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The College of Arts and Sciences

Mission Statement

By pursuing excellence in research and scholarship, we educate our students to become ethical professionals and citizens with knowledge of and appreciation for the fundamental interactions among the humanities and the sciences in a fast-changing, challenging, and diverse world.

About the College of Arts and Sciences

The College of Arts and Sciences was established on July 1, 1990, with the merger of the College of Sciences and the College of Humanities. The educational objectives of the college encompass a wide range of goals: to provide general educational courses for the University's undergraduates; to provide disciplinary study in the arts and sciences for our Bachelor of Science and Bachelor of Arts majors; to offer Master of Science and Doctoral programs in selected areas of faculty and research strength; to promote research, scholarships, and creative activities which expand disciplinary boundaries and to enhance faculty expertise and the quality of the university's instruction; and to improve the quality of life for the University's community through co-curricular programming in the arts and sciences.

Each undergraduate major offered by the College of Arts and Sciences combines disciplinary study with broad and useful preparation for a variety of careers as well as for further study in graduate or professional school. Each combines arts and sciences coursework with an emphasis on new and emerging technology related to their respective fields.

All undergraduate majors in the college offer co-operative education program options, with special opportunities relating academic study to work experience.

The college is open to transfer students, but (for undergraduate students) transfer after the seventh term is not recommended. Applicants from another Drexel college may be admitted in any term of the academic year if they meet program requirements. Students should consult the Assistant Deans of the College of Arts and Sciences for further information. The College's dedicated staff of professional advisors work to enhance a student's educational journey through a comprehensive academic advising program.

For additional information, visit the [The College of Arts and Sciences](#) web site.



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Master of Science Program in Biological Sciences

Requirements

Forty-five credits are required for the M.S. in Biological Sciences. Soon after matriculation the student completes a plan of study with the advisor, outlining his or her specific program. Both thesis and non-thesis options are available, although some formal research activity is recommended for all M.S. degree candidates. Students wishing to pursue Ph.D. candidacy are encouraged to elect the M.S. with thesis. After all other requirements are completed, the research M.S. student defends the thesis at a final oral examination. The non-thesis student takes a comprehensive examination. The M.S. candidate may simultaneously obtain secondary education certification by including specified required courses. The minimum number of credits for this M.S. degree is 48.

Contact the [Department of Bioscience and Biotechnology](#) at (215) 895-2624 for more information.



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Doctoral Program in Biological Sciences

The Doctor of Philosophy in Biological Sciences is conferred in recognition of breadth of scholarship and scientific attainment plus demonstrated ability to complete original research. A minimum of 90 credits is required beyond the bachelor's degree. In addition to a qualifying examination, the Ph.D. student must pass a candidacy examination and an oral defense of his or her dissertation, which demonstrates the capacity to perform independent research. Both examinations are administered by the student's examining committee.

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Chemistry

General Information

The [Chemistry Department](#) offers graduate programs in analytical chemistry, inorganic chemistry, organic chemistry, physical chemistry, and polymer chemistry. The department also encourages interdisciplinary activities. Faculty members are active participants in the environmental engineering and science and biomedical science and engineering programs; others work with physicists and biologists in areas such as atmospheric science, biochemistry, and biophysical chemistry.

The chemistry faculty wants graduate students to understand the purpose of, and need for, fundamental research while working on problems of practical interest and application to the challenges facing mankind in the modern world. Areas of research include the use of digital electronic methods to analyze trace constituents of air and water, a study of the molecules of living systems, the effects of toxic chemicals and carcinogens, synthesis and characterization of compounds of medicinal and industrial interest, methods for studying macromolecules, and characterization of transient species using lasers.

The Chemistry Department strives to maintain a community of research scholars (faculty, postdoctoral fellows, and graduate and undergraduate students) that is large enough to provide a variety of experiences within chemistry, yet small enough to give each student individual attention. Both full- and part-time study are available.



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Master of Science Program in Chemistry

General Requirements

The M.S. degree is awarded after satisfactory completion of a minimum of 45 credit hours in chemistry and related fields, at least 30 credits of which must be taken at Drexel. Both thesis and nonthesis options are available.

Course Requirements

The course requirements for both thesis and nonthesis options are one complete sequence in the major area of interest; one of the sequence courses from each of analytical, organic, polymer, and inorganic chemistry; and two courses in physical chemistry. The remaining credits may be chosen from graduate courses within the department or from other departments offering courses related to the student's major areas.

Major sequence (choose one of the following):		9.0 Credits
CHEM 521	Inorganic Chemistry I	3.0
CHEM 522	Inorganic Chemistry II	3.0
CHEM 755	Mass Spectrometry	3.0
or		
CHEM 530	Analytical Chemistry I	3.0
CHEM 531	Analytical Chemistry II	3.0
CHEM 532	Analytical Chemistry III	3.0
or		
CHEM 541	Organic Chemistry I	3.0
CHEM 542	Organic Chemistry II	3.0
CHEM 543	Organic Chemistry III	3.0
or		
CHEM 557	Physical Chemistry I	3.0
CHEM 558	Physical Chemistry II	3.0
CHEM 555	Quantum Chemistry I	3.0
or		
CHEM 561	Polymer Chemistry I	3.0
CHEM 562	Polymer Chemistry II	3.0
CHEM 563	Polymer Chemistry III	3.0
Additional sequence courses*		15.0
Electives		21.0

*One of which must be chosen from the following: CHEM 555 (Quantum Chemistry I) or CHEM 557 (Physical Chemistry I).

Thesis Option

Up to 9 credits of coursework may be replaced by either CHEM 997 or by sections of CHEM 680 involving laboratory research. No later than the spring term of the first year of coursework, a student should choose a research advisor with whom to work in carrying out an original investigation in chemistry. The results will be written up in thesis form and submitted to an M.S. thesis committee consisting of the research advisor and two other departmental faculty appointed by the advisor. The acceptance by this committee of the M.S. thesis completes the thesis option requirements for the M.S. degree. Students in the M.S. program receiving financial aid from the department must elect the thesis option if they do not pursue the Ph.D. program at Drexel.



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Doctoral Program in Chemistry

The Ph.D. degree is awarded in any of five main areas of chemistry: analytical, inorganic, organic, physical, or polymer chemistry. The degree recipient must demonstrate scholastic breadth in chemistry and contribute significantly to scientific advancement in a chosen major area. Requirements of the program include coursework, candidacy examinations, a chemical information retrieval or technical writing course, and successful completion of a publishable Ph.D. thesis.

Course Requirements

Ninety credits of graduate-level work must be completed for the Ph.D. degree. The Chemistry Department requires 30 credits of coursework in chemistry (outlined in the [Course Requirements](#) section of the M.S. program). The balance can be made up of advanced special topics courses and research credits.

Candidacy Requirements

To become a candidate for the Ph.D. in chemistry at Drexel, a student must pass a prescribed set of cumulative examinations and must present and successfully defend a research proposal in an area not directly related to his or her Ph.D. thesis research.

Cumulative Examinations

Written examinations designed to test a student's background in his or her major area are given monthly during the academic year and occasionally during the summer at the discretion of the faculty. Students should begin taking these examinations after having completed three courses in the major area (usually the main sequence courses). Full-time students normally begin taking these examinations in the fall term of their second year.

Research Proposal

The research proposal is an attempt to confront the student early on with the problem of defining and evaluating a worthwhile research program. The subject of the proposal is distinct from that of the thesis research. The examination at which the research proposal is defended is held no later than 90 days after the notification of a student's completion of the cumulative examination requirement. A written proposal is submitted to the committee no later than two weeks before the examination. A passing grade on this examination admits the student to Ph.D. candidacy.

Thesis

A Ph.D. thesis — the heart of the Ph.D. degree — must be written, accepted by the research supervisor, presented to a Ph.D. Thesis Examining Committee, and defended orally to the satisfaction of the Examining Committee. It is the responsibility of the student, not the research supervisor, to submit an acceptable thesis.



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Master of Science in Communication

General Information

Drexel's Master of Science in Communication prepares students for careers in a wide range of professional activities. The program specializes in three areas: technical communication, science communication, and public communication. Technical communication is for those seeking employment as technical writers, computer documentation specialists, and training specialists. Science communication has much to offer those who aspire to medical, science, and pharmaceutical writing. A concentration in public communication leads to careers in journalism and public relations. In addition, the program provides a strong foundation in theoretical approaches to communication. This theoretical basis is designed to ensure that, as the field changes, students will continue to have an intellectual framework for evaluating and implementing new technology and changing media.

Students can attend full time or part time, they can begin the program in any academic quarter, and they can complete all coursework in the evening. The program emphasizes flexibility, encouraging each student, in consultation with a faculty advisor, to fashion a particular course of study.

The program accommodates students from widely varying educational backgrounds: Many have backgrounds in science and mathematics; an equal number come from humanities-related areas. Some students pursue their degrees while already at work at demanding jobs in technical or scientific fields; others are new to the field. For students without previous work experience, the program requires a paid [internship](#)).

For more information, visit the College's [Department of Culture and Communication](#) home page.



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Master of Science Program in Communication

General Requirements

The M.S. degree requires 45 credits of coursework, a professional portfolio of three to five items developed by the student, and six months of paid [internship](#) for those who lack significant experience in communication related fields.

As a final graduation requirement, each student must submit a professional exit portfolio. Based on coursework and professional assignments, the portfolio undergoes a rigorous process of review by faculty members and by a professional outside the university.

Curriculum

Students may use electives to increase communication skills, to broaden theoretical backgrounds, or to develop areas of specialization. Any appropriate graduate course offered in the University can serve as an elective if the student has sufficient background to take the course. In addition, the program offers its own elective courses including special topics (COM 690). Qualified students may also pursue independent study for elective credit in special cases.

Core Courses		Credits
COM 500	Persuasive Writing and Reading in Communication	3.0
COM 610	Theories of Communication and Persuasion	3.0

Concentrations

Technical Communication

COM 510	Technical Writing	3.0
COM 570	Technical and Science Editing	3.0
COM 620	Message Design and Evaluation	3.0
COM 630	Developing Software Documentation	3.0
COM 875	Ethics in Technical and Science Communication	3.0
Electives		24.0

Science Communication

COM 520	Science Writing	3.0
COM 570	Technical and Science Editing	3.0
COM 620	Message Design and Evaluation	3.0
COM 670	Medical Writing	3.0
COM 875	Ethics in Technical and Science Communication	3.0
Electives		24.0

Public Communication

COM 635	Writing for the World Wide Web	3.0
COM 650	Telecommunications Policy	3.0
COM 660	Investigative Journalism	3.0
COM 680	Public Relations Strategies	3.0
COM 880	Seminar: Ethics for Public Communication	3.0
	Electives	24.0



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Master of Science in Environmental Policy

The graduate program in Environmental Policy prepares students for careers as policy analysts who have a strong commitment to environmental values, are scientifically and methodologically competent, and can work effectively in the democracy policy process with the various groups and institutions engaged in environmental issues.

To meet these requirements, students must complete a range of coursework designed to teach:

- knowledge of how policies are developed and implemented
- scientific and engineering basis of effective environmental policies
- an understanding of who the key players are in environmental politics, and how to work with them to accomplish environmental improvements.



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Master of Science in Environmental Policy (M.S.E.P.)

Curriculum

Core Courses	9.0 Credits
ENVR 501 Chemistry of the Environment	3.0
BIO 640 Biostatistics	3.0
ENVR 511 Evolutionary Ecology	3.0
or	
ENVR 521 Environmental Health	3.0

Required Specialization Courses in Environmental Policy	27.0 Credits
ENVR 522 Environmental Law	3.0
ENVR 523 Environmental Regulations	3.0
ENVR 760 Social Change & Environmental Movements	3.0
ENVR 771 Theory/Practice of Environmental Policy Analysis	3.0
ENVR 772 Methods of Environmental Policy Analysis	3.0
ENVR 773 Practicum in Environmental Policy Analysis	3.0
ENVR 865 Resource and Environmental Economics	3.0
ENVR 710 Environmental Cost Benefit Analysis and Valuation	3.0
ENVR 774 Economic Analysis of Environmental Policy	3.0

Recommended Electives	9.0 Credits
ENVR 880 Environment and Society	3.0
ENVR 885 International Environmental Politics	3.0
ENVR 886 Methods of Resource & Environmental Economic Analysis	3.0

Plan of Study

Within the first quarter of study, a student must meet with an assigned advisor and work out a plan of study. An example plan of study form can be viewed on the [Master of Science in Environmental Policy](#) web page.



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Graduate Study in Environmental Science

General Information

Environmental science is a multidisciplinary field in which we try to understand environmental problems and find solutions to them. This field requires understanding of a number of disciplines, including biology, chemistry, hydrology and climatology.

The environmental science program was created to focus on the need for scientists to aid in the development of local, national, and international environmental policy.

M.S. areas of concentration include: ecology, environmental assessment, environmental biotechnology, environmental risk management, paleoecology-geology, and toxicology and industrial hygiene. A student may alternatively craft a specialized plan of study outside of these strength areas under the guidance of an academic advisor.

The master's degree may be completed with either a thesis or non-thesis option. Those choosing to prepare a thesis must complete 45 credits (including 6 - 9 credits awarded for the thesis). Students choosing the non-thesis option must complete coursework totaling 48 credits. Most courses carry three credits.

Susan Cole is the Graduate Coordinator for Environmental Science. Susan Cole can be reached by telephone at 215-895-2905 or e-mail at coless@drexel.edu. Her office is located in Room 109 of Disque Hall.

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Master of Science in Environmental Science (M.S.E.S)

Curriculum

The M.S.E.S. degree requires three core courses that form the basis for further specialization. Students choose to complete the remainder of the program with an area of specialization and/or elective course options. Areas of specialization allow students to gain more depth in a particular area of interest. If student interest is not specifically addressed in any one area of specialization, elective courses may be used to build up an individualized plan of study. The program requires a total of 48 credits for non-thesis students and 45 credits for thesis students.

Core Courses		9.0 Credits
ENVR 501	Chemistry of the Environment	3.0
ENVR 506	Biostatistics	3.0
ENVR 511	Evolutionary Ecology	3.0

Areas of Specialization and Electives

Students may choose an area of specialization from below or design a unique plan of study combining one or more areas of interest. Students interested in applying their background in environmental science to environmental regulation or economics may also take electives in Environmental Policy

Ecology

Recommended Specialization Courses

ENVR 538	Biodiversity and Conservation	3.0
ENVR 583	Ecology of the NJ Pine Barrens	5.0
ENVR 611	Aquatic Ecology	3.0
ENVR 642	Biophysical Ecology	3.0
ENVR 690	Marine Ecology	3.0
ENVR 710	Physiological Ecology	3.0
ENVR 722	Tropical Ecology	3.0
ENVR 865	Special Topics: Community Ecology	3.0
ENVR 865	Special Topics: Population Ecology	3.0

Environmental Assessment

Recommended Specialization Courses

ENVR 516	Sanitary Microbiology	3.0
ENVR 521	Environmental Health	3.0

ENVR 538	Biodiversity and Conservation	3.0
ENVR 608	Fate of Pollutants in Air & Water	3.0
ENVR 611	Aquatic Ecology	3.0
ENVR 616	Environmental Microbiology	3.0
ENVR 711	Aquatic Toxicology	3.0
ENVR 726	Environmental Assessment	3.0
ENVR 727	Risk Assessment	3.0

Environmental Biotechnology

Recommended Specialization Courses

BIO 500	Biochemistry I	3.0
BIO 501	Biochemistry I - Laboratory	2.0
BIO 530	Techniques of Microbial Genetics	5.0
BIO 610	Biochemistry II	3.0
ENVR 516	Sanitary Microbiology	3.0
ENVR 608	Fate of Pollutants in Air and Water	3.0
ENVR 616	Environmental Microbiology	3.0
ENVR 726	Environmental Assessment	3.0
ENVR 757	Bioremediation	3.0

Environmental Risk Management

Recommended Specialization Courses

ENVR 522	Environmental Law	3.0
ENVR 523	Environmental Regulations	3.0
ENVR 608	Fate of Pollutants in Air and Water	3.0
ENVR 621	Epidemiology	3.0
ENVR 636	Principles of Toxicology I	3.0
COM 610	Theories of Communication & Persuasion	3.0
ENVR 727	Risk Assessment	3.0
EGMT 531	Economics for Engineering Management	3.0

Paleoecology-Geology

Recommended Specialization Courses

ENVR 520	Field Methods in Paleoecology	3.0
ENVR 865	Special Topics: Sedimentary Environments	3.0
ENVR 865	Special Topics: Invertebrate Paleontology	4.0
ENVR 865	Special Topics: Vertebrate Paleontology	3.0
ENVR 865	Special Topics: Paleobotany	3.0

Toxicology and Industrial Hygiene

Recommended Specialization Courses

ENVR 531	Industrial Hygiene I	3.0
ENVR 532	Industrial Hygiene II	3.0
ENVR 636	Principles of Toxicology I	3.0
ENVR 637	Principles of Toxicology II	3.0



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Ph.D. Program

A Ph.D. can be pursued in the fields of Environmental Science (including Environmental Policy) and Environmental Engineering in specialties consistent with interests of the Environmental Science affiliated faculty.

To be awarded the Ph.D., students must complete a major research project publishable in a peer-reviewed journal. The degree requires a total of 90 credits; credits earned toward a master's degree may apply toward the 90. There is no prescribed coursework -- students must take courses needed to complete their research under guidance of an academic advisor. Students must successfully pass the qualifying examination, the candidacy examination, and a Ph.D. dissertation and oral defense.



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Graduate Program in Human Nutrition

Undergraduate Prerequisites

The program's approach to graduate study in Human Nutrition is quantitative; therefore, applicants should have demonstrated competency in the coursework or its equivalent listed below.

A review of the applicant's transcript determines in what order any necessary undergraduate coursework shall parallel or precede graduate study. All newly accepted students are urged to systematically review their previous academic work, particularly in the areas of mathematics and biochemistry, prior to enrolling in their first graduate courses in the program. Biochemistry at the graduate level is a prerequisite for all other program courses.

- **General chemistry** (inorganic and organic) 3 terms or 3 semesters
- **Biochemistry** 1 term or semester
- **General biology** 2 courses
- **Human physiology** 2 courses
- **Microbiology** 1 course
- **Mathematics** 2 courses including derivatives and integrals
- **Statistics** 1 course
- **General psychology** 1 course
- **Foods** 2 terms or 1 semester
- **Basic Nutrition** 1 course
- **Advanced nutrition** 2 terms or 1 semester
- **Nutrition in the life cycle** 1 course
- **Therapeutic nutrition** 2 terms or 1 semester

Doctoral Program Admission Requirements

Human Nutrition is a part of the Department of Bioscience and Biotechnology, and the Doctor of Philosophy requirements are those of the department. Applicants without an M.S. degree should initially apply for admission as M.S. degree candidates. The Ph.D. degree requires a minimum of 90 credits beyond the bachelor's degree. Depending on the applicant's background, a qualifying examination may be required. Candidates must demonstrate appropriate scientific scholarship and the ability to conduct independent research representing a significant contribution to their chosen field. Ph.D. students must pass a candidacy examination and an oral defense of their dissertations. Applicants interested in the Ph.D. program should contact potential major professors for an appointment to discuss research interests.



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Master of Science in Human Nutrition

General Information

The human nutrition major is concerned with normal and therapeutic nutrition for individuals and groups. This major also encompasses nutrition science, the application of the principles of biochemistry, physiology, and biology to human nutritional needs. Current research in human nutrition includes food preference and nutrition, nutrition assessment, and effectiveness of nutrition education (particularly by the use of multimedia) on health and eating habits. Current research in nutrition science includes physiological and genetic determinants of obesity, lipid metabolism, nutraceuticals, and diet-endocrine interrelationships.

Graduate study in Human Nutrition is offered on both a full-time and part-time basis.



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Master of Science in Human Nutrition

45.0 Credits

The human nutrition major applies the principles of normal, preventive, and therapeutic nutrition to nutrition education and clinical practice. Students may select courses to focus on preventive community nutrition, therapeutic clinical nutrition, or human nutrition science. Several courses are designed to provide specialized training for advanced practice in dietetics.

Required courses		24.0 Credits
BIO 610	Biochemistry II	3.0
BIO 641	Data Analysis in the Biosciences	3.0
NFS 530	Macronutrient Metabolism	3.0
NFS 531	Micronutrient Metabolism	3.0
BIO 680	Issues in Scientific Research	3.0
NFS 730	Nutritional Assessment	3.0
NFS 849	Readings in Therapeutic Nutrition	3.0
NFS 554	Microbiology and Chemistry of Food Safety	3.0
or		
NFS 558	Nutritional Impact of Food-Processing Methods	

Nutrition Electives (Students select 3 of the following)		9.0 Credits
NFS 631	Nutrition Counseling	4.0
NFS 634	Women's Issues in Nutrition	3.0
NFS 640	Nutrition of the Schoolchild	3.0
NFS 641	Nutrition in Later Maturity	3.0
NFS 690	Community Nutrition	3.0
NFS 696	Methods of Teaching Dietetics	3.0
NFS 732	Weight Management and Eating Disorders	3.0

Electives 9.0 Credits

In consultation with their graduate advisory committee or graduate advisor, students select electives from departmental or related course offerings (excluding NFS 506).

Thesis Option

Students selecting the thesis option may include up to 6 credits of NFS 997 Research in Nutrition and Food Sciences among their **electives**.

Non-thesis Option

Students selecting the non-thesis option are required to pass a written comprehensive examination. Students electing the non-thesis option may include up to 3 credits of NFS 997 Research in Nutritional and Food Sciences among their **electives**.



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Ph.D. in Biological Sciences

Research area: Human Nutrition

Doctoral Program

It is possible for student with an interest in Human Nutrition to complete a Ph.D. in Biological Sciences while working in a laboratory of one of the Human Nutrition faculty. Since Human Nutrition is a part of the Department of Bioscience and Biotechnology, the Doctor of Philosophy requirements are those of the department.

Applicants without an M.S. degree should initially apply for admission as M.S. degree candidates. The Ph.D. degree requires a minimum of 90 credits beyond the bachelor's degree. Depending on the applicant's background, a qualifying examination may be required. Candidates must demonstrate appropriate scientific scholarship and the ability to conduct independent research representing a significant contribution to their chosen field. Ph.D. students must pass a candidacy examination and an oral defense of their dissertations. Applicants interested in the Ph.D. program should contact potential major professors for an appointment to discuss research interests.



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Master of Science Program in Mathematics

General Requirements

- Students must complete a minimum of 45 graduate credits for the M.S. degree. Of these, at least 36 credits must be core credits.
- The remaining elective courses can be courses that are offered within or outside of Department of Mathematics. Elective courses taken outside the department must receive prior departmental approval in order to be counted toward the degree.
- There are no thesis, language, or special examination requirements for the master's degree.
- Students seeking a dual M.S. must satisfy core requirements for both degree programs.
- Students should note that some departmental courses, such as Advanced Engineering Mathematics, are foundation courses and do not contribute to the departmental requirements for the degree. They do count toward the University requirements for a degree.

Curriculum

During their first term of study, students will meet with the Graduate Advisor to ensure that the program requirements are met.

At least 36 of the 45 credits required are to be accumulated by one of the following combinations:

- Set 1 + (Set 2 or Set 3) + the choice of any three of the advanced sequences.
- Students must take at least one course from Set 4.
- Students may replace Set 1 with Set 2 + nine additional credits taken from the core offerings/advanced sequence list.
- If all courses for both Set 2 and Set 3 are taken, students then select two of the advanced sequences instead of three.

Core Offerings

Set (1)

MATH 504	Linear Algebra and Analysis	3.0
MATH 505	Principles of Analysis I	3.0
MATH 506	Principles of Analysis II	3.0

Set (2)

MATH 630	Complex Variables I	3.0
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MATH 633	Real Variables I	3.0
MATH 634	Real Variables II	3.0

Set (3)

MATH 510	Applied Probability and Statistics I	3.0
MATH 511	Applied Probability and Statistics II	3.0
MATH 512	Applied Probability and Statistics III	3.0

Set (4)

MATH 538	Manifolds	3.0
MATH 520	Numerical Analysis I	3.0

Advanced sequences:

Students typically select three of the following sequences. Courses are offered in alternating years.

MATH 624	Ordinary Differential Equations II	3.0
MATH 625	Ordinary Differential Equations III	3.0

MATH 621	Partial Differential Equations I	3.0
MATH 622	Partial Differential Equations II	3.0

MATH 533	Abstract Algebra I	3.0
MATH 534	Abstract Algebra II	3.0

MATH 530	Combinatorial Mathematics I	3.0
MATH 531	Combinatorial Mathematics II	3.0

The remaining 9 credits can be accumulated by any combination of any of the mathematics courses, credits from approved Independent Study courses, transfer of approved credits from other departments, or transfer of graduate credits accumulated at other institutions prior to enrolling at Drexel. All transfer credits must have a grade of B or better and are subject to the approval by the Graduate Advisor.

For additional information, contact the [Department of Mathematics' Graduate Program](#).



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Doctoral Program in Mathematics

The Ph.D. degree in mathematics is awarded in any of the department's main areas of mathematics research, which include analysis, applied mathematics, biomathematics, combinatorics and discrete mathematics, differential geometry and its applications to computer vision, matrix and operator theory, numerical analysis, and number theory. The degree recipient must demonstrate scholastic breadth as well as making a contribution to scientific advancement in their chosen field.

Requirements of the program include course requirements, qualifying and candidacy examinations, completion of a research proposal, and successful completion of a publishable Ph.D. thesis.

At least 90 credits of graduate-level work must be completed for the Ph.D. degree. This total includes coursework required for the Master of Science Program in Mathematics. The balance is made up of more advanced special topics courses and research credits.

Further details about the doctoral program are available on the [Department of Mathematics' Graduate Programs](#) web page.



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Physics

General Information

Graduate students have the opportunity to work closely with world-recognized faculty whose interests span virtually all fields of physics. These daily encounters with faculty and fellow students provides the stimulus of new ideas and a collegial environment. Since specialization does not occur until after the second year, first- and second-year students can see some of the contemporary issues of physics first-hand, which proves helpful to students who are undecided about the field they wish to pursue.

Both full- and part-time study are available.



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Master of Science Program in Physics

General Requirements

Students who wish to complete only the master's degree are welcomed, and will find that the learning environment will allow them to broaden their professional understanding by exploring current topics and trends of physics in an interdisciplinary setting.

The requirement for the master's degree in physics is 45 graduate credits, with at least 30 credits taken in dynamics, mathematical physics, electricity and magnetism, quantum mechanics, and statistical mechanics. There are no thesis, language, or special examination requirements for the master's degree. Degrees are also available in collaboration with other departments and programs.



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Doctoral Program in Physics

The Doctor of Philosophy degree is conferred in recognition of breadth of scholarship and scientific attainment, plus demonstrated ability to investigate scientific problems independently and efficiently. Doctoral students are required to take a minimum of 45 credits of coursework and research work beyond the master's requirement of 45 credits.

The successful Ph.D. candidate must pass a candidacy examination, written and oral; satisfy a one-year residence requirement; and perform original research, write a satisfactory thesis describing that research, and defend this thesis in an oral examination.

A an outline of the course curriculum is available on the Department of Physics' [Doctoral Study](#) web page.



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Master of Science in Psychology

Degree Requirements

The general requirements for earning the M.S. degree in psychology are as follows:

- Completion of all required coursework with a minimum grade point average of 3.0, with no grade lower than a B in any required (non-elective) course and no more than two course grades of C or lower.
- Successful completion of a minimum of 45 credits.
- Successful completion of required research laboratory hours.
- Completion of an empirical thesis.
- Research laboratory: 8 hours/week for two years

For more information on specific requirements, consult the [Master of Science in Psychology Program Handbook](#) available from the [Department of Psychology](#) web site.

Required courses

PSY 510	Research Methods	3.0
PSY 530	Principles of Neuroscience	3.0
PSY 610	Data Analysis in Psychology	3.0
PSY 624	Behavior Analysis	3.0
PSY 690	MS Research I	3.0
PSY 691	MS Research II	3.0
PSY 692	MS Research III	3.0
PSY 722	Psychotherapy Techniques	3.0
PSY 812	Cognitive Neuroscience	3.0

Students select one of the following courses:

PSY 540	Principles of Neuropsychology	3.0
PSY 562	Consciousness	3.0
PSY 612	Psychology of Human-computer Interaction and Design	3.0
PSY 614	Problem-solving and Creativity	3.0
PSY 648	Forensic Psychology I	3.0
PSY 720	Health Psychology	3.0

Many additional electives are available to enhance individual plans of study.



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Ph.D. in Clinical Psychology

Drexel University offers the Ph.D. degree in clinical psychology with the primary goal of training clinical psychologists in the scientist-practitioner model. This model places equal emphasis on clinical research and the application of scientific principles. Students receive an appropriate, broad education in preparation for entry-level practice in professional psychology. This education includes training in intervention and assessment, as well as an introduction to the science and practice of clinical psychology. The program is accredited by the American Psychological Association.



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Doctoral Program in Psychology

Curriculum

The Drexel Ph.D. in Psychology curriculum follows the scientist-practitioner model and APA guidelines on accreditation of doctoral clinical psychology programs. It also considers state licensing guidelines and various publications that have been written on the topic of doctoral education, training, and credentialing in clinical psychology, as well as the specialty areas of cognitive-behavior therapy, forensic psychology, health psychology, and neuropsychology.

The following section outlines the courses required for graduation for entering Bachelor's-level students. The Ph.D. program curriculum requires the student to earn a minimum of 90 credits. Typically, students enroll in 27 credits during the first year, 22 credits during the second and third years, 12 credits in the fourth year, and 8 credits during the fifth/final internship year. Drexel University operates on a calendar of four eleven-week terms. Students in the program do not take courses during Summer Term in order to complete research projects and continue clinical practicum training.

All coursework can be divided into two major components: (1) Foundations of Psychology, which is the evolving body of knowledge in the discipline of psychology, and (2) Clinical and Professional Training, which focuses on the application of theory and empirical research to the practice of psychology. Listed below are all required and elective courses offered within the Drexel psychology curriculum followed by specific requirements for each concentration. Credit levels listed are set at the minimum required.

Foundations of Psychology

History and Systems

Required	3.0 Credits
PSY 712 History and Systems of Psychology	3.0

Statistics/Research Methods

Required	19.0 Credits
PSY 510 Research Methods in Psychology I	3.0
PSY 610 Data Analysis in Psychology	3.0
PSY 710 Multivariate Methods in Psychology	3.0
PSY 711 Data Analysis III: Advanced Topics	3.0
PSY 898 Thesis in Psychology	3.0
PSY 998 Dissertation in Psychology	4.0

Electives

Biological Bases of Behavior

Required		6.0 Credits
PSY 530	Principles of Neuroscience	3.0
PSY 630	Psychopharmacology	3.0

Electives		
PSY 812	Cognitive Neuroscience	3.0

Cognitive/Affective Bases of Behavior

Required		9.0 Credits
PSY 512	Cognitive Psychology	3.0
PSY 514	Learning Foundations of Behavioral Assessment	3.0

At least one of the following electives

PSY 516	Developmental Psychology	3.0
PSY 612	Psychology of Human-Computer Interaction	3.0
PSY 614	Problem-Solving and Creativity	3.0
PSY 616	Empirical Foundations of Unconscious Processes	3.0
PSY 840	Models of Memory	3.0

Social Bases of Behavior

Required		6.0 Credits
PSY 550	Multicultural Perspectives	3.0
PSY 517	Social Cognition in Clinical Psychology	3.0

At least one of the following electives:

PSY 518	Social Psychology	3.0
PSY 618	Psychology of Loss and Bereavement	3.0

Clinical and Professional Training

General Foundations of Practice

Required		6.0 Credits
PSY 520	Psychopathology	3.0
PSY 524	Professional Issues and Ethics	3.0

Foundations of Psychological Evaluation/Measurement

Required		15.0 Credits
PSY 522	Intellectual Assessment	3.0
PSY 620	Personality Assessment	3.0
PSY 514	Learning Foundations of Behavioral Assessment	3.0
PSY 515	Behavioral Assessment II	3.0

Electives		3.0
PSY 542	Neuropsychological Assessment	3.0
PSY 642	Neuropsychological Case Analysis/Integration	3.0
PSY 648	Forensic Psychology/Forensic Assessment I	3.0
PSY 649	Forensic Assessment II	3.0

Foundations of Intervention

Required		14.0 Credits
PSY 721	Principles of Psychotherapy	3.0
PSY 722	Psychotherapy Theories	3.0
PSY 899	Practicum	2.0
PSY 999	Internship	4.0

At least one of the following electives:

PSY 540	Principles of Neuropsychology	3.0
PSY 648	Forensic Psychology/Forensic Assessment I	3.0
PSY 819	Health Psychology	3.0
PSY 820	Cognitive-Behavior Therapy	3.0

Advanced Professional Training

Elective Courses		12.0 Credits
PSY 730	Criminal Law and Psychology (Villanova)	4.5
PSY 732	Law and Mental Health (Villanova)	4.5
PSY 746	Neuropsychological Evaluation and Intervention: Children and Adolescents	3.0
PSY 821	Family and Group Therapy	3.0
PSY 822	Pediatric Psychology	3.0
PSY 823	Substance Abuse	3.0
PSY 824	Eating and its Disorders	3.0
PSY 825	Seminar in Mind/Body Studies	3.0
PSY 826	Social Problem-solving and Psychopathology	3.0
PSY 827	Behavioral Stress Management	3.0
PSY 840	Models of Memory	3.0
PSY 845	Neuropsychological Evaluation and Intervention: The Elderly	3.0
PSY 854	Psychology of Rehabilitation	3.0
PSY 865	Psychopathy	3.0

Specific Concentration Requirements

Clinical Neuropsychology Concentration

The clinical neuropsychology concentration includes courses, research, and clinical experiences designed to train the students for professional practice in neuropsychology. Clinical neuropsychology involves the application of psychological assessment and intervention to the problems encountered by people with brain injury or illness. The knowledge of brain-behavior functioning and the incorporation of neuropsychological conceptualizations with traditional clinical conceptualizations of functioning are aimed at providing the student with a wider perspective regarding the range of human functioning and disability. The student is able to pursue specific interests in geriatrics, pediatrics, traumatic brain injury, and rehabilitation.

In addition to the core curriculum:

- One neuropsychology practicum (800 hours)
- A neuropsychology-focused thesis and dissertation
- Required classes: Principles of Neuropsychology, Principles of Neuroscience, Neuropsychological Assessment I and II, Case Analysis and Integration
- At least two neuropsychology electives: Models of Memory, Rehabilitation Psychology, Advanced Neuropsychology Assessment and Intervention: Children and Adolescents, Advanced Neuropsychology Assessment and Intervention: The Elderly.

Forensic Psychology Concentration

Forensic psychology involves the application of assessment and intervention techniques to informing legal decision-makers and attorneys on questions in criminal, civil, and family law. Those who concentrate in forensic psychology will be trained in relevant law, behavioral science research, and assessment and intervention approaches with a particular focus on juvenile and criminal issues.

In addition to the core curriculum:

- One forensic psychology practicum (800 hours)
- A forensic psychology-focused thesis and dissertation
- At least two years of research in an area related to forensic psychology
- Required classes: Forensic Assessment I and II, Law and Mental Health (at Villanova), and Principles of Neuropsychology
- At least two forensic psychology electives: Criminal Law and Psychology (Villanova), Children and the Law (Villanova), Substance Abuse

Health Psychology Concentration

Health psychology adopts a broad-based, biopsychosocial perspective in order to: (1) better understand the interplay among behavioral, emotional, cognitive, social, and biological factors regarding health, wellness, and physical disease; (2) promote and maintain wellness and positive physical health; (3) prevent, treat, and rehabilitate illness and disability, and (4) improve the health care delivery system. The health psychology concentration aims to provide specialty training in order to prepare graduate students for academic and/or clinical positions where the primary focus is on physical health problems.

In addition to the core curriculum:

- One health psychology practicum (800 hours)
- A health psychology-focused thesis and dissertation
- Required classes: Medical Psychology, Behavioral Stress Management (taken in second year with Personality assessment taken in third year)
- At least two Health Psychology electives: Seminar in Mind/Body Studies, Pediatric Psychology, Eating and Its Disorders, Substance Abuse

For more information on the Ph.D. program requirements, consult the Ph.D. Program Handbook available from the [Department of Psychology's](#) web site.



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Joint J.D./Ph.D. Law-Psychology Program

Drexel University and Villanova University Law School offer a joint and integrated program in law and psychology leading to the Juris Doctor (J.D.) in law from Villanova and the Doctor of Philosophy (Ph.D.) in clinical psychology from Drexel. The psychology component is housed in Drexel's Department of Psychology and is fully accredited by the American Psychological Association.

Drexel University now has a College of Law, which welcomed its first class in academic year 2006-2007. It is possible, therefore, that the legal training provided in the course of the Law-Psychology program may change in the coming years.

Visit the [Department of Psychology](#) web site for more information.

Curriculum

Law and psychology are related in many significant ways, yet few people are trained and skilled to strengthen this relationship. Many institutions permit students to pursue both degrees in an informal, uncoordinated manner. By contrast, Drexel University and Villanova train students in a carefully developed, integrated, conceptually unified program so that they acquire a mature understanding of the interaction between the two disciplines.

Over the seven-year course of study, students maintain continuous contact with the faculties of both schools and the developments in both disciplines. As the following sample curriculum reveals, students are enrolled concurrently in both universities and are required to fulfill the requirements of the J.D. and Ph.D. degrees. Students take courses in both institutions for the first six years; the emphasis in the first year is in law and the emphasis in the second year is in psychology. Time is about evenly divided between the institutions in the third through the sixth years.

At the end of the sixth year, students are awarded the J.D. degree from Villanova. During the seventh year, students undertake a full-time supervised psychology internship in an approved setting and complete their dissertation. Students then receive the Ph.D. degree from Drexel.

At the conclusion of the program, students are eligible for admission to the bar and, after completing the postdoctoral requirement for supervised experience in a given state, licensure as a psychologist.

The curriculum consists of five elements:

- The required core program in law and psychology at both institutions
- Interdisciplinary courses such as Introduction to Law and Psychology, Social Science Applications to Law, Law and Mental Health, Research in law and Psychology, and Forensic Assessment
- Legal clinics and psychology practica and internships that combine knowledge from both fields in a practical setting
- Electives in both fields, such as Health Law, Medical Malpractice, Privacy, Behavior Therapy, and Clinical Decision Making

- The option for employment one summer in a legal setting, such as a public-interest law firm, governmental agency, or private law firm

First Year

Course		Credits
LAW 0110	Civil Procedure	3
LAW 0120	Contracts	3
LAW 0150	Criminal Law and Procedure	2
LAW 0151	Introduction to Legal Research	1
LAW 0152	Introduction to Legal Writing	1
LAW 0154	Torts	3
PSYC 511	Psychopathology of Adults	3
PSYC 601	Principles of Psychotherapy	3
PSYC 730	Multicultural Perspective	3

Second Year

Course		Credits
LAW 0153	Property	2
LAW 1000	Constitutional Law I	3
PSYC 506	Introduction to Psychotherapy Skills	1
PSYC 525	Intellectual Assessment	3
PSYC 604	Behavioral Assessment	3
PSYC 625	Advanced Statistics	3
PSYC 710	Doctoral Research	6

Third Year

Course		Credits
	Required Category Case	3
PSYC 501	Social Cognition in Clinical Psychology	3
PSYC 502	Developmental Psychology	3
PSYC 605	Health Psychology	3
PSYC 622	Research Methods in Clinical Psychology	3
PSYC 631	Behavioral Therapy I	3

PSYC 640	Personality Assessment	3
PSYC 700	Clinical Practicum Seminar	2
PSYC 715	Law and Mental Health	3
PSYC 720	Forensic Assessment	3
PSYC 725	Seminar in Advanced Problems in Mental Health Law	3

Fourth Year

Course		Credits
LAW 7024	Evidence	3
LAW 7025	Family Law*	3
LAW 7028	Health Law*	2
PSYC 650	Psychopharmacology	3
PSYC 655	Ethics and Professional Issues	3
PSYC 700	Clinical Practicum Seminar (Two-Day)	2
PSYC 705	Social Science Applications to the Law	3
PSYC 710	Doctoral Research	12

Fifth Year

Course		Credits
LAW 6028	Legal Profession	2
LAW 7002	Administrative Law*	3
LAW 7004	Advanced Criminal Procedure*	3
LAW 7008	Children and the Law*	2
PSYC 611	Intro to Clinical Neuropsychology	3
PSYC 710	Doctoral Research in Law and Psychology	12

Sixth Year

Course		Credits
LAW 7005	Advanced Legal Writing	3
LAW 7015	Dispute Resolution*	2
LAW 7026	Federal Courts/Federal Systems*	3
LAW 7050	Trial Practice or Legal Clinic	1



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Master of Science in Publication Management

Students enter the Publication Management program from diverse undergraduate backgrounds, including liberal arts, business administration, journalism, communications, technical writing, and information studies. The program builds on the individual's undergraduate content base by providing knowledge about the key elements of the publishing process needed by a publishing executive. The program also serves the needs of individuals already employed in the printing or publishing industry who are seeking to update or broaden their knowledge.

Students completing the program may find career opportunities in the management of traditional publishing companies as well as in corporate communication areas of a broad range of business and education. Entrepreneurial opportunities provide another area of career development.

All courses in the program are offered in the evening on a part-time or full-time basis. The curriculum comprises courses in technical and science writing and editing, product acquisition, design, production, and printing technology offered through the College of Arts and Sciences and business management and marketing courses offered through the LeBow College of Business.



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Master of Science Program in Publication Management

45.0 credits

General Requirements

Graduation from the program requires the successful completion of all program pre- and co-requisites and 45 credits of graduate coursework.

Curriculum

Required courses	30.0 Credits
COM 510 Technical Writing	3.0
COM 570 Technical and Science Editing	3.0
PMGT 630 Publishing Environment	3.0
PMGT 631 Page Design and Production	3.0
PMGT 635 Periodicals Publishing	3.0
PMGT 730 Book Publishing	3.0
PMGT 745 Electronic Publishing	3.0
PMGT 735 Publication Budgeting and Estimating	3.0
PMGT 740 Publications Marketing	3.0
PMGT 800 Independent Study	3.0
or	
PMGT 801 Independent Project	3.0

Elective courses 15.0 Credits

Students select five additional courses for 15 elective credits.

One course (3 credits) must be a COM elective.

Electives may include, but are not limited to the following:

COM 500 Persuasive Writing and Reading in Communication	3.0
COM 520 Science Writing	3.0
COM 530 Technical and Science Photography	3.0
COM 540 Technical and Science Graphics	3.0
COM 610 Theories of Communication and Persuasion	3.0
COM 620 Message Design and Evaluation	3.0
COM 630 Developing Software Documentation	3.0
COM 640 Desktop Publishing	3.0
COM 645 Strategy and Design for Multimedia	3.0

COM 650	Telecommunications Policy	3.0
COM 655	Telecommunication Policy in the Information Age	3.0
COM 660	Investigative Journalism	3.0
COM 665	Journalists, Courts and the Law	3.0
COM 670	Medical Writing	3.0
COM 675	Grant Writing: Arts/Humanities	3.0
COM 680	Public Relations Strategies	3.0
COM 690	Special Topics in Communication	3.0
COM 865	Interconnections: Science and Technology, Literature and the Arts	3.0
COM 875	Ethics for Technical and Scientific Communication	3.0
COM 880	Ethics for Public Communication	3.0
ORGB 625	Leadership and Professional Development	3.0
MKTG 601	Marketing Strategy and Planning	3.0
MKTG 630	International Marketing	3.0

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Master of Science in Science, Technology, and Society

General Information

The increasingly complex nature of modern life has steadily eroded the distinctions traditionally made between social and technical issues. Leaders among scientists, engineers, policy-makers, managers, investors, and educators must base their decisions on a diverse array of data, new tools for gathering and evaluating this data, integrated systems of information, and interdisciplinary approaches to problem-solving. In an era of expanding global investment and complex regulation, opportunities will accrue to those who can identify potential problems early and formulate multifaceted, long-term, and viable solutions.

The graduate program in Science, Technology, and Society (STS) targets this new leadership cadre. STS at Drexel integrates the study of history, science and technology, public policy, and contemporary social and political issues. It combines core courses in the history of science and technology with classes that focus on gender and race, democratic institutions, ethics, and future challenges to industry and government. The program also provides a unique international orientation, which recognizes the crucial context of globalization in the advancement of science and technology and the broad implications of scientific research and innovation in the politics and history of the modern world.

Prospective students for the M.S. in STS see this educational opportunity as an essential factor in their skill enhancement and career advancement. They are recent college graduates in the social sciences, humanities, natural sciences, and engineering; middle and high school teachers; and professionals in businesses, city and state government offices, and area hospitals. Students can attend full time or part time and complete all coursework in the evening.

For additional information, visit the [Masters Program in Science, Technology, and Society](#) web page.



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Master of Science in Science, Technology, and Society

Curriculum

The M.S. degree in STS requires 45 credits of coursework. At least 36 credits must be in the Department of History & Politics. Required courses total 27 credits (including a 3-credit research seminar, a 3-credit practicum, and 6 credits of research and writing for the thesis, which may be tied to the practicum). Remaining credits are chosen from a list of electives.

Basic requirements		15.0 Credits
HIST 501	Introduction to Science, Technology, and Society	3.0
HIST 585	Technology in Historical Perspective	3.0
HIST 586	Gender and Technology	3.0
or		
PSCI 573	Gender, Race, and Science	3.0
PSCI 555	International Political Economy	3.0
One of the following courses:		
PSCI 571	Science and Technology Public Policy	3.0
PSCI 557	Globalization and Transition	3.0
PSCI 541	Technology in Developing Countries	3.0
PSCI 570	International Environmental Policy	3.0
Advanced requirements		12.0 Credits
HIST 696	Seminar in Science, Technology, and Society	3.0
or		
PSCI 696	Seminar in Science, Technology, and Society	3.0
HIST 697	Practicum: Science and Technology in Action	3.0
HIST 698	M.S. Thesis	6.0
or		
PSCI 698	M.S. Thesis	6.0
Suggested Electives (select at least three of the following)		9.0 Credits
HIST 541	Technology in Developing Countries	3.0
HIST 555	International Political Economy and Technology	3.0
HIST 557	Globalization and Transition	3.0
HIST 583	History of Medicine and Disease	3.0
HIST 586	Gender and Technology	3.0
HIST 590	Themes in the History of Science	3.0
HIST 591	Themes in the History of Technology	3.0
PSCI 541	Technology in Developing Nations	3.0
PSCI 555	International Political Economy	3.0
PSCI 557	Globalization and Transition	3.0
PSCI 570	International Environmental Policy	3.0

PSCI 573	Gender, Race, and Science	3.0
PSCI 574	Alternative Policy Perspectives	3.0
PSCI 575	Appropriate Technology and Development	3.0
COM 650	Telecommunications Policy	3.0
COM 690	Grant Writing	3.0
ENVR 880	Environment and Society	3.0
MGMT 602	Management and Technology	3.0
PSY 612	Human-Computer Interaction	3.0

Remaining electives

9.0 Credits

Any remaining electives may be taken in the Department of History & Politics or other departments and colleges in the university, chosen in consultation with the STS faculty.
