (3)

ACCT 572 Financial Reporting I (3)

P ADM 523 Governmental and Nonprofit Accounting (3)

Effective Semester: Summer 2016
Expiration Semester: Spring 2021

Adult Gerontology Acute Care Nurse Practitioner

Graduate Credit Certificate Program

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The purpose of the Adult Gerontology Acute Care Nurse Practitioner certificate is to prepare individuals with a Master's degree or higher in nursing seeking additional certification as an Adult Gerontology Acute Care Nurse Practitioner. The goal of this certificate is to prepare nurses to provide direct care of adults/older adults with acute and complex illness in acute care health care settings. Applicants will have an individualized plan of study based on review of graduate transcripts. Students are required to take NURS 860 (3), NURS 861 (3), NURS 862 (4), NURS 863 (4), NURS 864 (6), NURS 865 (1), and NURS 866 (1), fo a total of 22 credits. Additional courses that may be required are the Advanced Practice Core: NURS 802 (3), NURS 803 (3), and NURS 804 (3) and the Master's Core: NURS 501 (3), NURS 510 (3), and NURS 512 (3).

Admission Requirements:

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. International applicants must satisfy the English proficiency requirement.

Applicants are required to have a Master's degree in nursing from an ACEN or CCNE accredited institution. In addition, undergraduate chemistry and statistics are required. Students need to submit two recommendations, a goal statement, and official transcripts from all post-secondary institutions attended. Applicants are required to have two years of experience as an RN in an acute care hospital setting.

List of Courses

NURS 860 (3)
NURS 861 (3)
NURS 862 (4)
NURS 863 (4)
NURS 864 (6)
NURS 865 (1)
NURS 866 (1)

Additional Coursework*

Advanced Practice Core

NURS 802 (3)
NURS 803 (3)
NURS 804 (3)

Master's Core
NURS 501 (3)
NURS 510 (3)
NURS 512 (3)

*Any or all of these courses may be waived based on the certificate program chair's evaluation of transcripts and prior courses completed.

Effective Semester: Summer 2016

Expiration Semester: Summer 2020

Last Revised by the Department: Spring Semester 2016

Blue Sheet Item #: 41-01-080

Review Date: 08/14/2012

Agricultural Biosecurity and Food Defense

Graduate Credit Certificate Program

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This 12-credit graduate certificate program is designed to provide students with broad training in the field of agricultural biosecurity. Courses cover animal and plant health, and food defense aspects of agricultural biosecurity and food defense. Content is both theoretical and applied but with an emphasis on practical application of knowledge gained. A distance education format is used to accommodate the needs of professionals already active in this area.

The certificate program is an attractive option for those who desire advanced graduate training but do not require the full Master's degree program. It is also ideal for students who wish to move into the degree program once all admissions requirements are fulfilled (e.g.,GRE); however, successful completion of a certificate program neither implies nor guarantees admission to a graduate degree program at Penn State. Certificate students who wish to have certificate courses applied towards a graduate degree must apply and be admitted to that degree program. Courses taken in the certificate program may be applied toward a graduate degree, subject to restrictions outlined in the Transfer of Nondegree and Certificate Graduate Credits.

ADMISSION REQUIREMENTS

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicatns must satisfay the English proficiency requirement. Applicants must have a 3.0 or higher undergraduate grade-point average.

COURSES

AGRICULTURAL BIOSECURITY AND FOOD DEFENSE (AGBIO)

520. Agricultural Biosecurity (3)
521. Food Defense (3)
801. Veterinary Infectious Disease Diagnostic and Surveillance Systems (3)
802. Plant Protection (3)

Effective Date: Fall Semester 2017
Expiration Date: Fall Semester 2022

Last Revised by the Department: Fall Semester 2017

Review Date: 9/8/2017

Adult Gerontology Primary Care Nurse Practitioner

Graduate Credit Certificate Program

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The purpose of the Adult Gerontology Primary Care Nurse Practitioner certificate is to prepare individuals with a Master's degree or higher in nursing seeking additional certification as an Adult Gerontology Primary Care Nurse Practitioner. The curriculum includes the didactic and clinical courses required for application of the NP role and required for certification. Students are required to take NURS 870 (3), NURS 871 (3), NURS 872A (4), NURS 873A (4), and NURS 874A (6), for a total of 20 credits. Additional courses that may be required are the Advanced Practice Core: NURS 802 (3), NURS 803 (3), and NURS 804 (3) and the Master's Core: NURS 501 (3), NURS 510 (3), and NURS 512 (3).

Admission Requirements:

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* International applicants must satisfy the English proficiency requirement.

Applicants are required to have a Master's degree in nursing from an ACEN or CCNE accredited institution. In addition, undergraduate chemistry and statistics are required. Students need to submit two recommendations, a goal statement, and official transcripts from all post-secondary institutions attended.

List of Courses

NURS 870 (3)
NURS 871 (3)
NURS 872A (4)
NURS 873A (4)
NURS 874A (6)

Additional Coursework*

Advanced Practice Core
NURS 802 (3)
NURS 803 (3)
NURS 804 (3)

Master's Core
NURS 501 (3)
NURS 510 (3)
NURS 512 (3)

*Any or all of these courses may be waived based on the certificate program chair's evaluation of transcripts and prior courses completed.

Effective Semester: Summer 2016
Expiration Semester: Summer 2020

Ancient Languages

Postbaccalaureate Credit Certificate Program

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Advanced study in classical studies, ancient history, ancient philosophy, biblical studies, Egyptology, or ancient Near Eastern studies requires demonstrable proficiency in one or more ancient languages. The certificate in Ancient Languages, comprising 12 credits, is designed to provide proficiency in at least one ancient language for students who have completed an appropriate undergraduate degree and are planning to pursue graduate work in one of these fields. Training in a second ancient language is offered, and a writing-intensive course in a subject relevant to the student's interest will strengthen preparation for graduate-level research and writing. A grade of B or better must be earned in each course to satisfy the certificate.

Admission Requirements:

An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. The baccalaureate degree must be in any humanities field that includes at least one year of study in an ancient language.

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

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

List of Courses Included in the Certificate:

Select 9 credits from among the following courses; at least 6 credits must be in one language:
CAMS 420 Introductory Targumic Aramaic (3)
CAMS 471 Sumerian (3)
CAMS 472 Akkadian (3)
CAMS 481 Introduction to Middle Egyptian & Hieroglyphics (3)
CAMS 490 Ancient Mediterranean Languages (3-6)
CAMS 520 Advanced Sumerian (3)
CAMS 521 Advanced Akkadian (3)
CAMS 522 Comparative Semitics (3)
GREEK 401 Introductory Reading in Greek Literature (3-6)
GREEK 420 Greek Prose Authors (3-6
GREEK 425 Greek Historians (3-6)
GREEK 430 Greek Poetry (3-6)
GREEK 440 Greek Drama (3-6)
GREEK 496 Independent Studies (1-18)
GREEK 509 Greek Seminar (3-9)
GREEK 520 Greek Mythography (3)
GREEK 596 Individual Studies (1-9)
HEBR 451 Advanced Biblical Hebrew (3)
HEBR 452 Readings in Biblical Hebrew (3)
HEBR 496 Independent Studies (1-18)
LATIN 402 Republican Literature (3-12)
LATIN 403 Augustan Age Literature (3-12)
LATIN 404 Silver Age Literature (3-12)
LATIN 420 Medieval Latin Literature (3-6)
LATIN 450W History of Latin (3)
LATIN 496 Independent Studies (1-18)
LATIN 510 Latin Seminar (3-6)
LATIN 596 Individual Studies (1-9)

Select 3 credits from among the following courses:

CAMS 400W Comparative Study of the Ancient Mediterranean World (3)
CAMS 405 Law & Economy in the Ancient Near East (3) – when taught as a writing intensive section
CAMS 410 Classical Epic (3) – when taught as a writing intensive section
CAMS 411W Classical Drama (3)
CAMS 440W Studies in Classical and Ancient Mediterranean Archaeology (3)
CAMS 470 Languages and Cultures of the Ancient Near East (3) – when taught as a writing intensive section
CAMS 480 (J ST 480) Greeks and Persians (3) – when taught as a writing intensive section
CAMS 501 Comparative Greek and Latin Grammar (3)
CAMS 503 Seminar on Ancient Mediterranean Languages (3-6)
CAMS 592 Proseminar (3)
CAMS 593 Research Seminar (3-6)
CAMS 596 Individual Studies (1-9)

Effective Semester: Fall 2014
Expiration Semester: Summer 2019

Applied Behavior Analysis

Graduate Credit Certificate Program

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This program is intended for those who seek advanced knowledge in the field of applied behavior analysis. The 18-credit curriculum is specifically designed to prepare students to sit for the BCBA certification examination sponsored by the Behavior Analyst Certification Board. After completing the program, students will be able to:

1. Describe the basic principles of behavior and how those principles relate to community/classroom situations with clients.
2. Develop procedures to determine the purpose of aberrant behavior for an individual, determine if targeted behaviors warrant intervention, and monitor the effects of interventions.
3. Develop interventions based on the purpose of aberrant behavior.
4. Develop instructional programs to teach new behaviors that are functional in school and community settings.

ADMISSION REQUIREMENTS:

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

PRESCRIBED COURSES

SPECIAL EDUCATION (SPLED)

503A. Applied Behavior Analysis for Special Education: Basic Principles I (4)
503B. Applied Behavior Analysis for Special Education: Basic Principles II (4)
503C. Applied Behavior Analysis for Special Education: Extended Applications I (4)
503D. Applied Behavior Analysis for Special Education: Extended Applications II (3)
811. Ethical Considerations for Special Education Populations (3)

Effective: Spring Semester 2017
Expiration: Spring Semester 2022

Applied Statistics

Graduate Credit Certificate Program

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The graduate certificate in Applied Statistics helps quantitative professionals in a variety of fields become knowledgeable and skillful in applied statistics. The certificate was designed specifically for researchers working with statistical data who wish to advance their careers, and for those who seek career changes. The certificate is offered through Penn State's World Campus. Students earn the certificate by completing 12 credits of instructor-led online course work. Two 3-credit courses are required, and the remaining 6 credits are selected from a list of electives. Students who successfully complete the certificate earn 12 academic credits and receive the graduate certificate in Applied Statistics. Students subsequently admitted to the Department of Statistic's professional Master of Applied Statistics degree program may count up to 15 credits of certificate courses toward the M.A.S. degree.

Admission Requirements

An applicant must have received, from a regionally accredited institution, a baccalaureate degree earned under residence and credit conditions substantially equivalent to those required by Penn State. Applicants from countries in which English is not the primary language must earn TOEFL scores of at least 550 for the paper test or 213 for the computer-based test.

Admission Procedures

Students interested in applying for admission to the Graduate Certificate in Applied Statistics program should go to the World Campus web site: http://www.worldcampus.psu.edu/AppliedStatisticsCertificate_Admissions.shtml

PRESCRIBED COURSES

STATISTICS (STAT)

- 500. Applied Statistics (3)
- 501. Regression Methods (3)

ELECTIVES

Choose at lease 6 credits from:

STATISTICS (STAT)

- 414. Introduction to Probability Theory (3)
- 415. Introduction to Mathematical Statistics (3)
- 480. *Introduction to SAS (1)
- 481. Intermediate SAS for Data Management (1)
- 482. *Advanced Topics in SAS (1)
- 483. *Statistical Analysis Systems Programming (3)
- 502. Analysis of Variance and Design of Experiments (3)
- 503. Design of Experiments (3)
- 504. Analysis of Discrete Data (3)
- 505. Applied Multivariate Statistical Analysis (3)
- 506. Sampling Theory and Methods (3)
- 507. Epidemiologic Research Methods (3)
- 509. Design and Analysis of Clinical Trials (3)
- 510. Applied Time Series Analysis (3)

* Note: credits cannot be taken for both 483 and 480-482.

GEOGRAPHY (GEOG)

- 483. Problem-Solving with GIS (3)

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Fall Semester 2011
Expiration Date: Summer 2021

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-184

Review Date: 01/10/2012

Educating Individuals with Autism

Postbaccalaureate Credit Certificate Program

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The focus of this post-baccalaureate certificate program is to provide comprehensive, evidence-based information on creating effective educational programming for individuals with autism spectrum disorders. After completing the 12-credit program, students will be able to assess individuals with autism spectrum disorders to effectively provide instruction; develop strategies to enhance social, behavioral, communication, and academic gains; strengthen professional skills to work with families; and develop professional competencies to work with other educators and personnel in related disciplines.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

Required Courses:

- SPLED 461 Autism: Issues and Concerns (3)
- SPLED 462 Autism and Applied Behavior Analysis (3)
- SPLED 463 Communication and Social Competence (3)
- SPLED 464 Assessment and Curriculum (3)

Effective Semester: Fall Semester 2017
Expiration Semester: Summer Session 2022

Last Revised by the Department: Fall Semester 2017

Bioenergy

Graduate Credit Certificate Program

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The graduate certificate in Bioenergy is designed specifically for current and aspiring practitioners who seek advanced skills for growing the bioenergy industry. To accommodate participation by working professionals the program is offered through Penn State's World Campus by Renewable Energy and Sustainability Systems (RESS) graduate program. Bioenergy certificate students earn the certificate and 12 graduate credits by earning a grade of "C" or better in four prescribed online courses (note that grade requirements for using these courses in other graduate programs may be different). Students who are subsequently admitted to the RESS degree program may count credits earned in the certificate program toward the RESS degree. Admission into the RESS degree program is a separate step and is not guaranteed.

Admission Requirements:
Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicatns must satisfy the English proficiency requirement. A background in chemistry and thermodynamics is recommended.

Required Courses
ABE 884 (3)
ABE 885 (3)
ABE 888 (3)
FOR 880 (3)

Effective Semester: FA 2017
Expiration Semester: SU 2022

Last Revised by the Department: Fall Semester 2013

Blue Sheet Item #: 42-02-059

Review Date: 10/08/2013

Applied Bioinformatics

Graduate Credit Certificate Program

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Students will gain an understanding of genomic sequencing and learn how to analyze and interpret genomic data in the context of cellular behavior and activity. Genomic sequencing has an impact on all of the sciences, and access to this new type of information has fundamentally altered biology and it now demands that life scientists become familiar with computational and statistical concepts. The 11-credit curriculum includes 9 credits of core BMMB courses plus 3 credits of STAT. To earn the certificate, students must have achieved a B (3.0) average in all courses, receiving no grade lower than a C in any course.

Admission Requirements:

Applied Bioinformatics is a computationally heavy science that requires both computer and internet access to understand and practice the concepts presented in the coursework. Applicants must have a bachelor's degree and an eagerness to learn about the latest scientific developments of the genomic era.

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

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

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

Required Courses

BMMB 551/IBIOS 551, Genomics (3)
BMMB 554/IBIOS 554, Foundations in Data Driven Life Sciences (3)
BMMB 852, Applied Bioinformatics(2)
STAT 555/BIOL 555/IBIOS 555, Statistical Analysis of Genomics Data (3)

Effective Semester: Spring 2015

Expiration Semester: Fall 2019

Business Analytics

Graduate Credit Certificate Program

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Business Analytics (BAN)

The nine-credit graduate certificate program in Business Analytics (BAN) prepares business professionals to explore and analyze large data sets to support data-driven business decisions. The program covers the entire life cycle of a data analytics project using the descriptive/prescriptive/predictive framework for business analytics: descriptive (What happened?), predictive (What will happen?) and prescriptive (What should happen?). Target audiences include business analysts, analytic systems designers and the data scientists who have a focus on problems arising in the contexts of business decision-making. The certificate program builds on basic analytic concepts that professionals are expected to have and provides a practical approach to expanding these analytic skills to perform tasks in various areas of business such as marketing, supply chains, operations, forensics, and risk.

Admission Requirements:
Applicants must apply for admission to the certificate program via the Penn State Graduate School application for admission. Admission requirements are stated in the General Information section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Applicants are generally expected by have a minimum combined junior/senior grade-point average of 3.00 (B) on a 4.00 scale.

Admissions Prerequisite Requirement –Qualified applicants should have successfully completed an undergraduate or graduate-level course in statistics or be able to show significant experience using statistics in a professional capacity. In lieu of an appropriate statistics course or adequate professional experience, the admissions committee will consider exceptional GMAT/GRE test scores on a case-by-case basis. Students that do not have prior statistics coursework, significant experience using statistics in a professional capacity, or GRE/GMAT scores deemed sufficient by the admissions committee may complete (with a grade of B+ or
better) STAT 500 - Applied Statistics, online, through Penn State World Campus to satisfy the statistics prerequisite requirement.

Additional Requirements — Applications must include a statement of professional goals, a curriculum vita or resume, and two letters of recommendation. Applicants should have knowledge or experience in quantitative work such as science, engineering, or business. The objective is to establish a baseline knowledge and to prepare the student for the advanced coursework in this program. Applicants from other disciplines will be considered based on prior academic and professional experience.

Required Courses for the Certificate (9 credits)

BAN 530. Business Strategies for Data Analytics (3)
BAN 540. Marketing Analytics (3)
BAN 550. Prescriptive Analytics for Business (3)

Effective Semester: Fall 2017
Expiration Semester: Spring 2022

Children's Literature

Graduate Credit Certificate Program

Elisa Shaw Hopkins
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The goal of the program is to provide students with an in-depth background in the theories and genres of literature for children and youth while also considering pedagogical (broadly construed) and cultural implications. Students are required to take LL ED 502, Studies in Literature for Children, as a foundation to the various orientations to the study of children's literature. Students may choose a minimum of four additional courses in areas such as picture books, nonfiction literature, fantasy literature, myth and folklore, cultural and social issues, writing for children, theories of childhood, and research approaches for a total of 15 credits. The program does not lead to any initial teacher certification, but may assist students with recertification. Students should check with their specific state departments of education for regulations regarding recertification.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

REQUIRED COURSES:

LLED 502(3) and CI 560; LLED 462(3); LLED 464(3); LLED 465(3); LLED 520(3); LLED 561(3); LLED 563(3); LLED 564(3); LLED 568(3)

Effective: Summer 2017
Expiration: Summer 2022

Heritage and Museum Practice

Graduate Credit Certificate Program

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This 15-credit graduate certificate program offered at Penn State Harrisburg provides students with knowledge of practices in the heritage and museum sector, which includes historical and heritage societies, public folk arts and folklife centers and programs, art galleries, archives and record management programs, educational institutions, cultural and governmental agencies, preservation and cultural resource management groups, and media production companies. A goal of the program is to enable students to conceptualize, deliver, and manage effective heritage and museum projects. The Heritage and Museum Practice certificate is awarded for successful completion of 9 credits of prescribed courses plus 6 credits of electives from an approved list of courses. Students must earn a grade of B or above in each course that counts toward the certificate program.

Admission Requirements:

An applicant must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement..

A candidate in the certificate program may also become a candidate in the Master of Arts in American Studies, Master of Arts in Humanities, or Master of Arts in Public Administration degree programs if the candidate is admitted to one of these graduate degree programs; however, successful completion of the certificate program neither implies nor guarantees admission to any graduate degree program at Penn State. Certificate program students who wish to have the certificate courses applied to a degree program must formally apply and be admitted to that degree program. Students enrolled in any of these degree programs may apply credits earned toward the certificate as elective credits with program approval, subject to restrictions outlined in the "Transfer of Nondegree and Certificate Graduate Credits."

GPA REQUIREMENT
Applicants are expected to have 2.75 GPA or above in the last two years of undergraduate work in American Studies, history, art, architecture, anthropology, folklore, management, communications, or fields related to museum and heritage practice.

PRESCRIBED COURSES (9 credits)

AMERICAN STUDIES (AMST)
480. MUSEUM STUDIES (3)
481. HISTORIC PRESERVATION (3) or 482. PUBLIC HERITAGE (3)
550. SEMINAR IN PUBLIC HERITAGE (3)

ADDITIONAL COURSES (6 credits)
In addition to the 9 credits of prescribed coursework, students must select 6 credits from the following list of 500-level elective courses.

AMERICAN STUDIES (AMST)
520. TOPICS IN POPULAR CULTURE (3)
530. TOPICS IN FOLKLORE (3)
531. MATERIAL CULTURE AND FOLKLIFE (3)
540. ETHNOGRAPHY AND SOCIETY (3)
551. SEMINAR IN LOCAL AND REGIONAL STUDIES (3)
570. TOPICS IN AMERICAN ART (1 - 6 per semester)
575. MUSEUM INTERNSHIP (3)
595. INTERNSHIP (1-12)

PUBLIC ADMINISTRATION (PADM)
500. PUBLIC ORGANIZATION AND MANAGEMENT (3)
505. HUMAN RESOURCES IN THE PUBLIC AND NONPROFIT SECTORS (3)
516. STRATEGIC PLANNING (3)
517. NONPROFIT ORGANIZATIONS: HISTORY AND EVOLUTION (3)
518. NONPROFIT ORGANIZATIONS: MANAGEMENT AND LEADERSHIP (3)
519. NONPROFIT ORGANIZATIONS: RESOURCE DEVELOPMENT AND MANAGEMENT (3)

Effective Semester: Fall 2017
Expiration Semester: Spring 2022

Last Revised by the Department:Fall Semester 2017

Clinical Research

Graduate Credit Certificate Program

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In the current medical climate, there is a growing need for academic clinicians and health care professionals who are trained in clinical research. Unfortunately, there are few programs that offer the didactic preparation for the unique requirements of a clinical researcher.

The primary goal of this program is to provide a formal, structured program that will prepare certificate candidates to pursue a successful career in clinical research. The curriculum includes courses in biostatistics, epidemiology, clinical trials, decision and cost-effectiveness analysis, outcomes measurement, quality management, health care economics and policy, scientific communication, and SAS statistical analysis computing. The 15 credit hour program offers courses on weekday evenings, enabling the student to continue clinical or employment activities. Certificate candidates will be able to complete the 15 credit hour requirement in 2 semesters.

Admission Requirements

The successful applicant must have completed a medical, nursing, or baccalaureate degree from a regionally accredited institution. Fellows and junior faculty members with current appointments at the Penn State College of Medicine, as well as nursing graduates and public health personnel, are target candidates for the certificate program.

COURSES

Core (6 prescribed credits)

PUBLIC HEALTH SCIENCES (PHS)

520. Principles of Biostatistics (3)
550. Principles of Epidemiology (3)

In addition to the 6 credits of required core coursework, students must select an additional 9 credits from the following list of electives:

PUBLIC HEALTH SCIENCES (PHS)

500. Research Ethics (1)
511. Methods in Translational Research (1)
518. Scientific Communications (1)
519. Patient Oriented Research (1)
535. Quality of Care Measurement (3)
536. Health Survey Research Methods (3)
551. Advanced Epidemiological Methods (3)
580. Clinical Trials Design Analysis (3)
581. Clinical Trials Case Studies (1)
801. Data Management (1)

- PUBLIC HEALTH SCIENCES (PHS) course list

Effective Date: Spring Semester 2010
Expiration Date: Spring Session 2020

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-185

Review Date: 01/10/2012

Literacy Leadership

Postbaccalaureate Credit Certificate Program

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The Literacy Leadership postbaccalaureate certificate program is offered by the Teacher Education unit in the School of Behavioral Sciences and Education at Penn State Harrisburg. The primary goal of the program is to prepare K-12 educators (teachers, specialists, and/or administrators) to serve in literacy leadership roles in K-12 educational contexts. The 12-credit curriculum integrates core principles of literacy education that address curricular content, curriculum initiative planning, diverse K-12 students' needs, and leadership development consistent with standards-based professional development and candidate preparation guidelines. Candidates will complete four courses targeted to develop critical perspectives, reading, and writing associated with professional literacy initiatives and leadership skills. Candidates will complete three required courses and select the fourth course from a menu according to individual professional needs. The certificate is designed for educators who need to develop understandings of complexities involving literacy goals among K-12 students and adult educators.

Admission Requirements:

Applicants for the Certificate in Literacy Leadership must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

To be considered for admission into the certificate program, applicants must have a 3.0 grade-point average in the last two years of undergraduate work (or graduate work if applying with a Master's degree).

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

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

Graduate applicants will be able to complete this program as stand-alone graduate study or in conjunction with Master's-level studies in the Teaching and Curriculum or Literacy Education graduate programs at Penn State Harrisburg. Undergraduate candidates may apply with a recommendation from a Penn State academic unit but must have a conferred bachelor's degree prior to enrollment into the certificate program.

Candidates will apply to the program by completing the online Graduate School certificate application, including payment of the application fee. Candidates will earn the certificate upon successful completion of the four required courses. All courses must be taken for a letter grade with at least a 3.0 average maintained; no grades below a C will be counted toward the certificate.

List of Courses Included in the Certificate

The following three 3-credit courses are required:

- EDUC 452. Teaching Writing
- EDUC 471. Best Practices in Literacy
- EDUC 565. Literacy Leadership

In addition, each candidate must take one additional 3-credit course from the following list of electives:

- EDUC 477. Teaching Struggling Readers and Writers
- EDUC 432. Children's Literature and Teaching Writing
- EDUC 466. Foundations of Teaching English as a Second Language
- LL ED 445. Teaching English in Bilingual/Dialectal Education

Effective Semester: Fall Semester 2014
Expiration Semester: Spring Semester 2019

Last Revised Spring Semester 2014
Blue Sheet Item #: 42-07
Review Date: 06/10/2014

Corporate Finance

Graduate Credit Certificate Program

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The Finance faculty in the Master of Finance program at the School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) graduate certificate program in corporate finance.

The program is designed to provide preparation for individuals who work or aspire to work in the corporate finance field as financial analysts, credit managers, investor relations officers, treasurers, controllers, or in related positions in the treasury department or controller's office of an organization, investment banking firms, and commercial lending, or in the area of mergers and acquisitions.

The curriculum focuses on a set of knowledge and skills in financial analysis and reporting, financial modeling and valuation, and capital structure. Course work emphasizes the development of competencies in building pro forma financial statements, company valuation, advanced capital budgeting based on a real options approach, and understanding of 10K reports, as well as mergers and acquisitions, internal control and planning, and decision making under uncertainty. Content is both theoretical and applied, with an emphasis on practical application of knowledge gained.

This certificate program is an attractive option for individuals who desire advanced education but who do not wish to pursue a master's degree at this time. It is valuable for recent college graduates and others who wish to enroll in courses to determine if they are interested in a complete master's degree program, as well as for professionals who already hold a master's degree and wish to update or expand their knowledge and skills. With program approval, the courses in this graduate certificate program may be applied to the Master of Finance degree program or the Master of Business Administration program at Great Valley.

Admission Requirements

Individuals wishing to enroll in this graduate certificate program must hold a baccalaureate degree from a regionally accredited institution earned under residence and credit considerations substantially equivalent to those required by Penn State. Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average and should have satisfactorily completed some course work in Business Statistics, Financial Management/Corporate Finance, and Microeconomics.

Applicants holding a master's degree should have attained at least a cumulative grade point average of 3.0 in previous graduate work. Professional experience will be taken into consideration for admission. Applicants should submit an online nondegree application, available at http://www.gradsch.psu.edu/portal/gateway.html, and the application fee (payable online), along with supporting credentials. Supporting credentials include two official transcripts from each undergraduate and graduate institution attended, a current résumé, and a statement of intent or career objective. Supporting credentials should be sent directly to the Admissions Office at Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

With program adviser approval, all four courses in the certificate program may be applied to the master's degree program in Finance or the Master of Business Administration program at Great Valley. Certificate program students who wish to have the certificate courses applied to a master's degree program must formally be admitted to the master's degree program. Admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (telephone 610-648-3242 or email gvadmiss@psu.edu) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to the master's degree program and enrolls on a degree basis, certificate courses completed with a B or better will be "transferred" into the program.

Up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree program at Penn State. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

International Applicants

International applicants should consult with a program adviser prior to applying for admission for more information about admission and enrollment requirements. International applicants must satisfy all Graduate School requirements for admission. The language of instruction at Penn State is English.

Curriculum

The graduate certificate program in corporate finance requires a total of four courses (12 graduate credits). Three of the courses are required (ACCTG 512, BUSAD 526, and FIN 531), and the fourth course is an elective selected from a list of three courses (ACCTG 524 or BUSAD 528 or FIN 532). Students completing each of the four courses with a grade of B or better will be eligible to receive a graduate certificate. All courses are 3 graduate credits.

Prescribed Courses (9 credits)

Accounting (ACCTG)

512. Financial Accounting Theory and Reporting Problems (3 credits)

Business Administration (BUSAD)

526. Current Issues in Corporate Finance (3 credits)

Finance (FIN)

531. Financial Management (3 credits)

Elective Courses (Choose 1 from the following 3 courses) (3 credits)

Accounting (ACCTG)

524. Managerial Accounting (3 credits)

Business Administration (BUSAD)

528. Mergers and Acquisitions (3 credits)

Finance (FIN)

532. Financial Decision Processes (3 credits)

- ACCTG course list
- BUSAD course list

• FIN course list

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Fall Semester 2011

Expiration Date: Summer Session 2016

Last reviewed by the Department: Summer Session 2011

Blue Sheet Item #: 40-03-101

Review Date: 11/08/2011

Cybersecurity

Graduate Credit Certificate Program

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This graduate certificate program is designed to provide students with an understanding of various computer and information security domains, including access control, network security, information security and risk management, security architecture and design, and secure software development. To be awarded the graduate certificate in Cybersecurity, students must successfully complete 12 credits of course work. Students must complete each course with a grade of C or better and an overall grade-point average of 3.0 in the certificate courses to be awarded the certificate.

ADMISSION REQUIREMENTS

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. The successful applicant will possess a degree in science or engineering or a closely aligned field and is generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

List of Courses Included in the Certificate

CSE 543. Computer Security (3)
INFSY 563. Network Security (3)
IST 454. Computer and Cyber Forensics (3)
SWENG 510. Secure Software Engineering (3)

Effective Semester: Spring 2014
Expiration Semester: Fall 2018

Data Analytics

Graduate Credit Certificate Program

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The goal of this graduate certificate program is to prepare students to apply data analytics techniques to large data sets to support data-driven decisions across application domains. To be awarded the Graduate Certificate in Data Analytics, students must successfully complete 15 credits of course work. All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

ADMISSION REQUIREMENTS:

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants with undergraduate degree in a quantitative discipline such as science, engineering, or business may apply. Students from other disciplines will be considered based on prior coursework. Applicants are generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

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

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

Required courses (12 credits)

- STAT 500: Applied Statistics or BUSAD 501: Statistical Analysis for Managerial Decision Making
- DAAN 871: Data Visualization for Analytics
- BAN 530: Business Strategies for Big Data
- IN SC 525: Applied Data Mining

Elective courses (Select at least 3 credits; each course listed is worth 3 credits.)

- DAAN 881: Data-driven Decision Making
- BAN 540: Marketing Analytics
- SWENG 545: Data Mining
- DAAN 822: Data Collection & Cleaning

Effective Semester: Spring 2015
Expiration Semester: Fall 2019

Distributed Energy and Grid Modernization

Graduate Credit Certificate

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This graduate certificate is designed specifically for current and aspiring practitioners who seek advanced skills for advancing the electric power generation, distribution, and energy management sectors. Upon successful completion of the certificate, the student will be able to distinguish stakeholder perspectives across utility scale and microgrid systems, explain the characteristics of distributed energy generation systems with respect to electric grid integration, and appraise existing electric grid systems for opportunities to apply grid modernization strategies. To be awarded the Graduate Certificate in Distributed Energy and Grid Modernization, students must successfully complete 12 credits of course work. All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. International applicants must satisfy the English proficiency requirement. The successful applicant is generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

Required courses (6 credits)

E E 588	Power System Control and Operation (3)
A E 862	Distributed Energy Planning and Management (3)

Elective Courses (Select 6 credits)

A E 868	Commercial Solar Electric Systems (3)
A E 878	Solar Project Development and Finance (3)
AERSP 886	Engineering of Wind Project Development (3)
CSE 543:	Computer Security (3)
INFSY 563:	Network Security (3)

Effective Semester: Fall Semester 2016
Expiration Semester: Summer 2021

Dietetic Internship

Postbaccalaureate Credit Certificate Program

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Penn State's Dietetic Internship Program is a post baccalaureate, general, supervised practice program. Students who have completed a baccalaureate degree and hold a valid Verification Statement from a Didactic Program in Dietetics (DPD) may submit an application for consideration. The internship program is structured according to the Accreditation Council for Education in Nutrition and Dietetics (ACEND) Accrediation Standards for Nutrition and Dietetic Internsthip Programs (DI). Students are required to complete 15 graduate-level credits earning a grade a "B" or better. Upon completion of the program, students are eligible to take the registration examination to obtain the Registered Dietitian Nutritionist (RDN)/Registered Dietitian (RD) certification administered by the Commisstion on Dietetic Registration.

REQUIRED COURSES

NUTR 595A(3), NUTR 595B(3), NUTR 595C(1), NUTR 595D(6), NUTR 595E(1), NUTR 595F(1)

NON-COURSE REQUIREMENTS
Students must earn a grade of 'B" or better

Effective Date: Summer 2017
Expiration Date: Summer 2022

Last Revised by the Department: Spring 2017

Distance Education

Postbaccalaureate Credit Certificate Program

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The certificate in Distance Education is a postbaccalaureate program designed for educators and trainers who want to expand their knowledge and build competencies in the field of distance education. The certificate program consists of 12 credits of course work in Lifelong Learning and Adult Education (ADTED) of which 6 credits must be at the 500 level. The goal of the program is to assist the students in learning the latest trends, issues, and applications within the field of distance education while experiencing them firsthand as a student.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Applicants must submit the following materials:

- A one-page resume
- A statement describing professional goals, experiences, and responsibilities (2 page maximum)
- One letter of recommendation
- Official transcripts from all post-secondary institutions attended

Required Courses:
ADTED 460: Introduction to Adult Education
ADTED 470: Introduction to Distance Education
ADTED 531: Course Design and Development in Distance Education
ADTED 532: Research and Evaluation in Distance Education

Effective Date: Fall Semester 2016
Expiration Date: Fall Semester 2021

Last Revised by the Department: Fall Semester 2016

Enterprise Architecture

Graduate Credit Certificate Program

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The certificate in Enterprise Architecture (EA) is designed to provide an introduction to EA and increase the knowledge of professionals seeking advanced leadership roles within an organization. EA strives to align the enterprise information systems and technology with business strategy and goals to enable the most effective use of technology to both support and grow an organization. All candidates are required to complete nine (9) credits.

The certificate program is an attractive option not only for those who desire advanced education and do not want a full Master's Degree program, but also for students who might want to take a certificate to determine if they are interested in a complete professional graduate degree program in Enterprise Architecture and Business Transformation. Up to 15 credits of Penn State coursework taken in non-degree status can count towards a graduate degree in EA, but completion of the coursework neither implies nor guarantees admission to a graduate degree program at Penn State. Courses taken in the certificate program may be applied toward a graduate degree in Enterprise Architecture, subject to restrictions outlined in the Transfer of Nondegree and Certificate Graduate Credits. Certificate students who wish to have certificate courses applied towards a graduate degree in Enterprise Architecture and Business Transformation must apply and be admitted to that degree program. Admission to the Enterprise Architecture and Business Transformation graduate degree program is a separate step and is not guaranteed.

To be awarded the certificate, students must successfully complete 9 credits of graduate course work including EA 871 (3), EA 873 (3), and EA 874 (3).

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the
Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

A bachelor's degree in a related area (e.g., information sciences, business architecture, or computer science), while not required, is helpful in the successful completion of the certificate. It is expected that students will have a foundation in information technology or enterprise architecture with a minimum of two (2) years of relevant professional work experience. Applicants with less than two years of relevant professional work experience may be considered but may be required to take pre-requisite courses. For admission to the certificate, a 2.75 GPA, either overall or from the last 60 undergraduate credits, is needed. GRE scores are not required for non-degree graduate students.

Required Courses (9 credits)
EA 871 Enterprise Architecture Foundations I (3)
EA 873 Enterprise Modeling (3)
EA 874 Enterprise Information Technology Architecture (3)

Pattern of Course Scheduling

The certificate is highly flexible and is designed to meet the different needs of students and organizations. The courses are delivered online through the World Campus. With online delivery, the
certificate can easily fit into the work schedule of professionals from around the globe.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this certificate are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Fall Semester 2018
Expiration Date: Fall Semester 2023

Last Revised by the Department: Spring Semester 2018

Blue Sheet Item #: 46-04

Review Date: 1/9/2018

Educational Technology Integration

Postbaccalaureate Credit Certificate Program

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This 15-credit certificate program prepares educators and instructional design professionals who want to advance their skills in the design, development, and implementation of technology-based learning experiences. Students choose LDT 415A or LDT 415B to match the professional context in which they want to apply the skills learned in the program. The remaining twelve credits of the program can be chosen to best meet the individual interests, needs, and goals of the learner. In these courses, the intended professional context is addressed by the choice of projects.

For admission to the Graduate School, an applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. All international applications must meet the Graduate School's English proficiency requirements.

Required Courses (required courses for all candidates, 3 credits)

LDT 415A Systematic Instructional Development or
LDT 415B Systematic Instructional Development for Teachers (3 credits)

Candidates must complete four additional courses from the following list. (12 credits)

EDTEC 440: Educational Technology Integration (3 credits)
EDTEC 467: Emerging Web Technologies and Learning (3 credits)
EDTEC 566: Computers as Learning Tools (3 credits)
INSYS 527: Designing Constructivist Learning Environments (3 credits)
LDT 505: Integrating Mobile Technologies into Learning Environments (3 credits)
LDT 550: Learning Design Studio (3 credits)

Effective Semester: Summer Semester 2015
Expiration Semester: Spring Semester 2020

e-Learning Design

Graduate Credit Certificate Program

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This 12-credit certificate program will prepare those who want to develop a thorough understanding of design issues and technology used to create and deliver online teaching and learning experiences, with primary delivery of content through the Internet, with use of a variety of advanced technological tools. The target audience works or aspires to work in corporate, agency, and military training departments; entrepreneurial consulting companies; museums, nature centers, and other informal learning settings; community college learning resource centers; and colleges and universities.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. International applicants must satisfy the English proficiency requirement.

List of Courses* Included in the Certificate:

LDT 415A: Systematic Instructional Development (3 credits). Preparation in the use of a nine-step model for systematically analyzing instructional problems and developing validated, practical solutions.
LDT 467: Emerging Web Technologies and Learning (3 credits). This course examines emerging Web technologies and explores their application to learning and education.
ADTED 531: Course Design and Development in Distance Education (3 credits) In depth study of the practices of designing courses taught by print, broadcast, and telecommunications media to adult distance learners.
LDT 832: Designing e-Learning Within Course Management Systems (3 credits) Practical design of instructor-facilitated online lessons taking advantage of the affordances and within the constraints of course management systems.

Effective Semester: Spring 2016
Expiration Semester: Spring 2021

Engineering Leadership and Innovation Management

Graduate Credit Certificate Program

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The primary goal of the Engineering Leadership and Innovation Management certificate program is to provide professionals with the knowledge and skills in the key aspects of engineering business: leading teams, identifying new business opportunities, working across international and cultural boundaries, effectively managing projects, and promoting internal innovation. The certificate program highlights the changing nature of the field of Engineering, impacted by globalization and the importance of intercultural competencies and innovation management in the workforce. Upon completion of the certificate, students will have developed attributes required by today's successful engineering executives. Specifically, these include improved ability to lead technical teams and expanded professional skills in leadership, intercultural competence, and innovation management within the engineering profession. The twelve-credit certificate program is built from the College of Engineering approved Engineering Leadership and Innovation Management (ELIM) graduate degree program.

Entrance Requirements:

Applicants must hold either (1) a baccalaureate degree in engineering, science, or relevant discipline from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Applicants must have a 3.0 minimum undergraduate GPA (or equivalent). Exceptions to the minimum 3.0 grade-point average may be made for students with special backgrounds, abilities, and interests. Applicants to the Engineering Leadership and Innovation Management (ELIM) certificate must submit the following materials: • Penn State graduate degree application form and application fee; • World Campus program application (if applicable); • A Leadership and Innovation Portfolio that includes a statement of career and educational goals including documentation of a minimum of one year of related full-time work. Students wishing to enter the program directly from an undergraduate degree can fulfill the 1-year requirement for work experience through summer internships, summer employment, or co-op experiences plus additional experience within professional societies. Justification for this experience should be included in the Leadership and Innovation Portfolio. The statement should be an essay (2-3 pages in length) that demonstrates the applicant's written communication skills. • Submission of a resume • Submission of official transcripts from all post-secondary institutions attended Admissions decisions for the program are based on the quality of the applicant's credentials. The decisions are based on a review of the complete application portfolio. During the admission process, students who appear to be better suited for another graduate level program will be encouraged to apply to the appropriate program. Graduate Record Examination (GRE) scores are not required.

REQUIREMENTS FOR THE CERTIFICATE: (12 Credits)

REQUIRED COURSES (12 credits)

ENGR 501 (3), ENGR 802 (3), ENGR 804 (3), ENGR 405 (3)

Non-Course Requirements

*Related courses may be substituted for ENGR 405 per an approved list of courses by the ELD office.
Other elective courses outside this list may be petitioned for substitution to meet the ENGR 405 requirement

Effective Semester: Fall Semester 2017
Ending Semester:

Enterprise Information and Security Technology Architecture

Graduate Credit Certificate Program

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The goal of this advanced nine-credit graduate certificate in Enterprise Information and Security Technology Architecture (ENTSEC) is to provide information technology and business professionals with advanced knowledge of the enterprise information technology stack, enterprise architecture gap analysis, analytical risk management, migration planning, governance, and measurement, as well as security and network management strategy including intrusion detection, encryption, authentication, and network management.

The certificate program is an attractive option for professionals who may also consider completing the M.P.S. in Enterprise Architecture. Up to 15 credits of Penn State coursework taken in non-degree status can count towards a graduate degree in EA, but completion of the coursework neither implies nor guarantees admission to a graduate degree program at Penn State. Courses taken in the certificate program may be applied toward a graduate degree in Enterprise Architecture, subject to restrictions outlined in the Transfer of Nondegree and Certificate Graduate Credits. Certificate students who wish to have certificate courses applied towards a graduate degree in Enterprise Architecture must apply and be admitted to that degree program. Admission to the Enterprise Architecture graduate degree program is a separate step and is not guaranteed.

To be awarded the certificate, students must successfully complete 9 credits of graduate course work including EA 874, EA 876, and IST 554 with a grade point average of 3.0 or higher.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. International applicants must satisfy the English proficiency requirement. A bachelor's degree in a related area (e.g., information sciences, engineering, or computer science), while not necessary for admission, is helpful in the successful completion of the certificate. It is expected that students will have advanced knowledge in information technology and enterprise architecture with a minimum of five years of relevant professional work experience. Applicants with less than five years of 2 relevant professional work experience may be considered but will be required to take pre-requisite courses. For admission to the certificate, a 2.75 GPA, either overall or from the last 60 undergraduate credits, is needed. GRE scores are not required for non-degree graduate students.

Required Courses (9 credits)

EA 874 Enterprise Information Technology Architecture (3)
EA 876 Architecting Enterprise Security and Risk Analysis (3)
IST 554 Network Management and Security (3)

Pattern of Course Scheduling

The certificate is highly flexible and is designed to meet the different needs of students and organizations. The courses are delivered online through the World Campus. With online delivery, the certificate can easily fit into the work schedule of professionals from around the globe.

Student Aid

Refer to the Student Aid section of the Graduate Bulletin. Students in this certificate are not eligible for graduate assistantships.

Courses

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Semester: Fall Semester 2018
Expiration Semester: Fall Semester 2023

English as a Second Language Program Specialist

Postbaccalaureate Credit Certificate Program

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The English as a Second Language (ESL) Program Specialist certificate is designed to give teachers the essential knowledge and skills to effectively work with English learners, their families, and their communities in public school (K-12) contexts. Candidates are required to complete with a grade of a C or higher five 3-credit courses that correspond to the ESL Program Specialist K-12 Program Guidelines of the Pennsylvania Department of Education and include 60 hours of integrated field experience. An optional pathway to complete the ESL certificate is an international program in which some of the courses are completed abroad. The program will lead to demonstration of knowledge of the fundamental concepts and teaching practices of English as a Second Language instruction and services to the growing numbers of English learners in public schools. Candidates who wish to obtain certification from the Pennsylvania Department of Education (PDE) in addition to this earning this postbaccalaureate credit certificate from Penn State should consult with Curriculum and Instruction graduate program faculty and advisers to determine the PDE's current requirements prior to taking coursework for the ESL postbaccalaureate credit certificate.

Admission Requirements:

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

List of CoursesIncluded in the Certificate:
WL ED 400
WL ED 444
APLNG 484 OR APLNG 410
APLNG 493
WL ED 483

Effective Semester: Summer 2013

Expiration Semester: Spring 2018

Reveiw Date: 11/19/2013

English as a Second Language (ESL) Program Specialist and Leadership

Postbaccalaureate Credit Certificate Program

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The primary goal of the ESL Specialist and Leadership Certificate Program, a U.S. Department of Education, Office of English Language Acquisition (OELA), National Professional Development grant-funded program, is to prepare mainstream PreK-12 teachers to work effectively with English Language Learners (ELLs), their families, and communities. The curriculum includes: (1) legal, historical, and socio-cultural background and history of ELLs in the U.S.; (2) linguistics; (3) language acquisition; (4) ESL curricular, instructional, and assessment strategies and best practices; and (5) ESL instructional leadership, action research, and advocacy with ELL populations. The curriculum focuses on helping PreK-12 teachers do the following: (1) become ESL instructional leaders by learning, understanding, and incorporating curricular, instructional, and assessment strategies specifically tailored for ELLs; (2) learn to develop and implement ESL action research projects within their own classrooms; and (3) develop cultural competence, engage in active outreach, and become advocates for ELLs. Candidates are required to take all five courses (15 credits) in sequence.

ENTRANCE REQUIREMENTS

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. A baccalaureate degree in education or education-related field of study from a regionally accredited U.S. institution with a minimum 3.0 GPA; official transcripts from all post-secondary institutions attended; Level I or II teaching certification in Pennsylvania; and a written statement describing the applicant's teaching situation, demographic information about the school district and English Language Learners (ELLs), and why the applicant is applying to obtain the ESL specialist certificate.

REQUIRED COURSES

EDUC 466(3), EDUC 467(3), EDUC 468(3), EDUC 469(3), EDUC 475(3)

Effective Date: Summer 2017
Expiration Date: Spring 2022

Last Revised by the Department: Spring Semester 2017

Family Literacy

Postbaccalaureate Credit Certificate Program

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The certificate in Family Literacy, based on a multidisciplinary approach to literacy instruction involving both adult educators and early childhood education and family literacy specialists, is intended for location-bound students who work in a variety of literacy-related settings, both formal and informal. These settings include public schools and preschools (teachers, teaching assistants, reading specialists), organizations such as Head Start and grant-funded family literacy programs. The goal of the certificate is to build the capacity of the field to provide high-quality, research-based instruction and program development in family literacy. The certificate consists of a 12-credit program delivered online through the World Campus. The program objectives include strengthening program effectiveness through developing an understanding of staff roles and responsibilities as part of a collaborative family literacy team and supporting a learner-centered approach to delivering program services.

Admission Requirements

Students must have a baccalaureate degree to enroll.

PRESCRIBED COURSES

ADULT EDUCATION (ADTED)

- 456. Introduction to Family Literacy (3)
- 457. Adult Literacy (3)
- 458. Early Literacy Development (3)
- 459. Interactive Literacy and Parental Involvement: Supporting Academic Success (3)

- ADULT EDUCATION (ADTED) course list

Effective Date: Fall Semester 2010
Expiration Date: Spring Semester 2020

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-189

Review Date: 01/10/2012

Family Nurse Practitioner

Graduate Credit Certificate Program

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The purpose of the Family Nurse Practitioner certificate is to prepare individuals with a Master's degree or higher in Nursing seeking additional certification as a Family Nurse Practitioner. The curriculum includes the didactic and clinical courses required for application of the NP role and required for certification. The program of study is variable and based on evaluation of prior course completion and transcripts. Students are required to take NURS 870, NURS 871, NURS 872, NURS 873, NURS 874, NURS 875, and NURS 876, for a total of 23 credits. Additional courses that may be required are the Advanced Practice Core: NURS 802, NURS 803, and NURS 804 and the Master's Core: NURS 501, NURS 510, and NURS 512.

Admission Requirements:

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* International applicants must satisfy the English proficiency requirement.

Applicants are required to have a Master's degree in nursing from an ACEN or CCNE accredited institution. In addition, undergraduate chemistry and statistics are required. Students need to submit two recommendations and official transcripts from all post-secondary institutions attended.

List of Courses Included in the Certificate:

NURS 870(3)
NURS 871(3)
NURS 872(3)
NURS 873(4)
NURS 874(6)
NURS 875(2)
NURS 876(2)

Additional Coursework*

Advanced Practice Core

NURS 802 (3)
NURS 803 (3)
NURS 804 (3)

Master's Core

NURS 501 (3)
NURS 510 (3)
NURS 512 (3)

Effective Semester: Summer 2016
Expiration Semester: Summer 2020

Last Revised by the Department: Spring Semester 2016

Blue Sheet Item #: 40-04-190

Review Date: 01/10/2012

Financial Risk Management

Graduate Credit Certificate Program

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The Finance faculty in the Master of Finance program at the School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12-credit) graduate certificate program in financial risk management.

Financial risk management involves identifying and quantifying risk exposure and controlling the risk exposure. This certificate program is designed to help prepare individuals to manage financial risk, including credit risk, market risk, interest rate risk, currency risk, and inflation risks using financial derivative instruments such as forwards, futures, swaps, and options. Course work emphasizes the development of competencies in the valuation of financial derivatives, fixed income securities, and quantitative methods in finance. Content is both theoretical and applied, with an emphasis on practical application of knowledge gained.

The program is ideal for individuals who wish to develop and expand their analytical, technical, evaluative, and communication skills and expertise in this particular area of finance. Individuals working or aspiring to work as financial risk managers and in related positions focusing on the area of derivatives and managing risk in organizations, including insurance companies, commercial and retail banks, asset management firms, and regulatory agencies, will find the program particularly valuable.

This certificate program is an attractive option for individuals who desire advanced education but who do not wish to pursue a master's degree at this time. It is valuable for recent college graduates and others who wish to enroll in courses to determine if they are interested in a complete master's degree program, as well as for professionals who already hold a master's degree and wish to update or expand their knowledge and skills. With program approval, the courses in this graduate certificate program may be applied to the Master of Finance degree program or the Master of Business Administration program at Great Valley.

Admission Requirements

Individuals wishing to enroll in this graduate certificate program must hold a baccalaureate degree from a regionally accredited institution earned under residence and credit considerations substantially equivalent to those required by Penn State. Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average and should have satisfactorily completed some course work in Business Statistics, Financial Management/Corporate Finance, and Microeconomics.

Applicants holding a master's degree should have attained at least a cumulative grade point average of 3.0 in previous graduate work. Professional experience will be taken into consideration for admission. Applicants should submit an online nondegree application, available at http://www.gradsch.psu.edu/portal/gateway.html, and the application fee (payable online), along with supporting credentials. Supporting credentials include two official transcripts from each undergraduate and graduate institution attended, a current résumé, and a statement of intent or career objective. Supporting credentials should be sent directly to the Admissions Office at Penn State Great Valley, 30 East Swedesford Road, Malvern, PA 19355.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

With adviser approval, all four courses in the certificate program may be applied to the master's degree program in Finance or the Master of Business Administration program at Great Valley. Certificate program students who wish to have the certificate courses applied to a master's degree program must formally be admitted to the master's degree program. Admission into the master's degree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (telephone 610-648-3242 or email gvadmiss@psu.edu) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to the master's degree program and enrolls on a degree basis, certificate courses completed with a B or better will be "transferred" into the program.

Up to 15 credits of course work taken on a nondegree basis may be applied to a graduate degree program at Penn State. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.

International Applicants

International applicants should consult with a program adviser prior to applying for admission for more information about admission and enrollment requirements. International applicants must satisfy all Graduate School requirements for admission. The language of instruction at Penn State is English.

Curriculum

The graduate certificate in financial risk management requires a total of four courses (12 graduate credits). Three of the courses are required (FIN 531, FIN 513, and BUSAD 525), and the fourth course is an elective selected from a list of two (BUSAD 527 or FIN 505). Students completing each of the four courses with a grade of B or better will be eligible to receive a graduate certificate. All courses are 3 graduate credits.

Prescribed Courses (9 credits)

Business Administration (BUSAD)

525. Quantitative Methods in Finance (3 credits)

Finance (FIN)

513. Speculative Markets (3 credits)
531. Financial Management (3 credits)

Elective Course: Choose one course from the following two (3 credits)

Business Administration (BUSAD)

527. Fixed Income Securities (3 credits)

Finance (FIN)

505. Multinational Managerial Finance (3 credits)

- BUSAD course list
- FIN course list

Graduate courses carry numbers from 500 to 599 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Fall Semester 2011
Expiration Date: Summer Session 2016
Last reviewed by the Department: Summer Session 2011
Blue Sheet Item #: 40-03-103
Review Date: 11/08/2011

Folklore and Ethnography

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This 15-credit graduate certificate program offered at Penn State Harrisburg provides students with skills and practices used in projects and institutions of folklore and ethnography, which include field/folk schools and other educational settings, festivals and arts councils, historical and heritage societies, community and cultural organizations and centers, archives and record management programs, governmental agencies, cultural conservation/sustainability groups, and media production companies. The Folklore and Ethnography certificate is awarded for successful completion of 9 credits of prescribed courses plus 6 credits of electives from an approved list of courses. Students must earn a grade of B or above in each course that counts toward the certificate program.

Admission Requirements:
An applicant must hold either a baccalaureate degree from a regionally accredited U.S. institution or a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

A candidate in the certificate program may also become a candidate in the M.A. and Ph.D. in American Studies, M.A. in Communications, or M.A. in Humanities if the candidate meets criteria for admission to the Graduate School and to the graduate program; however, successful completion of the certificate neither implies nor guarantees admission to a graduate program at Penn State. Students enrolled in these or other degree programs may apply credits earned toward the certificate as elective credits with program approval. Students enrolled in doctoral degree programs who desire to include the coursework toward the certificate in their programs are normally limited in their choices of electives to 500-level courses. Doctoral students should check with their program advisers on their program requirements. Up to 15 credits of coursework taken in nondegree status can count towards a graduate degree.

GPA REQUIREMENT
Applicants are expected to have 2.75 GPA or above in the last two years of undergraduate work in folklore, anthropology, sociology, American Studies, ethnic studies, history, communications, or other fields related to folklore and ethnography.

PRESCRIBED COURSES

AMERICAN STUDIES (AM ST)

- 530. TOPICS IN AMERICAN FOLKLORE (3)
- 531. MATERIAL CULTURE AND FOLKLIFE (3)
- 540. ETHNOGRAPHY AND SOCIETY (3)

In addition to the 9 credits of prescribed coursework, students must select 6 credits from the following list of elective courses.

AMERICAN STUDIES (AM ST)

- 422. (RL ST 422) RELIGION AND AMERICAN CULTURE (3 PER SEMESTER, MAXIMUM OF 6)
- 439. AMERICAN REGIONAL CULTURES (3-6)
- 448. (ANTH 448) ETHNOGRAPHY OF THE UNITED STATES (3)
- 480. MUSEUM STUDIES (3)
- 481. HISTORIC PRESERVATION (3)
- 482. PUBLIC HERITAGE (3)
- 483. ORAL HISTORY (3)
- 493. (ENGL 493) THE FOLKTALE IN AMERICAN LITERATURE (3)
- 550. SEMINAR IN PUBLIC HERITAGE (3)
- 551. SEMINAR IN LOCAL AND REGIONAL STUDIES (3)
- 592. FIELD EXPERIENCE IN AMERICAN STUDIES (3)
- 595. INTERNSHIP (1-12)

Substitution of topical courses and seminars with variable content related to folklore and ethnography for elective credits is possible with approval in advance from the certificate coordinator.

Effective Semester: Summer 2014
Expiration Semester: Spring 2019

Geographic Information Systems

Postbaccalaureate Credit Certificate Program

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The Postbaccalaureate Certificate Program in Geographic Information Systems (GIS) helps professionals in a variety of fields become knowledgeable and skillful users of geographic information systems. The program was designed specifically for experienced GIS practitioners who lack formal education in geography and GIS and wish to advance their careers, and for those who seek to make career changes. The program is offered through Penn State World Campus. Students earn the Postbaccalaureat Certificate by completing four instructor-led online courses -- three required and one elective. Students who successfully complete the program earn 12 academic credits. Students subsequently admitted to the Department of Geography Master of Geographic Information Systems degree program may count up to 15 credits of certificate program courses toward the MGIS degree, subject to restrictions outlined in the Transfer of Nondegree and Certificate Graduate Credits. Certificate students who wish to have certificate courses applied towards a graduate degree in Geographic Information Systems must apply and
be admitted to that degree program. Admission to the Geographic Information Systems graduate degree program is a separate step and is not guaranteed.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

PRESCRIBED COURSES

GEOGRAPHY (GEOG)

- 482. Making Maps That Matter with GIS (3)
- 483. Problem-Solving with GIS (3)
- 484. GIS Database Development (3)

ELECTIVES

Choose at least 3 credits from:

GEOGRAPHY (GEOG)

- 485. GIS Programming and Customization (3)
- 486. Cartography and Visualization (3)
- 487. Environmental Applications of GIS (3)

Effective Date: Fall 2017
Expiration Date: Fall 2022

Last Revised by the Department: Fall Semester 2017

Geodesign

Graduate Credit Certificate Program

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The purpose of the graduate certificate in Geodesign is to provide students with a foundation in geospatially-oriented design through investigating interdisciplinary methods and the collaborative nature of the Geodesign process. This program is for current or aspiring practitioners, from a variety of professional backgrounds, employed in government agencies, businesses, and non-profit organizations, who see limitations in how regional and urban planning and design challenges are currently addressed. The program is designed for professional practitioners who wish to advance their careers, and for those seeking to make career changes, while remaining in their current location or maintaining full-time professional responsibilities. The certificate consists of a five-course, 14-credit curriculum that can be completed in one year and is delivered online through the World Campus. Students must earn a “C” or better in each course that is intended to count toward the certificate.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

List of Courses Included in the Certificate:
GEODZ 511 (3 credits): Geodesign History, Theory, Principles
GEODZ 822 (3 credits): Geodesign Models: Decision and Evaluation

GEODZ 824 (3 credits): Geodesign Models: Impact and Process*
OR
GEODZ 826 (3 credits): Geodesign Models: Change and Representation*
* Students will take one of these two “Models” courses; placement is dependent on previous experience.

Electives:
In addition to the 9 required credits specified above, students must select at least 5 credits of GEOG courses at the 400 level or higher; courses must be approved in advance by the student's adviser. A list of acceptable electives is maintained by the program office.

Effective Semester: Summer 2018
Expiration Semester: Spring 2023

Last Revised by the Department: Spring Semester 2018

Geospatial Intelligence Applications

Postbaccalaureate Credit Certificate Program

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The postbaccalaureate credit certificate in Geospatial Intelligence Applications provides a foundation in geospatial intelligence for the aspiring professional who has little or no experience in geography, geographic information systems, and remote sensing. The program addresses the theory, methodologies, techniques, and ethics in the professional application of geospatial intelligence. The curriculum integrates geospatial information science and analytic thinking in a synergistic manner. All candidates must take 13 credits, which includes a 3-credit course in geographic fundamentals of geospatial intelligence, a 3-credit course in the nature of geographic information course and 6 credits of geospatial information science and technology courses.

Admission Requirements
Applicants must apply for admission to the certificate program via the Graduate School application for Admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

An entering student must have worked, anticipates working, or completed in a satisfactory manner course work in an area related to interntional affairs, national security, law enforcement, or business.

PRESCRIBED COURSES
GEOGRAPHY (GEOG)

480. Exploring Imagery and Elevation Data in GIS Applications (3)
482. Making Maps That Matter with GIS (3)
483. Problem-Solving with GIS (3)
882. Geographic Foundations of Geospatial Intelligence (3)

Effective Date: Fall 2017
Expiration Date: Fall 2022

Last Revised by the Department: Fall Semester 2017

Geospatial Intelligence Analytics

Graduate Credit Certificate Program

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The graduate credit certificate in Geospatial Intelligence Analytics is for geospatial intelligence professionals with experience in Geographic Information Systems and Remote Sensing who are only able to participate part-time and at a distance, while maintaining professional responsibilities. The program promotes sound theory, methodologies, techniques, ethics, and best practices in the professional application of geospatial intelligence. The 13-credit curriculum integrates the geospatial information science and intelligence disciplines in a synergistic manner. The program is well suited for the geospatial intelligence professional serving outside the continental US.

Admission Requirements
An applicant for the graduate certificate must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. An entering student must have worked, anticipates working, or completed in a satisfactory manner course work in an area related to national security, law enforcement, or business. The student must be admitted to (1) Penn State's Graduate School, and (2) the graduate certificate in Geospatial Intelligence Analytics offered by the department of Geography. To apply, the student completes a single online application that provides the necessary information to each organization.Students interested in applying for admission to the Graduate Certificate in the Geospatial Intelligence Analytics program should go to the World Campus web site: http://www.worldcampus.psu.edu/degrees-and-certificates/geospatial-intelligence-certificate/apply. The Geospatial Intelligence Program Admissions Committee reviews and ranks applications as they are received.

PRESCRIBED COURSES
GEOGRAPHY (GEOG)

594A. Culminating Experiences in Geospatial Intelligence (1)
882. Geographic Foundations of Geospatial Intelligence (3)
883. Remote Sensing for the Geospatial Intelligence Professional (3)
884. Geographic Information Systems for the Geospatial Intelligence Professional (3)

ELECTIVES
Choose at least 3 credits from the following list of courses:

GEOGRAPHY (GEOG)

480. Exploring Imagery and Elevation Data in GIS Applications (3)
482. The Nature of Geographic Information (2)
483. Problem Solving with GIS (3)
484. GIS Database Development (3)
485. GIS Programming and Customization (3)
486. Cartography and Visualization (3)
487. Environmental Applications of GIS (3)
488. Acquiring and Integrating Geospatial Data (3)
489. GIS Application Development (3)
583. Geospatial System Analysis and Design (3)
584. Geospatial Technology Project Management (3)
586. Geographical Information Analysis (3)
588. Planning GIS for Emergency Management (3)
861. Map Projections for Geospatial Professionals (1)
862. GPS and GNSS for Geospatial Professionals (3)
863. GIS Mashups for Geospatial Professionals (3)
885. Advanced Analytic Methods in Geospatial Intelligence (3)

Graduate courses carry numbers from 500 to 699 and 800 to 899. Advanced undergraduate courses numbered between 400 and 499 may be used to meet some graduate degree requirements when taken by graduate students. Courses below the 400 level may not. A graduate student may register for or audit these courses in order to make up deficiencies or to fill in gaps in previous education but not to meet requirements for an advanced degree.

Effective Date: Spring 2014
Expiration Date: Fall 2018

Last Revised by the Department: Fall Semester 2013

Blue Sheet Item #: 42-02-060

Review Date: 10/08/2013

Geriatric Nursing Education

Graduate Credit Certificate Program

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In conjunction with the Hartford Center of Geriatric Nursing Excellence, the Penn State School of Nursing offers a Geriatric Nursing Education Graduate Certificate program. The primary goal of the program is to prepare individuals with a current Master's degree in Nursing or a related health discipline to teach geriatric content at both the Associate and Baccalaureate degree levels. The curriculum includes 6 credits (two 3 credit courses) of didactic content in gerontology and 6 credits (two 3 credit courses) of didactic content in education. All four courses will be delivered using distance technology, and are currently available through the World Campus.

Entrance Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Official transcripts from all post-secondary institutions attended must accompany the application. Applicants must hold a Master's degree in nursing or a related health discipline from a U.S. regionally accredited institution, or a Master's degree that is equivalent to a U.S. Master's degree from an officially recognized degree-granting international institution. The credit conditions for the Masters degree must be substantially equivalent to those required by Penn State's Master's degree programs in nursing or related health disciplines. Prior to an applicant's admission, transcripts are evaluated by the Director of the Center for Geriatric Nursing Excellence to ascertain the applicant's potential for successful completion of the core nursing courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and Research prior to making an offer of admission to this certificate program.

REQUIRED COURSES (12 credits)
NURS 522(3), NURS 523(3), NURS 840(3); NURS 841(3); NURS 842(3)

Non-Course Requirements

To be awarded the Graduate Certificate in Geriatric Nursing Education, students must successfully complete

NURS 522, NURS 523, and two of the following courses: NURS 840, NURS 841, or NURS 842

Effective Date: Fall 2017
Expiration Date: Fall 2022

Last Revised by the Department: Fall Semester 2017

Hospital and Health System Preparedness

Graduate Credit Certificate Program

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The Graduate Certificate in Hospital and Health System Preparedness provides students with knowledge and skills to protect the critical infrastructure of hospitals, medical facilities, and emergency management systems. The effective protection of critical infrastructure will allow medical facilities and emergency management systems to remain functional in the midst of natural disasters and intentional and unintentional incidents. The curriculum will emphasize a systems-based and an all-hazards approach to preparedness. Graduates will be experienced in development and revision of an emergency operations plan, both at facility- and community-level, and exercises to test and evaluate the plan. Graduates will be expected to understand and use an evidence-based approach in designing emergency operations plans and procedures. Graduates are employed by public health, hospitals and healthcare facilities, military and law enforcement, and emergency management services. The certificate is intended for students who seek to further their career in: Facility management and services, Healthcare administration and management, Emergency management and services, Infection and quality control. This 15-credit graduate certificate requires the following courses: PHP 410 (3), PHP 510 (3), PHP 530 (3), PHP 831 (3), and either PHP 832 (3) or PHP 527 (3).

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. International applicants must satisfy the English proficiency requirement. Applicants are required to submit a resume, statement of purpose, 3 names of recommenders, and GRE scores. Applicants may request a waiver from the GRE requirement if they meet one of the following criteria: 3.00 undergraduate grade-point average (GPA) either overall or in the last 60 credits; 5+ years of professional work experience; 3.00 GPA upon completion of a graduate certificate; or successful completion of a graduate or professional degree.

List of Courses* Included in the Certificate:

PHP 410 (3)
PHP 510 (3)
PHP 530 (3)
PHP 831 (3)
PHP 832 (3) or PHP 527 (3)

Effective Semester: Spring 2016

Expiration Semester: Fall 2020

Human Resources and Employment Relations (HRER)

Graduate Credit Certificate Program

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The program is designed for professionals who desire further education in the specialized field of Human Resources and Employment Relations (HRER) without completing a full master's degree. Many professionals and recent graduates believe they need further education beyond their bachelor's degree for personal and professional development and to compete effectively in the labor market for HRER practitioners. The certificate program provides flexibility for working professionals and advanced knowledge in the rapidly changing field of HRER in many areas, including: dispute management and resolution, workplace diversity, work and family, trends in human resources, and technology and the workplace. Upon successful completion of the certificate program, students may opt to apply for the master's degree in HRER.

Students must complete 9 credits.

Admission Requirements:

Admission to the program does not assume former knowledge of the field of HRER. An applicant must have received a valid bachelor's degree from a regionally accredited institution and have two years of full-time professional work experience. The following documentation must be submitted for evaluation prior to admission:

- A valid transcript demonstrating graduation from a baccalaureate degree program
- A one-page statement of purpose, focusing on educational and professional objectives
- A resume

List of Courses Included in the Certificate:

HUMAN RESOURCES AND EMPLOYMENT RELATIONS (HRER)

504. Seminar in Employment Relations (3)
505. Seminar in Human Resources (3)

Select One Elective from the Course List below:

500. Topics in Comparative Industrial Relations (3)
501. Labor and Employment Law (3)
502. Organizations in the Workplace (3)
512. Research Methods in Human Resources and Employment Relations I (3)
513. Research Methods in Human Resources and Employment Relations II (3)
516. Labor Market Analysis (3)
536. Diversity in the Workplace (3)

Effective Semester: Summer 2010
Expiration Semester: Spring 2020

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-195

Review Date: 01/10/2012

Human Resource Management

Graduate Credit Certificate Program

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Human Resource Management (HRMT)

The goal of this graduate certificate program is to prepare students to make managerial decisions that integrate HR strategies and practices with organizational strategy in order to improve business performance. To be awarded the Graduate Certificate in Human Resource Management, students must successfully complete 15 credits of course work. All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

Admission Requirements:

Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. The successful applicant is generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

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

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

Required course (3 credits)*

MGMT 541 Human Resource Management

* Students who already have completed a graduate-level course that provides a comprehensive overview of the HR function in organizations and an in-depth examination of the strategic planning and implementation of HRM, as determined in advance by the head of the certificate program, may be permitted to waive this course if completed within five years prior to admission.

Elective courses (**12 credits**: select one course from each of the following four categories; each course listed is worth 3 credits.)

With advance approval of the head of the certificate program and the instructor, special topics courses and online graduate courses that are particularly relevant to the categories listed below may be used to satisfy certificate requirements.

Category 1: Internal Consulting	
ACCTG 524	Managerial Accounting**
BUSAD 523	Prices and Markets
BUSAD 578	Managing Business Processes
HRER 516	Labor Market Analysis
HRER 816	Labor Market Analysis
Category 2: Organizational Development & Change	
BUSAD 519/LEAD 519	**Developing Creative High Performance Organizations**
BUSAD 545	Negotiation Strategies
BUSAD 555/LEAD 555	Full Range Leadership Development
BUSAD 558	Knowledge Management
LEAD 562	Strategic Leadership
MGMT 501	Behavioral Science in Business
MGMT 523	Organizational Change: Theory and Practice
Category 3: Globalization	
BUSAD 542	Global Intercultural Management
BUSAD 556/LEAD 556	Diversity Leadership
HRER 800	International and Comparative Employment Relations
Category 4: Current Topics in Human Resources	
BUSAD 534	Ethical Dimensions of Management in the Biotechnology and Health Industry
BUSAD 551	Business, Ethics, and Society
BUSAD 559	Career Management
BUSAD 802	Cornerstone of Sustainability

BUSAD 809 Triple Bottom Line Accounting
HRER 501 Labor and Employment Law
MGMT 507 Positive Organizational Behavior and Wellbeing

** This course has prerequisites or requires demonstration of prior preparation in a subject area. Please contact the management division at Penn State Great Valley prior to registering for this course.

Effective Semester: Fall 2014
Expiration Semester: Spring 2019

Last Revised by the Department: Fall Semester 2014

Blue Sheet Item #: 43-03-000

Review Date: 10/7/2014

Homeland Security

Graduate Credit Certificate Program

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In this 12-credit graduate certificate program, students will learn about the origins and organization of the Homeland Security Enterprise, including relevant Congressional acts, Presidential policies, and national strategies, as well as the roles and shared responsibility of key agencies and partners at federal, state, and local levels, and from the private sector. They will apply that knowledge to current situations and select scenarios based on an all-hazards and whole-community approach.

The certificate program offers a viable opportunity for those who seek advanced education but do not wish or have not yet determined if they are ready to pursue a full master's degree program. For students in the Intercollege Master of Professional Studies in Homeland Security (*i*MPS-HLS), this program may be pursued to earn an embedded certificate as an additional credential.

The curriculum consists of two required courses (6 credits) and two electives (6 credits). The two prescribed courses are HLS 811 (Fundamentals of Homeland Security) and HLS 404 (Homeland Security and Defense in Practice). Two electives must be chosen from the courses listed in the Elective Courses section below. Students must achieve a GPA of 3.00 or above to be awarded the certificate.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission . Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin . International applicants must satisfy the English proficiency requirement .

Applicants are expected to have a 3.0 or higher GPA in their undergraduate work.

PRESCRIBED COURSES:

HLS 811. Introduction to Homeland Security (3)
HLS 404. Homeland Security and Defense in Practice (3)

ELECTIVE COURSES:

Choose 6 credits from the following:

- HLS 802. Multifaceted Approaches to Homeland Security (3)
- HLS 804. Strategic Planning and Organizational Imperatives in Homeland Defense and Security (3)
- HLS 540. Comparative Homeland Security and Related Methods (3)
- HLS 558. Disaster Psychology (3)
- HLS 875 U.S. Homeland Security Law (3)
- HLS 832. U.S. Military's Domestic Imperative: Homeland Defense and Defense Support of Civil Authorities (3)
- PUBPL 475. Critical Infrastructure Protection (3)

Effective Date: Fall Semester 2017
Expiration Date: Fall Semester 2020

Last Revised by the Department: Spring Semester 2017

Translational Science

Graduate Credit Certificate Program

Gail D. Thomas, Ph.D.
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The primary goal of this certificate is to provide a formal, structured program that allows medical and health care professionals, those wanting to enter the area of health care research, and graduate students seeking a career in a health care related discipline to develop or enhance a successful career in translational science. The curriculum includes courses in 4 specific translational science clusters. Candidates are required to complete 15 credits, including a 10 credit core of required 500-level courses and 5 elective credits. Courses must be selected from the detailed curriculum, or by permission in advance from the certificate director. Courses are available at the Hershey and University Park Campuses enabling the student to continue employment activities or graduate school programs. Candidates must obtain a B or better in each course.

Admission Requirements:
Applicants must apply for admission to the certificate program via the Graduate School application for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

List of Courses Included in the Certificate: 10 credits

PHS 520 (3) or STAT 500 (3) or STAT 501 (3);
and
PHS 550 (3) or H P A 540 (3) OR STAT 507 (3);
and
PHS 580 (3) or STAT 503 (3) or STAT 509 (3);
and
PHS 500 (1) or MCIBS 591 (1) or BMS 591 (1)

Electives (In addition to the 10 required credits, select at least 5 credits from the following list.):

BB H 505, Behavioral Health Research Strategies (3)
BIOL 555, Statistical Analysis of Genomics Data (3)
BMMB 852, Applied Bioinformatics (2)
BMS 801, Writing Grant Proposals for Biomedical Research (1)
CTS 590, Clinical and Translational Science Colloquium (1)
H P A 528, Health Data Analysis for Research (3)
H P A 564, Research Methods in Health Services Research (3)
HD FS 503, Human Development Intervention: Analysis of Theories and Approaches (3)
HD FS 516, Methods of Research in Human Development (3)
KINES 588, Scientific Writing in Kinesiology (3)
MCIBS 555, Statistical Analysis of Genomics Data (3)
NUTR 540, Research Methods (3)
PHS 518, Scientific Communication (2)
PHS 519, Patient-Centered Research (3)
PHS 521, Applied Biostatistics (3)
PHS 536, Health Survey Research Methods (3)
PHS 540, Decision Analysis I (1)
STAT 555, Statistical Analysis of Genomics Data (3)

Effective Semester: Summer 2018
Expiration Semester: Spring 2023

International Human Resources and Employment Relations

Graduate Credit Certificate Program

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This 12 credit program is designed to provide HR practitioners and those with an interest in global HR business practices with a comprehensive understanding of the law, policy and best practices necessary for effective management of global human resources, employment relations and labor relations responsibilities. All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

ADMISSION REQUIREMENTS

Admission to the certificate program will require: (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution.

- Applicants admitted into the certificate program must have a 3.0 grade-point average in the last two years of undergraduate work. This requirement may be waived in exceptional circumstances;
- All applicants submit a Graduate School application (including payment of the application fee), resume, and personal statement addressing their reasons for pursuing a certificate in international human resources and employment relations;
- Applicants must have two (2) years of full-time work experience (excludes part-time jobs and internships;
- The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5;
- International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

LIST OF COURSES INCLUDED IN THE CERTIFICATE

LER 403. International Human Resource Studies
HRER 803. Human Resources in Multinational Enterprises
HRER 801. Comparative and International Labor and Employment Law
LER 400. Comparative Employment Relations Systems

Effective Date: Spring Semester 2016
Expiriation Date: Summer Session 2021

Institutional Research

Graduate Credit Certificate Program

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The primary goal of the program is to improve the skills of institutional researchers on college and university campuses. The curriculum includes research design, assessment and evaluation of student and faculty issues, and the integration of strategic planning with institutional finance. All candidates are required to take 15 credits of coursework in Higher Education including HI ED 801: Foundations of Institutional Research, and HI ED 830: Designing Institutional Research Studies. Students may include up to 6 credits in statistics as part of their program of study for the Institutional Research certificate.

Admission Requirements

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Students are expected to have prior knowledge of introductory statistics.

PRESCRIBED COURSES

HIGHER EDUCATION (HI ED)

- 801. Foundations of Institutional Research (3)
- 830. Designing Institutional Research Studies (3)

ELECTIVES (select three)

HIGHER EDUCATION (HI ED)

- 552. Administration in Higher Education (3)
- 556. Higher Education Students and Clientele (3)
- 595. Internship in Higher Education (3)
- 596. Individual Studies (3)
- 810. Planning and Resource Management in Higher Education (3)
- 820. Studying Students and Student Affairs Programs (3)
- 840. Assessing Student Outcomes and Evaluating Academic Programs (3)
- 850. Analyzing Faculty Workload, Performance, and Compensation (3)
- 860. Conducting Enrollment Management Studies (3)

STATISTICS (STAT)

- 500. Applied Statistics (3)
- 501. Regression Methods (3)

- HIGHER EDUCATION (HI ED) course list
- STATISTICS (STAT) course list

Effective Date: Summer Session 2014
Expiration Date: Spring Semester 2019

Last Revised by the Department: Spring Semester 2014

Blue Sheet Item #: 42-06

Review Date: 04/08/2014

International Affairs

Graduate Credit Certificate Program

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This program provides students, professionals, and others with an accessible, professional education in the rapidly evolving field of international affairs. The certificate builds career options in international relations, public policy, intelligence, defense policy, military affairs, counterterrorism, diplomacy, international organizations, law enforcement, international business, international law, international education, economic development, international environmental policy, and international energy policy.

The 12-credit program offers a unique balance of academic study, hands-on training, and professional development; it includes 6 credits of core courses, 3 credits in additional core courses or SIA electives, and 3 credits in additional 500 or 800 level courses (in some cases, at the discretion of the certificate program head, substitution of a relevant course from an appropriate unit may be possible).

All courses must be taken for a letter grade with at least 3.0 grade-point average maintained; no grades below a C will be counted toward the certificate.

Entrance Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

All applicants submit an application (including payment of the nonrefundable application fee), two letters of recommendation, and a personal statement addressing their reasons for pursing a certificate in international affairs and discussing their plans and goals.

List of Courses Included in the Certificate:

REQUIRED COURSES - Select 6 Credits from the below Core Courses:
INTAF 506 - International Economics: Principles, Policies, and Practices (3 credits)
INTAF 801 - Actors, Institutions, and Legal Frameworks in International Affairs (3 credits)
INTAF 802 - Foundations of Diplomacy and International Relations Theory (3 credits)
INTAF 803 - Multi-sector and Quantitative Analysis
INTAF 804 - Global Cultures and Leadership (3 credits)
INTAF 890 - Colloquium on Current Policy Challenges

ADDITIONAL Core Courses or SIA Elective Courses:
Select an additional 3 credits in Core Courses or SIA Elective Courses.

Additional 500 or 800 Level Courses:
Select an additional 3 credits in 500 or 800 Level Courses.

*In some cases, at the discretion of the certificate program head, substitution of a relevant course from an appropriate unit may be possible.

Effective Semester: Spring 2018
Expiration Semester: Spring 2023

Last Revised by the Department: Fall Semester 2017

International Development Policy

Graduate Credit Certificate Program

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This program provides students, professionals, and others with an accessible, professional education in the rapidly evolving field of international development policy. Students study geopolitical, cultural, and legal aspects of international affairs pertaining to economic development. The certificate is a strong addition to the resume of anyone interested in a career in international relations, public policy, intelligence, defense, military affairs, counterterrorism, diplomacy, NGOs, international business, international law, or economic development.

The 15-credit program offers a unique balance of academic study, hands-on training, and professional development; it includes 9 credits of core courses (6 required and 3 elective credits) and 6 broader elective credits. All courses must be taken for a letter grade with at least a 3.0 grade-point average maintained; no grades below a C will be counted toward the certificate.

Admission Requirements:

Admission to the certificate program will require: (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

All applicants submit an application (including payment of the application fee), two letters of recommendation, and a personal statement addressing their reasons for pursuing a certificate in international affairs and discussing their plans and goals.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.

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

List of Courses Included in the Certificate:

REQUIRED CORE COURSES (6 credits):
INTAF 805 - International Economics: Principles, Policies, and Practices
INTAF 803 - Multi-sector and Quantitative Analysis

ELECTIVE CORE COURSES (Select 3 credits):
INTAF 590 – International Affairs Colloquium
INTAF 801 - Actors, Institutions, and Legal Frameworks in International Affairs
INTAF 802 - Foundations of Diplomacy and International Relations Theory
INTAF 804 - Global Cultures and Leadership

ADDITIONAL ELECTIVE COURSES (Select 6 credits on topics relevant to international development policy):
INTAF 501 - Water and Sustainable Development
INTAF 502 - Science, Technology, and International Policy
INTAF 504 - Political Economy of Development and Growth
INTAF 810 - Energy, International Security, and the Global Economy
INTAF 811 - Estimative Analysis in International Strategy

A complete list of potential elective courses will be maintained by the head of the certificate program and will be available from the program office. With approval in advance from the adviser, a student may be permitted to use another graduate course to fulfill this elective requirement.

Effective Semester: Fall 2015
Expiration Semester: Spring 2020

Last Revised by the Department: Fall Semester 2014

Blue Sheet Item #: 43-04-000

Review Date: 01/13/2015

International Security Studies

Graduate Credit Certificate Program

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This program provides students, professionals, and others with an accessible, professional education in the rapidly evolving field of international security studies. Students study geopolitical, cultural, and international law aspects of international affairs pertaining to security dilemmas. The certificate is a strong addition to the resume of anyone interested in a career in international relations, public policy, intelligence, defense, military affairs, counterterrorism, diplomacy, law enforcement, international organizations, or international law.

The 15-credit program offers a unique balance of academic study, hands-on training, and professional development; it includes 9 credits of core courses (6 required and 3 elective credits) and 6 broader elective credits. All courses must be taken for a letter grade with at least a 3.0 grade-point average maintained; no grades below a C will be counted toward the certificate.

Admission Requirements:

Admission to the certificate program will require: (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

All applicants submit an application (including payment of the application fee), two letters of recommendation, and a personal statement addressing their reasons for pursuing a certificate in international affairs and discussing their plans and goals.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). The minimum acceptable composite score for the IELTS is 6.5.

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

List of Courses Included in the Certificate:

REQUIRED CORE COURSES (6 credits):
INTAF 801 - Actors, Institutions, and Legal Frameworks in International Affairs
INTAF 802 - Foundations of Diplomacy and International Relations Theory

ELECTIVE CORE COURSES (Select 3 credits):
INTAF 590 – International Affairs Colloquium
INTAF 803 - Multi-sector and Quantitative Analysis
INTAF 804 - Global Cultures and Leadership
INTAF 805 - International Economics: Principles, Policies, and Practices

ADDITIONAL ELECTIVE COURSES (Select 6 credits relevant to international security):
INTAF 503 - Hazards, Disasters, and International Affairs
INTAF 505 - Strategy, Conflict, Peace
INTAF 810 - Energy, International Security, and the Global Economy
INTAF 812 - The Role of Intelligence in International Relations
INTAF 814 - U.S. Policy in the Middle East

A complete list of potential elective courses will be maintained by the head of the certificate program and will be available from the program office. With approval in advance from the adviser, a student may be permitted to use another graduate course to fulfill this elective requirement.

Effective Semester: Fall 2015
Expiration Semester: Spring 2020

Last Revised by the Department: Fall Semester 2014

Blue Sheet Item #: 43-04-000

Review Date: 01/13/2015

Principalship

Graduate Credit Certificate Program

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The goal of the program is to prepare students to apply for principal certification by earning 18 credits in Educational Leadership coursework. Successful completion of coursework required for the iPrin Certificate partially fulfills Pennsylvania Department of Education (PDE) requirements for principal certification. This curriculum has been approved by PDE. Note that some states have reciprocity with Pennsylvania and may recognize completion of course work leading to certification. A U.S. student should check first with their state about reciprocity before applying to the certificate program. International students can enhance their professional credentials by earning the certificate and may be qualified to manage and lead a U.S.-based school overseas. Students must maintain a minimum GPA of 3.0 for courses counting toward the certificate.

Admission Requirements:

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

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

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

Required Courses:

EDLDR 559 School Improvement (3)
EDLDR 560 (C & S 560) Principles of Instructional Supervision (3)
EDLDR 568 The Principalship (3)
EDLDR 576 The Law and Education (3)
EDLDR 579 Financial Management for Schools (3)
EDLDR 595A Principal Internship (3)

Effective Semester: Fall 2014
Expiration Semester: Spring 2019

Information Systems Cybersecurity

Postbaccalaureate Credit Certificate Program

Lead Certificate Chair:

Mary Beth Rosson
Associate Dean for Undergraduate and Graduate Studies
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This postbaccalaureate certificate program is designed to provide students with both a breadth and depth of training in information cybersecurity. The certificate will enable those completing the program to market to academic institutions, government, and technology-based businesses. Students will be exposed to principles, models, tools, and applications in information security that specifically focus on network security, security and risk management, digital forensics, crisis and disaster management, and web security and privacy. A distance education format is used to accommodate the needs of professionals already active in this area. The certificate program is an attractive option not only for those who desire advanced education but do not wish a full Master's degree program, but also for students who might wish to take a certificate to determine if they are interested in a complete postbaccalaureate degree program in Information Sciences and Technology (IST). To be awarded the certificate, students must successfully complete 15 credits of course work as detailed below. A 3.0 GPA must be obtained in order to successfully complete the certificate.

Entrance Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. A bachelor's degree in a related area (e.g., engineering and science), while not necessary for admission, is helpful in the successful completion of the certificate. It is expected that students will have a basic level of competency in computer language and information technology (related work experience can be used to demonstrate such competency). GRE scores are not required for nondegree graduate students.

Required Courses (15 credits)

IST 815(3), IST 554(3); IST 451(3); IST 454(3); IST 456(3); IST 564(3); INSC 561(3)

Effective Date: Spring 2017
Expiration Date: Spring 2022

Laser-Materials Processing and Laser-Based Manufacturing

Graduate Credit Certificate Program

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The purpose of this program is to prepare engineers to integrate laser-materials processing into the concurrent design and manufacture of multiscale components and systems of the future. Its objective is to offer a multidisciplinary curriculum drawing upon the strengths of several engineering departments and the Applied Research Laboratory. To be awarded the Laser-Materials Processing and Laser-Based Manufacturing certificate, students must successfully complete with a grade of B or higher 12 credits of graduate course work including E SC 540 and three of the following courses: E SC 541, E SC 542, E SC 543, or E SC 544, or other courses approved in advance by petition.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. International applicants must satisfy the English proficiency requirement.

Graduates in engineering, the sciences, or medicine who present a 3.0 grade-point average will be considered for admission. Exceptions to the minimum 3.00 GPA may be made for students with professional experience, special backgrounds, abilities, and interests. GRE scores are not required.

Required Courses

ENGINEERING SCIENCE (E SC)

- E SC 540. Laser Optics Fundamentals (3)

AND THREE OF THE FOLLOWING:

- E SC 541. Laser-Materials Interactions (3)
- E SC 542. Laser Integrated Manufacturing (3)
- E SC 543. Laser Microprocessing (3)
- E SC 544. Laser Laboratory (3)

To be awarded the Laser-Materials Processing and Laser-Based Manufacturing certificate, students must successfully complete with a grade of B or higher E SC 540 and three of the following courses: E SC 541, E SC 542, E SC 543, or E SC 544, or other courses approved in advance by petition.

Effective Date: Spring Semester 2016
Expiration Date: Fall Semester 2020

Last Revised Spring Semester 2016

Long-Term Care Administration and Policy

Graduate Credit Certificate Program

Hengameh Hosseini
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The Health Administration program at Penn State Harrisburg offers a Long-Term Care Administration and Policy graduate credit certificate program. This certificate program is designed for working long-term care administrators, professionals, and policy makers in for-profit, not-for-profit, and public organizations who need more knowledge and skills in long-term care administration and policy, as well as in long-term care systems and their relationship to and integration with health-care systems.

The Long-Term Care Administration and Policy graduate credit certificate program consists of four Health Administration (HADM) graduate-level courses (12 credits).

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School applicantion for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

Applicants admitted into the certificate program must have a master's degree or a 3.0 grade-point average in the last two years of undergraduate work. This requirement may be waived in exceptional circumstances. Additionally, applicants must have at least three years of professional experience. All courses must be taken for a letter grade. A 3.0 grade-point average in the certificate program courses is needed for the awarding of the certificate, and only grades of C or better will be counted toward the certificate.

If an applicant to the certificate program already holds a graduate degree in health care administration or a related field and has taken graduate courses that duplicate the content of courses in the certificate program, he or she may substitute other HADM courses for those redundant courses with the prior approval of the person in charge.

PRESCRIBED COURSES

HEALTH ADMINISTRATION (HADM)

- 542. Health Politics and Policy (3)
- 543. Long-Term Care Administration and Policy (3)
- 545. Health Financial Management (3)

ELECTIVE COURSES (select one)

HEALTH ADMINISTRATION (HADM)

- 539. Health Systems Organization (3)
- 551. Health Care Law (3)
- 552. Health Delivery Systems: Managed Care (3)

Effective Date: Summer Session 2017
Expiration Date: Spring Semester 2022

Last Revised by the Department: Fall Semester 2017

Adult Education in the Health and Medical Professions

Graduate Credit Certificate Program

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The primary goal of the Graduate Certificate in Adult Education in the Health and Medical Professions is to assist medical/health professionals in increasing their knowledge and competence in educating adult learners in medical education/health science settings.

The objectives are to promote: awareness of how learning theory informs practice; effective methods for teaching adults; development of a reflective practice; understanding of program/instructional design

Candidates are required to take **12 graduate credits, including the 9-credit core of three required classes and one other advisor-approved 3-credit graduate course** related to the candidate's specific area of interest. The required classes, in which assignments will relate to health/medical education issues, are:

ADTED 460: Introduction to Adult Education
ADTED 501: Foundations of Medical Education
ADTED 505: Teaching of Adults
The 3-credit graduate elective will be related to the candidate's specific interest in medical/health education.

ADMISSION REQUIREMENTS

U.S. applicants must have a baccalaureate degree from a regionally accredited institution. International applicants must have a tertiary (post secondary) degree that is deemed comparable to a four-year U.S. bachelor's degree. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Additionally, all international applicants must meet the Graduate School's English proficiency requirements.

Applicants must submit the following materials:
* A one-page resume
* A statement describing professional goals, experience, and responsibilities (2 pages maximum)
* One letter of recommendation
* Official transcripts for all undergraduate and graduate programs previously attended.

LIST OF COURSES INCLUDED IN THE CERTIFICATE

The three required classes include the following and assumes that the candidate would relate a part of their papers or assignments to the areas of health or medical education :
ADTED 460: Introduction to Adult Education
ADTED 501: Foundations of Medical Education
ADTED 505: Teaching of Adults
The 3-credit graduate elective will be related to the candidate's particular interest related to health or medical education, and could include other graduate courses in the Adult Education Program or another related area.

Effective Date: Summer Session 2010
Expiration Date: Spring Semester 2020

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-197

Review Date: 01/10/2012

Nanotechnology Systems and Device Development

Graduate Credit Certificate Program

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The goal of the program is to prepare students to develop nanotechnology-enabled components, including wearable systems for simultaneously monitoring the medical condition of the wearer and the surrounding environment. The monitored data is transmitted in real time to a local base station (e.g. smartphone) that forwards it to a remote facility for further processing and action decisions. The ultimate purpose of these systems includes medical monitoring for diagnosis of environmentally related diseases, environmental monitoring to warn that the local environment contains allergens or other factors to be avoided. The exact course selection shall be determined in advance by the student and the student's adviser following the guidelines below. Students shall provide written input to their adviser describing proposed course(s) and how the courses will contribute to the requirements of the certificate. Students must receive a C or better in each course included for the certificate, and must achieve an overall 3.0 GPA for the certificate courses.

Admission Requirements:
An applicant for this graduate certificate must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Ordinarily, an entering student must have completed in a satisfactory manner a minimum of course work in an Engineering or Science discipline that is equivalent to a Penn State major in those areas. Applicants must have a 3.0 or higher undergraduate GPA. International students must satisfy Graduate Council's English proficiency requirements.

List of Courses Included in the Certificate:
The certificate requires a minimum of 12 credits, as described below. At least 50% of the total number of credits must be taken at the 500 level.

Required:
3credits from the following list:
E E 442. Solid State Devices (3)
E E 441. Semiconductor Integrated Circuit Technology (3)
E E 542. Semiconductor Devices (3)
MATSE 413. Solid State materials (3)
MATSE 510. Surface Characterization of Materials (3)
3 credits from the following list:
E E 541. Manufacturing Methods in Microelectronics (3)
E SC 481. Elements of Nano/Micro-electromechanical Systems Processing and Design (3)
E SC 577. Engineered Thin Films (3)
MATSE 450/E SC 450. Synthesis and Processing of Electronic and Photonic Materials (3)
At least 2 credits from the following list:
ENGR 486. Business Opportunities in Engineering (2)
ENGR 411. Entrepreneurship Business Basics (3)
ENTR 430. Entrepreneurship and New Product Development (3)

Electives:
The balance of the required credits shall be determined in advance by the student and his/her graduate adviser. Examples of acceptable courses (a current list of potential elective courses will be maintained by and available from the head of the certificate program):
E E 546. Field-Effect Devices (3)
E SC 482. Micro-Optoelectromechanical Systems (MOEMS) and Nanophotonics (3)
E SC 484. Biologically Inspired Nanomaterials (3)
MATSE. 400 Crystal Chemistry (3)
MATSE 483/E SC 483. Simulation and Design of Nanostructures (3)
MATSE 511B. Transmission Electron microscopy (1)
MATSE 514. Characterization of Materials (3)

Effective Semester: Fall 2014
Expiration Semester: Summer 2019

Last Revised by the Department: Summer Session 2014

Blue Sheet Item #: 43-01

Review Date: 08/19/2014

Nonprofit Administration

Graduate Credit Certificate Program

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The graduate credit certificate program in Nonprofit Administration is offered by the graduate program in Public Administration at Penn State Harrisburg. The certificate is designed for administrators and professionals in government and not-for-profit organizations who need to acquire additional knowledge and skills in the following areas:

- Management of nonprofit organizations and leadership
- In-depth understanding of nonprofit organizations' evolution, current operation, and future direction
- Understanding of finance, taxation, and competition that affect an organization's future
- Working in the nonprofit sector

Admission Requirements

1. An applicant must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.
2. Applicants must have a GPA of 3.0 in the last two years of undergraduate work. Applicant must have at least two years of managerial or administrative experience in the nonprofit sector.
3. Applicant must have at least two years of managerial or administrative experience in the nonprofit sector.

Participants will apply to the program by completing the online Graduate School certificate application, including payment of the application fee, and will earn the certificate upon successful completion of the three required courses and one elective course (12 credits). All courses must be taken for a letter grade with at least a 3.0 average maintained; no grades below a C will be counted toward the certificate.

If a student who is already enrolled in a graduate degree program wishes to enroll in this graduate credit certificate program as well, he/she must do so by completing the online certificate application and paying the application fee.

Students who are already enrolled in the Public Administration degree program at Penn State Harrisburg must complete a "Notice of Intent" form as well in order to enroll in the certificate program. These students can choose elective courses for their MPA degree program in accordance with the requirements of the certificate program in order to earn the certificate in Nonprofit Administration. Courses taken in the certificate program may be applied toward a graduate degree in Public Administration, subject to restrictions outlined in the Transfer of Nondegree and Certificate Graduate Credits.

The certificate program consists of four graduate courses (12 credits). All courses must be at the 500 level. Students are required to take three required courses and one elective course of their choice.

PRESCRIBED COURSES

PUBLIC ADMINISTRATION (PADM)

- 517. Nonprofit Organizations: History and Evolution (3)
- 518. Nonprofit Organizations: Management and Leadership (3)
- 519. Nonprofit Organizations: Resource Development and Management (3)

Elective Courses: (choose one)

Students are required to take one elective 3-credit course. Students are free to choose any 3-credit course at the 500 level that is relevant to their interest. Following is the suggested list of courses from which students can choose.

PUBLIC ADMINISTRATION (PADM)

- 510. Organization
- 514. Public Organization and Managerial Consultation
- 516. Strategic Planning
- 522. Government Financial Management
- 523. Governmental and Nonprofit Accounting
- 550. Program Planning and Evaluation

Effective Date: Summer Session 2017
Expiration Date: Summer Session 2022

Last Revised by the Department: Fall Semester 2017

Nurse Administrator

Graduate Credit Certificate Program

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The purpose of the Nurse Administrator graduate credit certificate is to prepare nurses with a baccalaureate or higher degree in Nursing for certification as a nurse administrator. The certificate requires completion of three 3-credit graduate-level nurse administrator didactic courses (9 credits); an optional practicum course (4 credits) is available as well. All courses are delivered using distance technology and are available through the World Campus.

Entrance Requirements:

Applicants must hold a Bachelor's or higher degree in nursing from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution. Applicants must apply for admission to the certificate program via the Graduate School Application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Official transcripts from all post-secondary institutions must accompany the application. Prior to an applicant's admission, transcripts are evaluated by the Graduate Admissions Committee to ascertain the applicant's potential for successful completion of the core courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and Research prior to making an offer of admission to this certificate program.

REQUIRED COURSES (9-13 credits)
NURS 845(3), NURS 846(3), NURS 847(3), NURS 848(4)

Non-Course Requirements
Applicants must hold a current license to practice professional nursing in the United States or a foreign country.

Effective Semester: Spring 2017
Expiration Semester: Spring 2022

Nurse Educator

Graduate Credit Certificate Program

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The purpose of the Nurse Educator certificate is to provide nurses with a baccalaureate degree or higher in nursing formal content in nursing education for those who plan to teach in a variety of educational and clinical settings. The certificate requires completion three 3-credit graduate-level nurse educator didactic courses (9 credits); an optional 4-credit nurse educator practicum is available as well. All courses are delivered using distance technology and are available through the World Campus.

Entrance Requirements:

Applicants must hold a Bachelor's or higher degree in nursing from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution. Applicants must apply for admission to the certificate program via the Graduate School Application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Official transcripts from all post-secondary institutions attended must accompany the application. Prior to an applicant's admission, transcripts are evaluated by the Graduate Admissions Committee to ascertain the applicant's potential for successful completion of the core courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and Research prior to making an offer of admission to this certificate program.

REQUIRED COURSES

NURS 840(3), NURS 841(3), NURS 842(3), NURS 843(4)

Non-Course Requirements

Applicants must hold a current license to practice professional nursing in the United States or a foreign country.

Effective Semester: Spring 2017
Expiration Semester: Spring 2022

Fundraising Leadership

Graduate Credit Certificate Program

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Nonprofit organizations need well-educated fundraising leaders in the face of decreasing government support and increasing targets for private support. The Postbaccalaureate Credit Certifidate in Fundraising Leadership is designed to instill graduates of the program with an understanding of fundraising principles and leadership. The certificate encourages development of critical thinking and problem solving required of leaders in nonprofits. The goal of the certificate is to develop the next generation of fundraising leaders, preparing them to serve as leaders from any position and also as directors and vice presidents of development. The program will benefit: recent college graduates entering the profession; fundraisers who seek to move into higher-level positions; for-profit professionals in marketing, advertising, sales, communications who wish to move into nonprofits and fundraising; nonprofit leaders directly responsible for fundraising or are supervising fundraisers.

Admission Requirements:

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin*. All international applicants must meet the Graduate School's English proficiency requirements.

Due to the multidisciplinary nature of philanthropy, no specific courses or majors are required for admission to the certificate program.

Required Courses

LA 402(3), LA 802(3), LA 895(1-3)

Elective Courses

COMM 428A(3) or HIED 552(3)

Effective Semester: Summer 2017
Expiration Semester: Summer 2022

Project Management

Graduate Credit Certificate Program

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Delivering complex projects on time and under budget is a daily challenge for most corporations. More organizations now use project-based methods to accomplish such tasks, resulting in increased demand for project managers. The online Graduate Certificate in Project Management is an interdisciplinary, 12-credit program that uses problem-based learning to provide a strong foundation in project management theory and practice. The program is offered by the AACSB Accredited Sam and Irene Black School of Business and Penn State is a Project Management Institute (PMI)® Registered Education Provider (R.E.P), making this certificate a well-respected credential. In addition to being an excellent stand-alone credential, all of the courses in the Graduate Certificate in Project Management can be applied toward the Master of Project Management degree program also offered through Penn State's World Campus; however, successful completion of the certificate neither guarantees nor implies acceptance into any graduate program at Penn State. Approval to apply nondegree graduate credits toward a degree program must be granted by the student's academic adviser, the program head or graduate officer, and the Graduate School. A maximum of 15 credits earned as a nondegree student may be applied to a degree program.

Admission Requirements

Only candidates who demonstrate high promise of success for graduate work are admitted to the program. All applicants must hold either (1) a baccalaureate degere from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. Admission decisions are based on:

1. Undergraduate grad-point average
2. A personal essay
3. Two submitted letters of recommendation

The applicant's cumulative undergraduate grade-point average or the junior/senior grade-point average is required to be a 3.0 or better. The MPM program emphasizes application of course concepts to actual project management opportunities and problems. Therefore, students who currently are, or previously were, employed as project managers or project team members will derive the greatest benefit from the program. All applicants must provide evidence of sufficient current or previous work experience that will enable them to successfully complete course assignments requiring the application of course concepts to real project management situations. This evidence may be provided in either the form of two letters of recommendation from individuals who know the applicant in a professional capacity or through nomination to participate in the program by an appropriate official within the applicant's employing organization. Those who write letters of recommendation or submit nominations on behalf of the candidate will be asked to attest to the nominee's suitability for the program of study considering factors such as the applicant's length of employment, level and areas of work responsibility, personal qualities, career goals, maturity of purpose, and program requirements to apply course concepts to work-related issues. Applicants are encouraged to consult with the program chair concerning the suitability of their work experiences in relationship to program requirements.

The language of instruction at Penn State is English. All international applicants must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, 213 for the computer-based test, or a total score of 80 with a 19 on the speaking section for the Internet-based test (iBT). The minimum composite score for the IELTS is 6.5. International applicants are exempt from the TOEFL/IELTS requirement who have received a baccalaureate or a graduate degree from a college/university/institution in any of the following: Australia, Belize, British Caribbean and British West Indies, Canada (except Quebec), England, Guyana, Republic of Ireland, Liberia, New Zealand, Northern Ireland, Scotland, the United States, and Wales.

All students must be computer literate and have ready and reliable access to a computer and the Internet to successfully complete the MPM program. They must know how to use word processing software, log on to an Internet provider, and use e-mail. Additionally, MPM students will use Microsoft Office in their coursework that will require they have a working knowledge of Microsoft Office programs such as Word, Excel, Power Point, and Access. Access to fax facilities may be needed as an additional form of communication between student and instructor or between students.

COURSES

Students complete MANGT 510, Project Management (3), in their first semester of study and three additional courses from the following list for a total of 12 credits:

MANAGEMENT (MANGT)

- 515. Cost and Value Management (3)
- 520. Planning and Resource Management (3)
- 525. Commercial and Procurement (3)
- 531. Organizations (3)
- 535. Interpersonal and Group Behavior (3)
- 540. Strategy: Corporate, Business and Project (3)

MANGT 515 through 540 may be taken either concurrently or subsequently with MANGT 510.

- MANAGEMENT (MANGT) course list

Effective Date: Fall Semester 2012
Expiration Date: Fall Semester 2020

Last Revised by the Department: Fall Semester 2011

Blue Sheet Item #: 40-04-198

Review Date: 01/10/2012

Public Budgeting and Financial Management

Graduate Credit Certificate Program

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The primary goal of this graduate certificate is to educate administrators and professionals in government and not-for-profit organizations who need to acquire additional knowledge and skills in the following areas: (1) fiscal and governmental aspects of budgeting and financial management; (2) development of organizational budgets; and (3) governmental and not-for-profit accounting. At the end of the program students will be able to:

- Explain the significance of key topics in government financial management (governmental accounting, auditing, financial reporting, internal controls and budgeting at the federal, state and local levels) as they relate to public sector organizations.
- Describe how government financial management can contribute toward more efficient use of public resources, increased transparency and improved accountability.
- Identify and describ e the role of key actors in the government financial management process.
- Apply key financial management planning, management, and control tools to addressing resource contraints, and meeting transparency and accountability demands.

To complete the program students need to successfully complete 9 credits. Specifically, students need to complete 3 different courses including PADM 502, PADM 522 and PADM 523. Successful completion of a course is defined as a grade of B- or better.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission (http://www.gradschool.psu.edu/prospective-students/how-to-apply/). Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin (http://bulletins.psu.edu/graduate/generalinformation). International applicants must satsify the English proficiency requirement (http://bulletins.psu.edu/graduate/generalinformation/admission2).

PRESCRIBED COURSES

PUBLIC ADMINISTRATION (PADM)

- 502. Governmental Fiscal Decision-Making (3)
- 522. Government Financial Management (3)
- 523. Governmental and Not-for-Profit Accounting (3)

Effective Date: Spring Semester 2017

Expiration Date: Spring Semester 2022

Last Revised by the Department: Fall Semester 2017

Public Health

Graduate Credit Certificate Program

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The purpose of the graduate certificate in Public Health is to provide students with foundational graduate-level course work in public health. The four-course, 12-credit curriculum can be completed in two semesters. All course work will be at the 500 or 800 level. Certificate course work may be transferable to the Penn State Master of Public Health (MPH) graduate degree program should a student wish to continue public health training at the graduate level. Upon completion of the Public Health certificate, students will be able to: 1. Demonstrate their knowledge in core areas of public health, which include biostatistics, epidemiology, health services administration, and social and behavioral sciences. 2. Apply their knowledge and skills to solving public health problems.

Entrance Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Applicants must submit the following items with their applicant for admission to the Public Health certificate program:

- Official transcripts from all post-secondary institutions attended
- Resume/CV
- Statement of Purpose or Rationale for seeking a Graduate Certificate in Public Health
- Two letters of recommendation

Upon approval, certificate program students will enroll in course work on a nondegree basis. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships. Students must complete each course with a grade of B or better in order to receive the certificate. All courses in the certificate program may be applied to the M.P.H. degree program. Students must earn a grade of B or better for a course to be applied to the M.P.H. degree program. Certificate program students who wish to have the certificate courses applied to the M.P.H. degree program must formally apply and be admitted to the Penn State M.P.H. degree program. Admission into the Penn State M.P.H. degree program is a separate step and is not guaranteed. Students who are interested in the Penn State M.P.H. degree program should contact the program at 717-531-1502 or mphprogram@phs.psu.edu, or visit med.psu.edu/mph. Once a certificate program student is admitted to the Penn State M.P.H. degree program and enrolls on a degree basis, certificate courses completed with a B or better may be applied toward the M.P.H. degree.

REQUIRED COURSES (12 credits)
PHS 504(3), PHS 520(3), PHS 550(3), PHS 571(3)

Effective Semester: Spring 2018
Expiration Semester: Spring 2023

Last Revised by the Department: Spring 2018

Public Health Preparedness

Graduate Credit Certificate Program

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This graduate certificate program is designed to provide non-science students with broad training in the field of public health preparedness. A distance education format is used to accommodate the needs of professionals already active in this area. Applicatns must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. All applicants are expected to have a 3.0 or higher undergraduate grade point average. Three letters of recommendation are required. Special backgrounds, abilities, and interests related to homeland security are desirable.

REQUIRED COURSES

PHP 410. Public Health Preparedness for Disaster and Bioterrorism Emergencies I (3)
PHP 510. Public Health Preparedness for Disaster and Bioterrorism Emergencies II (3)
PHP 527. Public Health Evaluation of Disasters and Bioterrorism (3)
PHP 530. Critical Infrastructure Protection of Health Care Delivery Systems (3)

Effective Date: Summer Session 2017
Expiration Date: Summer Session 2022

Last Revised by the Department: Spring Semester 2017

Public Sector Human Resources Management

Graduate Credit Certificate Program

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The graduate credit certificate program in Public Sector Human Resources Management is offered by the Public Administration program at Penn State Harrisburg.

The certificate is designed for administrators and other professionals in government and not-for-profit organizations who need to acquire additional knowledge and skills in the following areas:

- personnel/human resource management
- labor relations
- problem solving
- planning
- management of organizational change and development

The certificate program in Public Sector Human Resources Management requires taking four courses (12 credits) -- two required and two elective courses.

Admission Requirements

An applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. A Graduate School certificate application must be completed and submitted with copies of all undergraduate degree transcripts.

Successful applicants typically have a 3.0 grade-point average in the last two years of undergraduate work.

Applicants who have graduate degrees in public administration or a related field, and who have taken graduate courses that duplicate the content of courses in the certificate program, may substitute other P ADM courses for those courses with the prior approval of the person in charge. Graduate transcripts, course syllabus, and course projects/term papers will be needed for this evaluation process. Some certificate courses may be used toward completion of the master's degrees in Public Administration and in Health Administration but completion of a certificate neither implies nor guarantees acceptance into a graduate degree program at Penn State.

REQUIRED COURSES

PADM 505(3), PADM510(3), PADM 511(3), PADM 512(3), PADM 514(3), PADM 515(3), PADM 516(3)

Non-Course Requirements

The seven certificate courses listed above are categorized into 2 categories: required courses and elective courses. PADM 505 and PADM 510 are required courses; PADM 511, PADM 512, PADM 514, PADM 515, and PADM 516 are elective courses. Student must take required courses and choose 2 elective courses from the list of 5 elective courses in order to graduate. With the approval by the certificate coordinator, students could also choose other HR-related Penn State graduate-level courses as elective courses for this certificate.

- PUBLIC ADMINISTRATION (P ADM) course list

Effective Date: Spring 2017
Expiration Date: Spring 2022

Last Revised by the Department: Spring 2017

Solar Energy

Graduate Credit Certificate Program

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The graduate certificate in Solar Energy is designed for current and aspiring practitioners seeking advanced skills in resource assessment, project development, and system design for solar thermal and solar electric systems. The program is offered by the Department of Energy and Mineral Engineering through Penn State's World Campus. Certificate students earn the certificate and 12 graduate credits by successfully completing each of four 3-credit, instructor-led online courses with a grade of C or better. Courses taken in the certificate program may be applied toward the Master of Professional Studies in Renewable Energy and Sustainability Systems (RESS) if the student has earned a B- or better in each course, subject to restrictions outlined in the Transfer of Nondegree and Certificate Graduate Credits . Certificate students who wish to have certificate courses applied towards the M.P.S. in RESS must apply and be admitted to that degree program. Admission to the RESS graduate degree program is a separate step and is not guaranteed.

ADMISSION REQUIREMENTS

Applicants must apply for admission to the certificate program via the Graduate School application for admission . Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin . International applicants must satisfy the English proficiency requirement . This degree must be from an officially recognized degree-granting institution in the country in which it operates. A background in systems science, engineering, or physics is strongly recommended.

List of Courses Included in the Certificate:
Required (6 credits):
E M E 810. Solar Resource Assessment and Economics (3)
A E 878. Solar Project Development and Finance (3)

Electives (6 credits):
E M E 811. Solar Thermal Energy for Utilities and Industry (3)
E M E 812. Utility Solar Power and Concentration (3)
A E 862. Distributed Energy Planning and Management (3)
A E 868. Commercial Solar Electric Systems (3)

Effective Semester: Summer 2018
Expiration Semester: Summer 2023

Supply Chain Management

Graduate Credit Certificate Program

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The Graduate Certificate in Supply Chain Management is a 12-credit online professional development program focused on building competence across the foundations of supply chain management. Through integration of strategic procurement, supply management, manufacturing, service operations, and demand fulfillment, this year-long program positions students to manage and enhance the value of today's complex supply chains. In addition to core supply chain principles, topics in ethics, performance metrics, financial analysis, and information systems are covered. The certificate program starts with basic supply chain concepts that professionals are expected to know and then uses a best-practices approach to build supply chain skills and analytical capabilities.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

Applicants should have at least two years of professional experience along with an understanding of basic accounting and microeconomic terms and principles. Spreadsheet skills and knowledge of business statistics are necessary for successful participation in the program.

Along with the submission of the online application and the nonrefundable application fee, the following is required:

- Official Transcripts and Grade Point Average (GPA) - Applicants must submit official transcripts from all post-secondary institutions attended. A Grade Point Average (GPA) of 3.00 on a 4.00 scale in the final two years of undergraduate studies or in your most recent gradaute degree is required.
- Resume - Applicants must upload their current resume with the online application.

List of Courses Included in the Certificate:

BA 803 - Business Ethics (1)

SCM 800 - Supply Chain Management (4)

SCM 801 Supply Chain Performance Metrics and Financial Analysis (1)

SCM 812 - Demand Fulfillment (2)

SCM 822 - Supply Management (2)

SCM 842 - Manufacturing and Service Operations Planning (2)

Effective Date: Fall Semester 2016
Expiration Date: Fall Semester 2021

Last Revised by the Department: Fall Semester 2016

Sustainable Management Practices

Graduate Credit Certificate Program

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The School of Graduate Professional Studies at Penn State Great Valley offers a 12-credit Graduate Certificate program in Sustainable Management Practices. The primary goal of this certificate program is to prepare individuals to design, implement, and evaluate new or existing sustainable practices in their organizations. Sustainability in this context refers to the operational policies and practices that seek to maximize not only the economic, but also the social (employees, community) and environmental (physical) outcomes of an organization.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Individuals wishing to enroll in this graduate certificate program are expected to have achieved a 3.0 (B) or higher undergraduate grade point average. Applicants holding a master's degree should have attained at least a cumulative grade point average of 3.0 (B) in pervious graduate work. Professional experience will be taken into consideration for admission. Applicants must submit a current resume and a statement of intent or career objective.

REQUIRED COURSES (12 credits)

BUSAD 802(3), BUSAD 582(3); BUSAD 809(3); BUSAD 824(3); BUSAD 879(3); MGMT 507(3); SYSEN 507(3)

NON-COURSE REQUIREMENTS

BUSAD 802 is required. Three electives must be chosen.

Effective Date: Fall Semester 2016
Expiration Date: Fall Semester 2021

Last Revised by the Department: Fall Semester 2016

Review Date: 1/10/2017

Sustainability Management and Policy

Graduate Credit Certificate Program

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The graduate certificate in Sustainability Management and Policy is designed specifically for current and aspiring practitioners who seek advanced skills for advancing sustainability practice. The program is offered by the Department of Energy and Mineral Engineering through Penn State's World Campus. Certificate students earn the certificate and 12 graduate credits by successfully completing each of the four required 3-credit, instructor-led online courses with a grade of C or better. Credits earned in this program may be applied to the intercollege Master of Professional Studies in Renewable Energy and Sustainability Systems (iMPS-RESS) program if a student is subsequently admitted to that program and has earned a B- or better in each course; however, successful completion of the certificate neither implies nor guarantees admission into a graduate degree program at Penn State.

ADMISSION REQUIREMENTS

For admission to the Graduate School, an applicant must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates.

The student must be admitted to (1) Penn State's Graduate School, and (2) the graduate certificate in Sustainability Management and Policy offered by the Department of Energy and Mineral Engineering. To apply, the student completes a single online application that provides the necessary information to each organization.

Graduate Certificate in Sustainability Management and Policy Students interested in applying for admission to the Graduate Certificate in Sustainability Management and Policy should go to the World Campus web site:

http://www.worldcampus.psu.edu/degrees-and-certificates/sustainability-management-policy-certificate/apply. The Sustainability Management and Policy Graduate Certificate Program Admissions Committee reviews and ranks applications as they are received.

List of Courses Included in the Certificate

B A 850. Sustainability Driven Innovation (3)
EME 803. Applied Energy Policy (3)
EME 805. Renewable Energy and Nonmarket Enterprise (3)
EME 807. Technologies for Sustainability Systems (3)

Effective Semester: Fall 2013
Expiration Semester: Summer 2018

Systems Engineering

Graduate Credit Certificate Program

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The goal of this graduate certificate program is to prepare students to apply systems engineering principles across the product development or acquisition lifecycle. To be awarded the Graduate Certificate in Systems Engineering, students must successfully complete 12 credits of course work. All courses must be completed with a grade of C or better and a grade-point average of 3.0 to be awarded the certificate.

Admission Requirements:
Applicants must hold either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. The successful applicant will possess a degree in science or engineering or a closely aligned field and is generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

Required courses (9 credits)
SYSEN 520 (3): Systems Engineering
SYSEN 522 (3): Systems Verification Validation & Testing
SWENG 586 (3): Requirements Engineering

Elective courses (Select at least 3 credits; each course listed is worth 3 credits.)
SYSEN 530 (3): Systems Optimization
SYSEN 531 (3): Probability Models and Simulation
SYSEN 533 (3): Deterministic Models and Simulation
SYSEN 536 (3): Decision and Risk Analysis in Engineering
SYSEN 550 (3): Creativity and Problem Solving I

Effective Semester: Fall 2013

Expiration Semester: Spring 2018

Last Revised by the Department: Spring Semester 2013

Blue Sheet Item #: 42-01-131

Review Date: 08/20/13

Teaching Writing and Literacy

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This program is designed to afford educators deep study in all aspects of teaching writing and literacy. The certificate will contain 12 core credits plus a 3-credit concentration for a total of 15 credits. A grade of C or higher must be earned in each course to be counted toward the certificate.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admsision. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants just satisfy the Egnlish proficiency requirement.

PRESCRIBED COURSES

EDUC 425. Literacy Assessment (3)
EDUC 452. Teaching Writing (3) OR ENGL 409. Composition Theory and Practice for Teachers (3)
EDUC 463. The Internet and K-12 Education (3)
EDUC 477. Teaching Struggling Readers and Writers (3)

Select one 3-credit elective concentration from the following list.

EDUC 400. Diversity and Cultural Awareness Practices in the K-12 Classroom (3)
EDUC 416. Teaching Secondary English and the Humanities (3)
EDUC 432. Children's Literature in Teaching Writing (3)
EDUC 464. Technology and the Learning Process (3)
EDUC 465. Serving Culturally and Linguistically Diverse Learners (3)
EDUC 471. Best Practices in Literacy (3)
ENGL 472. Current Theories of Writing and Reading (3)

Effective Semester: Summer 2017
Expiration Semester: Summer 2022

Last Revised by the Department: Fall 2017

Wind Energy

Graduate Credit Certificate Program

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This program is designed to provide technical depth in wind-turbine technology and the science of siting turbines. The certificate program is offered in residence by the Department of Aerospace Engineering and also is available for online delivery via Penn State's World Campus as a subset of the online intercollege Master of Professional Studies program in Renewable Energy and Sustainability Systems (iMPS-RESS). To be awarded the Certificate in Wind Energy, students must successfully complete 9 graduate credits with a grade of "C" or better in three required courses. Students who subsequently are admitted to the iMPS-RESS degree program may count credits earned in the certificate program toward the RESS degree; however, successful completion of this certificate program neither implies nor guarantees admission to a graduate degree program at Penn State.

Admission Requirements:

Applicants must have received either (1) a baccalaureate degree from a regionally accredited U.S. institution or (2) a tertiary (postsecondary) degree that is deemed comparable to a four-year bachelor's degree from a regionally accredited U.S. institution. This degree must be from an officially recognized degree-granting institution in the country in which it operates. In addition, a background in incompressible fluid mechanics, statics, and dynamics is expected. Professional experience may be taken into consideration for admission.

The student must be admitted to the graduate certificate program in Wind Energy offered by the Department of Aerospace Engineering and to the Graduate School. GRE scores are not required for non-degree graduate students. International students must take and submit scores for the TOEFL (Test of English as a Foreign Language) or the IELTS (International English Language Testing System), with the exceptions noted below. The minimum acceptable score for the TOEFL is 550 for the paper-based test, or a total score of 80 with a 19 on the speaking section for the internet-based test (iBT). Applicants with iBT speaking scores between 15 and 18 may be considered for provisional admission, which requires completion of specified remedial English courses ESL 114G (American Oral English for Academic Purposes) and/or ESL 116G (ESL/Composition for Academic Disciplines) and attainment of a grade of B or higher. The minimum acceptable composite score for the IELTS is 6.5.

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

List of Courses Included in the Certificate:

AERSP 880. Wind Turbine Systems (3)
AERSP 583. Wind Turbine Aerodynamics (3)
AERSP 886. Engineering of Wind Project Development (3)

Applicants who do not have the necessary background for the above courses will need to take the appropriate prerequisite courses.

Effective Semester: Spring 2014
Expiration Semester: Fall 2018

Last Revised Spring Semester 2014

Blue Sheet Item #: 42-07

Review Date: 06/10/2014

Health Sector Management

Graduate Credit Certificate Program

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The School of Graduate Professional Studies at Penn State Great Valley offers a four-course (12- credit) Graduate Certificate program in Health Sector Management.

The program is designed to provide preparation for individuals who work or aspire to work in the health sector as administrators, managers, physicians, nurses, pharmaceutical representatives and scientists, and other health sector organizations. The program is designed to respond to the needs of professionals in health care provider organizations, third-party payors, biopharmaceutical organizations, and other organizations whose business is focused on the health sector including information technology, medical devices, benefits management, clinical research organizations, and consulting firms.

The curriculum emphasizes development of the knowledge, skills, and abilities necessary to understand and influence the dynamics of the health sector's business environment. The curriculum's broad focus considers business issues from the vantage points of multiple stakeholders to prepare students with a comprehensive understanding of the health sector. The program is designed to help students build a distinctive competence in health sector management that is relevant not only to managers and professionals employed by payor and provider organizations but also for those employed by biopharmaceutical, medical device, information technology, and other organizations that comprise the health sector. Required course work emphasizes the key dimensions of policy, financing, and organization in the health sector; critical analysis of current issues that health sector organizations face; as well as legal and ethical dimensions of decision making in the health sector. The cost, quality, access paradigm serves as an over-arching framework for study of current issues in the health sector including commercialization of biopharmaceuticals, information technology (IT) solutions, marketing, managing business processes, developing new ventures, regulation, and quality improvement. Content is grounded in research and best demonstrated practice and is both theoretical and applied, with an emphasis on practical application of knowledge gained.

This certificate program is attractive to individuals who desire advanced education in health sector management but who do not wish to pursue a master's degree at this time, as well as those interested in pursuing specialized knowledge of health sector management concurrent with a graduate degree program. With program approval, the courses in this graduate certificate program may be applied to the Master of Business Administration program at Great Valley or, in the case of two courses in the certificate program (BUSAD 530 and BUSAD 534), to the Master of Leadership Development (MLD) program. This graduate certificate program also is valuable for individuals who already hold a master's degree and wish to update or expand their knowledge and skills.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

Applicants are expected to have achieved a 3.0 (B) or higher undergraduate grade point average. Applicants holding a master's degree or doctoral degree should have attained at least a cumulative grade point average of 3.0 (B) in previous graduate work. Professional experience will be taken into consideration for admission.

Applicants are required to submit: official transcripts from all post-secondary institutions attended; a current resume, and a statement of intent or career objective.

Admission decisions are made by a faculty committee and are based on the quality of the applicant's credentials in relation to those of other applicants. Evaluation criteria include professional and academic accomplishments. Upon approval, certificate program students will enroll in course work on a nondegree basis. Students must complete each course with a grade of B or better in order to receive the certificate. Note that admission as a nondegree graduate student neither guarantees nor implies subsequent admission to a degree program. Nondegree students are not eligible to receive fellowships or graduate assistantships.

International applicants should consult with a program adviser prior to applying for admission for more information about admission and enrollment requirements. International applicants must satisfy all Graduate School requirements for admission.

With adviser approval, all four courses in the certificate may be applied to the Great Valley MBA, and two courses (BUSAD 530 and BUSAD 534) may be applied to the Great Valley Master of Leadership Development program.

· Certificate program students who wish to have the certificate courses applied to a master'sdegree program must formally be admitted to the master'sdegree program. Admission into the master'sdegree program is a separate step and is not guaranteed. Interested students should contact the Great Valley Admissions Office (telephone 610-648-3242 or email gvadmiss@psu.edu) for more information about how to apply and make a change from nondegree to degree status. Once a certificate program student is admitted to a master'sdegree program and enrolls on a degree basis, certificate courses completed with a grade of B or better will be "transferred"into the program, subject to restrictions outlined in theTransfer of Nondegree and Certificate Graduate Credits. However, admission into a graduate program, and credit toward a graduate degree for specific courses taken on a nondegree basis, is up to the graduate program.
· Students who are already enrolled at Penn State in a master'sdegree program must make a new, separate online application to the certificate program. Certificate programs course will only apply to their master'sprogram with adviser approval. Courses applied to the student'smaster'sdegree program must be completed with a grade of "B" or better.

List of Courses Included in the Certificate

The graduate certificate program in health sector management requires a total of four 3-credit courses (12 graduate credits) as outline below. Two courses are required (BUSAD 530 and BUSAD 534), and two courses are electives selected from a list of four courses (BUSAD 511, 578, 835; HPA 836).

Students completing each of the four 3-credit courses with a grade of B or better will be eligible to receive a graduate certificate.

Required Courses (6 credits)
BUSAD 530 Biotechnology and Health Industry Overview
BUSAD 534 Ethical Dimensions of Management in the Biotechnology and Health Industries

Elective Courses (6 credits) (Choose 2 from the following 4 courses)
BUSAD 511 New Ventures I
BUSAD 578 Managing Business Processes
BUSAD 835 Commercialization of Biopharmaceuticals
HPA 836 Health Law

Effective Semester: Spring 2017

Expiration Semester: Spring 2022

Human Factors Engineering and Ergonomics

Graduate Credit Certificate Program

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Individuals involved in the design and development of products for human use will find the program content immediately applicable to their job. With an emphasis on the application of user engineering design principles, the tools and methods to assess and enhance quality and productivity for both consumers and employees are provided. Applications include medical devices, consumer products, military systems, software design and the workplace. The program is comprised of three courses from the Penn State curriculum. These courses provide students with both a breadth and depth in their exposure to user engineering tools and principles.

Applicants must apply for admissions to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. The successful applicant will possess a baccalaureate degree in a related technical field (with courses in calculus and physics) and is generally expected to have a minimum GPA of 3.0. GRE scores are not required for nondegree graduate students.

REQUIRED COURSES (9 credits)

IE 479(3), IE 553(3), IE 558(3)

Effective Semester: Spring 2017

Ending Semester: Spring 2022

Interdisciplinary Educational Intervention Research

Postbaccalaureate Credit Certificate Program

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This program meets the growing need for educational researchers by training students from a variety of related disciplines to conduct sound, cutting-edge research for the benefit of children in educational settings. These interdisciplinary educational researchers will be trained to advance scientific knowledge to support the work of practitioners and policymakers, with a particular focus on students who are at-risk for school difficulties and schools that serve economically-disadvantaged students. The 12-credit curriculum provides an interdisciplinary perspective on the design and evaluation of programs and policies that address contemporary educational challenges. Certificate courses address four core domains of translational educational research, including the use of developmental and epidemiological studies to inform the design of interventions, and rigorous evaluation of education interventions with advanced methodologies.

Admission Requirements:

This program is designed specifically for students pursuing research-focused doctoral programs in fields related to education, including educational psychology, school psychology, special education, developmental psychology, child-clinical psychology, or human development and family studies. However, other graduate students interested in interdisciplinary training in the educational sciences will be eligible for this certificate after completing prerequisites for the certificate coursework.

For admission to the Graduate School, an applicant must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. All international applicants must meet the Graduate School's English proficiency requirements.

List of Courses Included in the Certificate:

1) PSY 578 (Cross-listed as HD FS 578, EDPSY 578) Contemporary Issues in Interdisciplinary Educational Intervention Sciences (3)
2) Choose 1 of 2 program evaluation courses: HD FS 506 Design and Evaluation of Prevention and Health Promotion Programs Across the Life Span or EDPSY 560 Contemporary Issues in the Evaluation of Educational Programs (3)
3) Choose 1 of 3 multi-level modeling courses: SOC 578 Multilevel Regression Models, HD FS 517 Multivariate Study of Change and Human Development, or EDPSY 557 Hierarchical Linear Models in Education Research (3)
4) Choose 1 elective 3-credit 500-level course that focuses on a content area of education intervention research. Options include (but are not limited to): HD FS 508 Best Practices in Preventative Intervention; PSY 576 Clinical Child Interventions; S PSY 535 School-Based Psychological Interventions for Children and Youth; SPLED 504 Classroom and School-Wide Management Practices in Special Education.

Effective Semester: Fall 2016
Expiration Semester: Fall 2021

International Public Policy

Graduate Credit Certificate Program

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This program provides students, professionals, and other with an accessible professional education in the rapidly evoliving field of internatiional public policy. The certificate will build career options and expand knowledge and skills in the field of international public policy.

The 12-credit program offers a unique balance of acadmic study, hands-on training, and professional development; it includes 9 credits in required courses and 3 broader elective credits. All courses must be taken for a letter grade with at least a 3.0 grade-point average maintained; no grades below a C will be counted toward the certificate.

Admission Requirements:

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement.

All applicants submit an application (including payment of the nonrefundable application fee), two letters of recommendation, and a personal statement addressing their reasons for pursuing a certificate in international public policy and discussing their plans and goals.

List of Courses Inlcuded in the Certificate:

Required Courses (9 Credits):
INTAF 890 Colloquium on Current Policy Challenges
INTAF 508 Domestic Influences on Foreign Policy
INTAF 803 Multi-Sector and Quantitative Analysis

Elective Course (3 Credits):
INTAF 810 Energy, International Security, and the Global Economy
INTAF 510 Cross Cultural Conflict Resolution
INTAF 504 Political Economy of Development and Growth
INTAF 814 U.S. Policy in the Middle East

Effective Semester: Spring 2018
Expiration Semester: Spring 2023

Marketing Analytics

Graduate Credit Certificate Program

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The Graduate Certificate in Marketing Analytics is a twelve-credit online program focused on building a core understanding of key functions in the field of marketing analytics. The program focuses on how marketing analytics are (1) applied within organizations, (2) conducted, and (3) meaningfully communicated and applied to business decision-making and strategy. The curriculum is geared towards college graduates interested in developing skills in marketing analytics functions, but who may have little or no formal training in the field. The certificate is industry applicable, since it is aimed at giving professionals the core knowledge they need to successfully apply marketing analytics in today's data-driven organizations.

Entrance Requirements:

Admission Requirements: Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Along with the submission of the online application and the nonrefundable application fee, the following is required: Official Transcripts and Grade Point Average (GPA) – Applicants must submit official transcripts from all post-secondary institutions attended. A Grade Point Average (GPA) of 3.00 on a 4.00 scale in the final two years of undergraduate studies or in the most recent graduate degree is required. Resume – Applicants must upload their current resume with the online application. Reference Letters – Applicants must submit two professional or academic letters of reference. Statement of Purpose - Applicants must upload a statement describing how professional experience and goals align with the certificate.

REQUIREMENTS FOR THE CERTIFICATE: (12 Credits)

REQUIRED COURSES (3 credits)

MKTG 811 (3), MKTG 812 (3), MKTG 813 (3), MKTG 814 (3)

Effective Semester: FA 2017
Ending Semester: FA 2022

New Ventures and Entrepreneurs

Graduate Credit Certificate Program

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Kathryn Jablokow
Penn State Great Valley
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This graduate certificate is designed specifically to help current and aspiring entrepreneurs conceptualize and develop new business ventures and/or new products to take to market. This 12-credit certificate will engage students in a creative process that includes opportunity recognition, idea generation and selection, the lean start-up process, and business plan development. Using a cross-disciplinary approach, students will gain competence in writing all sections of a professional business plan, including the presentation of financial statements and market data. Students will also have an opportunity to pitch their new ventures/products to potential funders.

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfay the English proficiency requirement. The successful applicant is generally expected to have a minimum combined junior/senior grade-point average of 3.0 (B) on a 4.0 scale.

REQUIRED COURSES

BUSAD 511(3), BUSAD 522(3), ACCTG 511(3); BUSAD 519(3); BUSAD 545(3); BUSAD 582(3); BUSAD 809(3); MGMT 507(3); SYSEN 505(3); SYSEN 550(3); SYSEN 552(3); SYSEN 554(3); SYSEN 555(3)

NON-COURSE REQUIREMENTS

BUSAD 511 and 522 are required. Two electives from the list are required.

EFFECTIVE DATE: Fall Semester 2016
EXPIRATION DATE: Summer 2021

Last Revised by the Department: Spring Semester 2017

Organization Development and Change: Analytics

Graduate Credit Certificate Program

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The focus of this certificate program is for students to learn about the use of analytical tools and approaches as they apply to organization development and change initativbes. This includes approaches to evaluating organization development (OD) and consulting services; assessing and feeding back data in organization development; and use of labor supply models to evaluate investments. To be awarded the Certificate in Organization Development and Change: Analytics, students must successfully complete 12 credits of coursework in the required courses listed below.

Admission Requirements:

An applicant for the graduate certificate program must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Additionally, all international applicants must meet the Graduate School's English proficiency requirements.

Required Courses

WF ED 572 Foundations in Organization Development and Change (3)
WF ED 585 Appraising Organization Change and Development and Consulting (3)
WF ED 582 Assessing Data: Organizational Diagnosis (3)
WF ED 543 Evaluation of Investments in Workforce Education and Development (3)

Effective Semester: Spring 2016

Expiration Semester: Spring 2021

Organizational Development and Change: Consulting Skills

Graduate Credit Certificate Program

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To become effective Organization Development (OD) consultants and OD practitioners, hands-on experience is necessary. After completing the certificate program, students will have skills and competencies that can be applied to help the organizations they serve continuously improve and maximize potential. To be awarded the Certificate in Organization Development and Change: Consulting Skills, students must successfully complete 12 credits of coursework in the courses listed below.

Admission Requirements:

An applicant for the graduate certificate program must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Additionally, all international applicants must meet the Graduate School's **English proficiency requirements**.

Required Courses

WF ED 572 Foundations in Organization Development and Change (3)
WF ED 881 Marketing Organization Development (3)
WF ED 884 Appreciative Inquire (3)
WF ED 582 Assessing Data: Organizational Diagnosis (3)
*TRDEV 565 Impelmenting Training and Development Programs (3) is an approved substitution for one of the starred courses listed above.

Effective Semester: Spring 2016

Expiration Semester: Spring 2021

Organization Development and Change: Essentials

Graduate Credit Certificate Program

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The primary goal of the certificate programs is to provide essential knowledge skills in organization development and change, facilitation of groups and teams, appreciative inquiry, and process consultation. The certificate program focuses on exposing students to global issues and the way change occurs around and within organizations. Emphasis is placed on the importance of knowledge and skills when it comes to facilitating change initiatives from a humanistic perspective. To be awarded the Certficiate in Organization Development and Change: Essentials, students must successfully complete 12 credits of coursework in the courses listed below.

Admission Requirements:

An applicant for the graduate certificate program must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Additionally, all international applicants must meet the Graduate School's English proficiency requirements.

Required Courses

WF ED 572 Foundations in Organization Development and Change (3)
WF ED 880 Facilitating Groups and Teams (3)
WF ED 884 Appreciative Inquiry (3)
WF ED 578 Process Consultation in Organization Development (3)
*TRDEV 565 Implementing Training and Development Programs (3) is an approved substitution for one of the starred courses listed above.

Effective Semester: Spring 2016

Expiration Semester: Spring 2021

Organization Development and Change: Operational Excellence

Graduate Credit Certificate Program

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This certificate program teaches students how to change corporate culture from a continuous process improvement perspective. Recognizing that organizations either get better or worse, the focus of this certificate is on the tools and methodologies for making positive organizational impact. Emphasis is placed on the application of essential continuous improvement methodologies including lean and six sigma concepts to improve processes in any industry. A focus is also placed on the concepts and skills needed to complete project initiatives on time and within budget. To be awarded the Certificate in Organization Development and Change: Operational Excellence, students must successfully complete 12 credits of coursework in the required courses listed below.

Admission Requirements:

An applicant for the graduate certificate program must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Additionally, all international applicants must meet the Graduate School's English proficiency requirements.

Required Courses

WF ED 572 Foundations in Organization Development and Change (3)
WF ED 880 Facilitating Groups and Teams (3)
WF ED 451 Lean-Sigma for Professionals (3)
WF ED 405 Project Management for Professionals (3)

Effective Date: Spring 2016

Expiration Semester: Spring 2021

Organization Development and Change: Occupational Safety and Health

Graduate Credit Certificate Program

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Accidents in the workforce and educational environments are metaphorically similar to a line of falling dominos. As one incident occurs, it has the ability to trigger a harmful chain reaction. Therefore the Organization Development and Change, Occupational Safety and Health Certificate Program is designed to assist workforce development professionals in building the skills and abilities needed to create and support workplaces and educational environments that are free of occupational safety and health hazards. Emphasis is placed on leadership development to promote detection, analysis, and correction of unsafe workplace conditions and procedures. To be awarded the Certificate in Organization Development and Change: Occupational Safety and Health, students must successfully complete 12 credits of coursework in the required courses listed below.

Admission Requirements:

An applicant for the graduate certificate program must hold either (1) a bachelor's degree from a U.S. regionally accredited institution or (2) a postsecondary degree that is equivalent to a U.S. baccalaureate degree earned from an officially recognized degree-granting international institution. Additionally, all international applicants must meet the Graduate School's English proficiency requirements.

Required Courses

WF ED 572 Foundations in Organization Development and Change (3)
WF ED 573 Needs Assessment for Workforce Development Professionals (3)
WF ED 411 Occupational Safety and Health for Workforce Education and Development Professionals (3)
WF ED 806 Program and Facilities Management for Workforce Development Professionals (3)

Effective Semester: Spring 2016

Expiration Semester: SPring 2021

Primary Palliative Care

Graduate Credit Certificate Program

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The Penn State College of Nursing offers a Graduate Certificate in Primary Palliative Care program. The primary goal of the program is to prepare individuals with a Bachelor's or higher degree in Nursing or a related health discipline in the principles and practice of primary palliative care. The curriculum includes 6 credits (two 3 credit courses) of didactic content in primary palliative care and interdisciplinary management of advanced serious illness and one 3 credit course of the
interdisciplinary practice of the palliative care role. The practicum course involves the application of knowledge acquired in previously completed courses related to primary palliative care. The practicum will build upon and extend students' previous experiences and fulfill mutually agreed-upon objectives based on the student's identified learning needs. All courses will be delivered using distance technology.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Graduate Bulletin. International applicants must satisfy the English proficiency requirement. Official transcripts from all post-secondary institutions attended are required.

Applicants must hold a Bachelor's or higher degree in nursing or a related health discipline from a U.S. regionally accredited institution or from an officially recognized degree-granting international institution. Copies of all undergraduate and graduate degree transcripts must accompany the application.

Prior to an applicant's admission, transcripts are evaluated by the program coordinator to ascertain the applicant's potential for successful completion of the core courses. A recommendation regarding admission is discussed with the Associate Dean for Graduate Education and Research prior to making an offer of admission to this certificate program.

REQUIRED COURSES (9 credits)

NURS 824(3), NURS 825(3), NURS 826(3)

EFFECTIVE DATE: Fall Semester 2017
EXPIRATION DATE: Spring Semester 2022

Remote Sensing and Earth Observation

Graduate Credit Certificate Program

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The Certificate in Remote Sensing and Earth Observation helps geospatial professionals become skillful users of imagery and sensor data in the context of geographic information systems and spatial analysis. This program is designed specifically for GIS practitioners who lack formal education in techniques and technologies associated with spatial image analysis and earth observation methods in order to pursue professional development and make career changes. The program explores theory and techniques for the professional application of remote sensing in geospatial systems and analysis. The program is offered through Penn State's World Campus. Students earn the certificate by completing four instructor-led online courses -- three required and one elective. Students who successfully complete the program earn 12 academic credits. Students admitted to the Department of Geography's Master of GIS degree program may count up to 15 credits of certificate program courses toward the MGIS degree.

Admission Requirements

Admission requirements listed here are in addition to requirements stated in the GENERAL INFORMATION section of the *Graduate Bulletin.* International applicants must satisfy the English proficiency requirement.

Intermediate-level experience with professional applications of geographic information systems is expected as pre-requisite knowledge. Coursework to establish that prerequisite knowledge is available through the related Postbaccalaureate Certificate in GIS program.

Prescribed Courses

GEOG 480: Exploring Imagery and Elevation Data in GIS Applications
GEOG 883: Remote Sensing Analysis and Applications
GEOG 481: Topographic Mapping with Lidar

Electives - choose at least 3 credtis from:

GEOG 589: Emerging Trends in Remote Sensing
GEOG 892: Geospatial Applications of Unamanned Aerial Systems

Effective Semester: Summer 2016
Expiration Semester: Summer 2021

Survey Research Methods

Graduate Credit Certificate Program

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The certificate in Survey Research Methods shall provide supplemental tranining to graduate students in social science, health, education, and policy-related graduate programs at Penn State. The collection of data by questionnaire, web surveys, phone or personal structured interviews is a highly specialized technique whose "best practices" and "cutting edge" change frequently. The data collected by surveys typically violate assumptions of random samplying that undergird graduate-level courses in applied statistics. Those earning this certificate will have supplemental training in data collection and take a coherent cluster of courses in applied statistics that will provide them with superior preparation for completion their dissertation, and for employment in the academic, public, and private sectors.

All certificate recipients will be required to complete two core courses, two additional electives at the 500 level, and one hands-on internathip or apprenticeship experience.

Admission Requirements

All applicants must be enrolled in and have completed 18 credits in a graduate degree program at Penn State. A graduate grade-point average of 3.30 or higher shall normally be required. All applicants will be required to submit a letter from their academic adviser or department head that explains how the certificate program will enhance the student's primary course of study.

COURSES

Required Courses
PL SC 518/SOC 518. Survey Methods I: Survey Design (3)
PL SC 519/SOC 519. Survey Methods II: Analysis of Survey Data (3)
PL SC 595A/SOC 595A. Internship (1)

Electives:
In addition to the required courses listed above, stuents must select any two additional 3-credit courses in intermediate or advanced applied staistics or interviewing techniques, as approved by the chair of the Survey Research Center (SRC) Faculty Advisory Committee.

There is no specific list of courses because offerings in the social and behavioral sciences change frequently and *are most often offered under the 597 rubric.* As a general rule, these courses must be at the 500 level, and they must have prerequisites equivalent to two semesters of applied statistics. For example, offerings in SOC that require prior completion of SOC 574-575 and offerings in PL SC that require prior completion of PL SC 502-503 would normally be eligible. We will apply comparable criteria for advanced methodology electives in departments such as (but not restricted to) Human Development and Family Studies, Education, and Psychology. These departments have offered relevant courses on topics such as Hierarchical Modeling, Latent Class Analysis, Item Response Theory, Time Series, Analysis, Survival Analysis, and the Analysis of Missing Data. In addition, some regularly offered classes, such as HD FS 526, SOC 578, and STAT 506, would satisfy the requirement.

Students accepted into the certificate program will submit a “Planned Program of Study” form annually. Approval by the Chair of the SRC Faculty Advisory Committee shall constitute formal approval for a course to count in meeting this requirement. All courses used to meet the requirements of the Certificate may be double-counted towards the student’s doctoral degree program if permitted by the program.

Effective Semester: Spring Semester 2010
Expiration Semester: Summer Semester 2019

Teaching and Learning Online in K-12 Settings

Postbaccalaureate Credit Certificate

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This 15-credit certificate will prepare current or future K-12 educators to develop and teach online courses for K-12 student audiences. Students who complete this certificate will develop a thorough understanding of design issues and technology used to create and deliver effective online learning experiences. The coursework aligns with the eleven National Standards for Quality Online Teaching which have been established by the International Association for K-12 Online Learning (iNACOL). Pennsylvania credentialed teachers have the option to use this certificate program to complete the requirements for the Pennsylvania Department of Education Online Instruction Endorsement.

Admission Requirements

Applicants must apply for admission to the certificate program via the Graduate School application for admission. Admission requirements are stated in the GENERAL INFORMATION section of the Gradaute Bulletin. International applicants must satisfy the English proficiency requirement.

COURSES

LDT415A(3), LDT 433(3), LDT 467(3), LDT 832(3), LDT 835(3)

Effective Date: Summer 2017
Expiration Date: Summer 2022

Trauma-Informed Psychotherapy

Graduate Credit Certificate Program

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The primary goal of this certificate is to prepare mental health professionals, and those in related fields, with training and practice in trauma-focused assessment, diagnosis, and treatment. The curriculum will provide thorough training in trauma-informed conceptualization of and empirically-supported treatment for posttraumatic stress disorder and other trauma-related problems. All
candidates are required to take 12 credits in four courses (trauma and resiliency, foundations in trauma-focused treatment, advanced trauma-focused treatment, and crisis intervention.)

REQUIRED COURSES (12 credits)
PSYCH 442(3), PSYSC 843(3), PSYSC 844(3), PSYSC 845(3)

Non-Course Requirements

An applicant must have a master's degree from a regionally accredited institution of higher education in clinical or counseling psychology, counselor education, marriage and family therapy, or social work, or be concurrently enrolled as a degree student in a Penn State master's degree in clinical or counseling psychology or counselor education. For students concurrently enrolled in a
master's degree program, the certificate will be awarded upon completion of the 12 credits required for the certificate. The certificate cannot be awarded prior to completion of the master's degree.

Effective Semester: Fall 2017
Ending Semester: Fall 2022