Drexel University Undergraduate Catalog

2003 - 2004

About this Catalog
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1.800.2.DREXEL enroll@drexel.edu

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About the University

Yesterday, Today, and Tomorrow

In 1891, near the end of a long and prosperous life, Philadelphia financier and philanthropist Anthony J. Drexel founded the Drexel Institute of Art, Science and Industry. As society's need for technically proficient leaders grew, so did Mr. Drexel's institution, first becoming the Drexel Institute of Technology in 1936, and then Drexel University in 1970.

Today, more than 11,500 undergraduate and 4,500 graduate students attend Drexel's eight colleges and three schools:

- The College of Arts and Sciences, which grants bachelor's, master's, and Ph.D. degrees
- The Bennett S. LeBow College of Business, which grants bachelor's, master's, and Ph.D. degrees
- The College of Engineering, which grants bachelor's, master's, and Ph.D. degrees
- The College of Information Science and Technology, which grants bachelor's, master's, and Ph.D. degrees
- The College of Media Arts and Design, which grants bachelor's and master's degrees
- The Goodwin College of Professional Studies, which grants interdisciplinary bachelor's degrees, provides academic and professional support for all part-time undergraduate students, and offers continuing professional education courses
- The School of Biomedical Engineering, Science, and Health Systems, which grants bachelor's, master's, and Ph.D. degrees
- The School of Education, which grants bachelor's, master's, and Ph.D. degrees, and recommends issuance of Pennsylvania instructional and teaching certificates
- The College of Nursing and Health Professions, which grants bachelor's, master's, and Ph.D. degrees
- The Drexel University College of Medicine, which grants M.D., master's and Ph.D. degrees
- The School of Public Health, which grants master's and Ph.D. degrees

One of the first schools in the nation to adopt mandatory co-operative education programs, Drexel now administers one of the largest, with more than 4,800 students taking part in co-op/internships on an annual basis. Agreements with 1,500 business, industrial, governmental, and other institutions located in 27 states and 11 foreign countries enable Drexel students to acquire practical experience related to college studies through periods of paid internships.

Located on 49 acres in Philadelphia's University City neighborhood, just minutes from Center City, Drexel is ideally situated for its valuable co-operative relationships with business and industry. The 45-building campus, which includes seven residence halls housing more than 2,500 students, is a vibrant mix of neoclassical architecture, such as the grand Main Building at 32nd and Chestnut Streets, and innovative classrooms and laboratories, such as those found in the Leonard Pearlstein Business Learning Center, completed in 2002. The University's educational programs are enhanced by the industrial, commercial, professional, and cultural activities of the nation's fifth-largest metropolitan area.

A unique academic niche is filled by the Drexel University College of Medicine, the nation's largest private medical school, which combines more than a century of excellence in medical education with Drexel's technological focus. Drexel also includes an outstanding college for nursing and the health professions and one of only two public health schools in Pennsylvania.

Drexel University is privately controlled, nonsectarian, and coeducational.

Accreditation

Drexel's educational program is accredited by the Middle States Association of Colleges and Secondary Schools.

Accreditation was last reaffirmed in 2001.

The following programs are accredited, approved, or certified by the associations noted:

- Architecture is one of the few part-time evening programs accredited by the National Architectural Accrediting Board.
- Chemistry (College of Arts and Sciences) is certified by the American Chemical Society.
- Clinical dietetics (College of Arts and Sciences) is approved by the American Dietetics Association.
- The clinical psychology Ph.D. program (College of Arts and Sciences) is accredited by the American Psychological Association.

- The computer science B.S. degree program (College of Arts and Sciences) is accredited by the Computing Sciences Accreditation Board.
- All engineering curricula, except the program in industrial engineering, are accredited or currently under review by the Accreditation Board for Engineering and Technology, the final authority on educational standards of the engineering profession.
- Hospitality management is accredited by the Accrediting Commission for Programs in Hospitality Administration.
- The library and information science M.S. degree program (College of Information Science and Technology) is accredited by the American Library Association.
- Interior design (College of Media Arts and Design) is accredited by the Foundation for Interior Design Education Research.

Any student or prospective student may request a copy of the documents describing the institution's accreditation. This information is available in the Provost's Office and in the Financial Aid Office, both located in the Main Building.

Technology
Technology is integrated into every aspect of the Drexel educational experience, marking the university as a leader in educational innovation.

Drexel made history in 1983 when it became the first university to mandate that all students must have personal access to a microcomputer. This tradition of leadership in integrating state-of-the-art technologies into a Drexel education continued when Drexel in early 1998 inaugurated the first totally wireless library in the nation. In 2000, Drexel again made history by becoming the nation's first major university to offer completely wireless Internet access across the entire campus.

And in 2002 the University launched DrexelOne Mobile, a Web portal that allows students to retrieve personalized information via any Web-enabled handheld device.

Our students are able to access the Internet and Drexel's comprehensive system of information networks from anywhere on campus using a laptop computer in a fully wireless environment. Drexel students are the first in the U.S. to enjoy the best of both worlds—a campus network ranked by *Yahoo! Internet Life* magazine's "most wired" survey as number one in Philadelphia and number six nationwide, and an all-wireless environment where it's easy to access the network at anytime and from anyplace on campus.

Drexel Co-op
One of the nation's most established and successful experiential programs, Drexel Co-op: The Ultimate Internship® provides students with a unique combination of academic and professional problem-solving skills.

Quality Faculty
Dedicated to teaching and learning, Drexel faculty have reached the highest level of recognition for their research and scholarship.

Undergraduate Programs

The College of Arts Sciences

The College of Arts and Sciences offers the following curricula leading to the Bachelor of Science degree:

Bioscience and Biotechnology
Chemistry
Communication
Criminal Justice
History & Politics
International Area Studies
Environmental Science
Mathematics
Nutrition and Foods
Physics
Psychology
Sociology
Unified Science

The College also offers students the option of a Bachelor of Arts degree in the following majors:

- Communication
- History & Politics
- International Area Studies
- English

Students can select from a variety of four- and five-year major options with co-operative education opportunities for

relating academic study to work experience and developing first-job potential.

Bachelor of Arts Degree Programs
The Bachelor of Arts degree provides a broad-based liberal education while allowing students the option of practical application of their studies through Drexel's well-established cooperative education program. (In some cases, four-year options or alternatives to the co-op experience are available.)

The B.A. degree continues the Drexel focus on critical reasoning, a strong grounding in arts and sciences, and effective development of communication skills. The degree is intended to provide a solid liberal arts background for graduate study as well as for professional degrees in such areas as law, public history, foreign service, education, counseling, social work, public health, and medicine.

While the B.A. degree requires more liberal arts courses than the Bachelor of Science degree, it also allows more varied choices in the fulfillment of math and science requirements. The B.A. degree prepares students for an ever-changing and culturally diverse world and will provide them with the tools they will need to be leaders in industry, arts, government, and human services. Drexel's strong advising program helps students learn more about the degree options and which option best matches each student's long-term goals.

Curricular Organization for Science and Mathematics Majors
All Students in the majors in biological sciences, chemistry, mathematics, nutrition and foods, physics, and unified science study essentially the same or similar subjects during the freshman year. This recognizes the fundamental knowledge common to those disciplines; it also allows for transfer between majors at the end of the freshman year without loss of time.

Upper-class students in those disciplines are given the opportunity to take electives in liberal, scientific, and technically related fields.

The flexibility available in the elective programs and the opportunity to complete an academic minor permit students to prepare for continuing studies in graduate or professional school, for work in government or industry, or for a change in educational goals.

Generally the basic requirements in each major are completed prior to the senior year. Thus, for science and mathematics majors, the technical electives in the last year may be selected in some advanced specialty within the specific major, and free electives may be used for enrichment or to prepare for a change of field. Each student's elective program must be approved by and adviser from his or her major department.

Curricular Organization for Humanities and Social Science Majors
Students majoring in the humanities and social sciences complete the same or similar sets of courses in the freshman and sophomore years. Some of these courses (for instance, the humanities sequences) are identical for all students, including science majors, while others may vary by discipline (for instance, Calculus I for majors in the technical and science track of the communication major but Calculus I or Introduction to Analysis I for psychology majors). All students majoring in a humanities or social sciences field are encouraged to take at least one course in their proposed field of concentration in the freshman year. Intensive work in a specific concentration begins in the sophomore year, but in each year after the first, students have an opportunity to take at least one elective course. All humanities and social sciences majors have a significant degree of flexibility, allowing them to complete disciplinary requirements and, through electives, to take a minor or another major or prepare for entry into graduate or professional school.

Majors in Science or Mathematics with Secondary and Elementary Teacher Certification
The School of Education offers innovative and science-intensive curricula that combine academic majors with appropriate coursework and experiences to satisfy state requirements for certification in biology, chemistry, earth and space sciences, mathematics, physics, and elementary education. Students interested in the teacher education programs should contact the director of the School.

Accelerated Program and Bachelor's/Master's Dual Degree Program
The Accelerated Program of the College of Arts and Sciences provides opportunities for highly talented and strongly motivated students to progress toward their educational goals essentially at their own pace. Primarily through advanced placement, credit by examination,

flexibility of scheduling, and independent study, the program makes possible the completion of the undergraduate curriculum and the master's degree in science disciplines in five years. Students enrolled in this program may take advantage of the five-year Bachelor's/Master's Dual Degree Program.

Pre-professional Programs
Students wishing to prepare for admission to professional schools of law, medicine, veterinary medicine, or dentistry may obtain pre-professional counseling and assistance in making application from the Office of Pre-professional Programs, 215-895-2437.

Degree Requirements
Certification for graduation is provided by the individual department or program according to the requirements for each major, which are set forth in subsequent pages. The minimum number of credits required for the degree of Bachelor of Science varies from one department and program to another but in no case does it exceed 192 credits of academic work with two to six terms of co-operative experience.

Writing-Intensive Course Requirements
In order to graduate, all students beginning with the entering class of 2002/01 (Fall 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid “clustering” these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term.

Co-operative Education
Co-op is an essential component in defining the "Drexel Difference" in the College of Arts and Sciences.

Students spend a minimum of six months (two terms) applying classroom and studio skills in paid positions within their chosen professions. Often referred to as "The Ultimate Internship," a co-op is a valuable, direct way to learn about a career and work with other professionals, and a way to gain skills and experience that set Drexel graduates apart from students who complete their professional education in more traditional academic settings**.**

The Special Language Enhancement Program
Students who have good academic qualifications but whose TOEFL scores are below the minimum required by the admissions office may be accepted to Drexel through the Special Language Enhancement Program (SLEP). SLEP students will be provided a program that includes English Language study, Drexel courses, and academic advising. Please contact the English Language Center for more information.

Biological Sciences

The biological sciences encompass many fields. Biologists study the structure and functions of living organisms from the individual cell to the full organism, and collectively to the community level. Discoveries in the biological sciences influence many aspects of our daily lives and have become the foundation of most new developments of the new century. In the past two decades, advances in molecular biology and genetics have been rapid, opening many new, exciting career opportunities in the fields of biotechnology and genetic engineering. Biologists can pursue a variety of options including careers in medicine, dentistry, veterinary medicine or other health-related areas; in research or commercial laboratories; in various private and government agencies; and in teaching. In fact, more than 100 different occupations have been listed for biologists.

The bioscience major resides in the Department of Bioscience and Biotechnology. Students earn a bachelor's degree in the biological sciences and are prepared for technical careers in research or commercial laboratories, or for professional schools or graduate study. Graduates in the biological sciences are in demand and enjoy a high

placement rate with competitive salaries. Graduates with a degree in the biological sciences work for pharmaceutical companies, medical research laboratories, or biotechnology companies, or in government laboratories.

The undergraduate curriculum was developed with support from a National Science Foundation grant. Our nationally recognized curriculum emphasizes laboratory experiences in which students work in teams to learn scientific principles by designing focused research projects. During their freshman and sophomore years, majors in biological sciences participate in the Enhanced Bioscience Curriculum (EBE) program, an integrated curricular approach where students spend five hours per week in lab learning how to participate in the scientific process. This unique curricular approach is extended into the bioscience upper-level required courses in biochemistry, developmental biology, physiology, and advanced cell biology. In addition to the foundation curriculum, with its focus on basic bioscience principles, students select elective courses in their areas of interest. The goal of the program is to give students the knowledge, tools, and skills of the bioscientist necessary to face the challenges of the 21st century.

The course requirements identifies required support courses in chemistry, physics, mathematics, humanities, and science and human affairs. With proper selection of electives, students can meet teacher certification requirements or complete a minor in another field. Students are encouraged to consult frequently with their academic adviser for curriculum planning.

Co-op/internship employment is an option for biological sciences students. The major offers three distinct plans:

Five-year option with co-op/internship experience: This option allows for the greatest amount of employment experience, with three distinct six-month periods of employment included with studies. After the start of the sophomore year, students study or work through all terms, including summer.

Four-year option with one co-op/internship experience: The degree includes just one six-month period of full-time employment. After the start of sophomore year, students study or work through all terms, including summer.

Four-year option without co-op experience: The degree can be completed in four years without co-op/internship employment. Students are not required to pursue studies during any of the summer terms.

B.S. in Biological Sciences

Degree Requirements: 191.0 credits

Bioscience required courses

BIO 114	Bioscience I: Growth of Organisms/Populations	5.5
BIO 115	Bioscience II: Organismal Physiology	5.5
BIO 117	Bioscience III: Molecular and Cellular Genetics	5.5
BIO 204	Bioscience IV: Metabolic Molecular Cell Biology	5.5
BIO 206	Bioscience V: Gene Expression and Function	5.5
BIO 268	Vertebrate Developmental Biology	4.5
BIO 303	Biochemistry I: Biomolecules	3.5
BIO 305	Biochemistry I Laboratory	2.0
BIO 307	Biochemistry II: Metabolism	3.5
BIO 309	Biochemistry II Laboratory	2.0
BIO 201	Human Physiology I	4.0
BIO 203	Human Physiology II	4.0
BIO 480	Physiology Laboratory	1.0
BIO 482	Advanced Cell Biology	5.0
BIO 460	Evolution	3.0
BIO 471	Seminar in Biological Science	2.0
BIO 472	Seminar in Biological Science	1.0
BIO 473	Seminar in Biological Science	1.0
Bioscience electives*		15.0

***Students must select at least five courses from their area of interest.**

Mathematics and statistics courses

BIO 440	Biometry	3.0
BIO 441	Data Analysis in the Biosciences	3.0
MATH 101	Introduction to Analysis I	4.0
or		
MATH 111	Calculus A	3.0
or		
MATH 121	Calculus I	4.0
MATH 102	Introduction to Analysis II	4.0
or		
MATH 112	Calculus B	3.0
or		
MATH 122	Calculus II	4.0
MATH 239	Intermediate Calculus	4.0
or		
MATH 113	Calculus C	3.0

or	
MATH 123 Calculus III	**4.0**

Physical sciences courses

CHEM 101 General Chemistry I	**4.0**
CHEM 102 General Chemistry II	**4.0**
CHEM 103 General Chemistry III	**5.0**
CHEM 241 Organic Chemistry I	**4.0**
CHEM 242 Organic Chemistry II	**4.0**
CHEM 243 Organic Chemistry III	**3.0**
CHEM 244 Organic Chemistry I Laboratory	**3.0**
CHEM 245 Organic Chemistry Laboratory II	**3.0**
PHYS 152 Physics for Life Sciences I	**4.5**
PHYS 153 Physics for Life Sciences II	**4.5**

Humanities and social science courses

ENGL 101 Expository Writing and Reading	**3.0**
ENGL 102 Persuasive Writing and Reading	**3.0**
ENGL 103 Analytical Writing and Reading	**3.0**
COM 230 Techniques of Speaking	**3.0**
COM 310 WI Technical Writing	**3.0**
PHIL 251 Ethics	**3.0**
UNIV 101 The Drexel Experience	**2.0**
Humanities and social sciences electives	**6.0**
Science, technology, and human affairs elective	**3.0**
Free electives*	**24.0**

*** Students can choose from a variety of course offerings to best meet their academic interests. The program also provides opportunities for qualified students to take research credits (through permission of department), allowing them to carry out a research project with a faculty member. CHEM 256 (Physical Chemistry for the Biosciences) is highly recommended as an elective for bioscience majors.**

Minor in Biological Sciences

The minor is designed for students who wish to become acquainted with the life sciences while pursuing a major in another area. This option should be particularly useful for students majoring in areas such as chemistry, engineering, physics, or psychology who are interested in admission to medical schools or graduate programs. Students interested in the minor should consult with an academic adviser in the department for help with course selections.

Required courses
Students must complete 38 credits of coursework as follows:

BIO 114 Bioscience I: Growth of Organisms and Populations	**5.5**
BIO 115 Bioscience II: Organismal Physiology	**5.5**
BIO 117 Bioscience III: Molecular and Cellular Genetics	**5.5**
BIO 204 Bioscience IV: Metabolic Molecular Cell Biology	**5.5**
BIO 206 WI Bioscience V: Gene Expression and Function	**5.5**
BIO 303 Biochemistry I: Biomolecules	**3.5**
BIO 305 Biochemistry I Laboratory	**2.0**
BIO 460 Evolution	**3.0**
BIO 471 Seminar in Biological Science	**2.0**
BIO 472 Seminar in Biological Science	**1.0**
BIO 473 Seminar in Biological Science	**1.0**
BIO 460 Evolution	**3.0**

Chemistry

Each student plans a course of study and selects electives in consultation with an advisor in the Chemistry Department. Students are required to take two courses, or 6 credits, of liberal studies electives and a minimum of 6 credits of technical electives, such as biological science, mathematics, geology, accounting, law, and advanced chemistry. As part of the latter, following the ninth term in college, students often select an integrated three-term sequence of advanced courses in chemistry.

Students who show initiative and laboratory ability are encouraged to select a research problem and/or other advanced courses in chemistry during the junior and senior years. Most graduate courses in chemistry are open to qualified seniors. Prerequisites and descriptions of available graduate courses appear in the graduate catalog.

Some knowledge is required of a foreign language in which a significant body of chemical literature exists. Students generally elect German, French, or Russian.

Both a five year co-op degree and a four-year non-co-op degree are offered.

B.S. in Chemistry

Degree Requirements: 191.5 credits

General education requirements

ECON 211 Principles of Economics I (Micro)	3.0
ECON 212 Principles of Economics II (Macro)	3.0
GER 101 German I*	4.0
GER 102 German II*	4.0
GER 103 German III*	4.0
HIST 167 The 20th-Century World I	3.0
HIST 168 The 20th-Century World II	3.0
ENGL 101 Expository Writing and Reading	3.0
ENGL 102 Persuasive Writing and Reading	3.0
ENGL 103 Analytical Writing and Reading	3.0
UNIV 101 The Drexel Experience	2.0
Humanities elective	3.0
Electives	33.0

*Or another approved language.

Chemistry requirements

CHEM 101 General Chemistry I	4.0
CHEM 102 General Chemistry II	4.0
CHEM 103 General Chemistry III	5.0
CHEM 230 Quantitative Analysis	3.0
CHEM 231 WI Quantitative Analysis Laboratory	2.0
CHEM 241 Organic Chemistry I	4.0
CHEM 242 Organic Chemistry II	4.0
CHEM 243 Organic Chemistry III	3.0
CHEM 244 Organic Chemistry Laboratory I	3.0
CHEM 245 Organic Chemistry Laboratory II	3.0
CHEM 251 Physical Chemistry I	3.0
CHEM 346 Qualitative Organic Chemistry	5.5
CHEC 352 Physical Chemistry and Applications II	4.0
CHEC 353 Physical Chemistry and Applications III	4.0
CHEM 354 Physical Chemistry IV	3.0
CHEM 357 WI Physical Chemistry I Laboratory	2.5
CHEM 358 Physical Chemistry II Laboratory	2.5
CHEM 420 Molecular Sym/Group Theory App. to Chem	3.0
CHEM 421 Inorganic Chemistry I	3.0
CHEM 422 Inorganic Chemistry II	3.0
CHEM 423 Inorganic Chemistry Laboratory	4.0
CHEM 430 Analytical Chemistry I	3.0
CHEM 431 WI Analytical Chemistry II	4.0

Computer/mathematics requirements

CS 170 Computer Programming	3.0
MATH 121 Calculus I	4.0
MATH 122 Calculus II	4.0
MATH 123 Calculus III	4.0
MATH 200 Calculus IV	4.0
MATH 201 Linear Algebra	4.0
MATH 210 Differential Equations	4.0

Physics requirements

PHYS 111 Physics I	4.5
PHYS 112 Physics II	4.5
PHYS 211 Physics III	4.5

Minor in Chemistry

The academic minor program in chemistry is designed to expose students to each of the major sub-disciplines of chemistry (analytical, inorganic, organic, and physical). In order to accomplish this students take a total of at least 27.5 credits of chemistry past the freshman year (100 level courses).

As chemistry is an experimental science at least two laboratory courses must be included in the group of courses taken for the minor. Students should note that their academic major may require certain chemistry courses that can also be used to fulfill the requirements for a minor in chemistry.

The remaining credits can be selected from any of the regularly offered chemistry department lecture or laboratory courses 200-level and above according to specific interests. Note that existing course pre-requisites may affect which courses may be selected. The variable credit courses CHEM 493 Senior Research Project or CHEM 497 Undergraduate Research may also be used to fulfill either the lecture or laboratory requirements for the minor.

Required courses

CHEM 241 Organic Chemistry I	**4.0**
CHEM 230 Quantitative Analysis	**3.0**
CHEM 251 Physical Chemistry I*	**3.0**
CHEM 421 Inorganic Chemistry I	**3.0**
CHEM 244 Organic Chemistry I Laboratory	**3.0**
A second chemistry laboratory course	**3.0**

*** Students may substitute CHEC 352 Physical Chemistry II (4 credits) or CHEC 353Physical Chemistry III (4 credits) for the CHEM 251 physical chemistry lecture requirement.**

Communication

The Culture and Communication department offers majors in communication, with specializations in:

- Corporate Communication
- Technical and Science Communication
- Global Journalism

In addition, the department offers a major in Sociology.

The department is committed to helping students become broadly educated and professionally competent individuals. Students are exposed to a variety of media and are guided in the development of their interpretive and expressive skills.

All Communication majors take a common core of courses that emphasize communication theory and methods. Then, they specialize in one of three concentrations. Students in the Corporate Communication concentration pursue careers in public relations, corporate training, and corporate communication. Those who choose the Technical and Science Communication concentration go on to work in technical writing, science writing, publishing, and software and hardware documentation. Global Journalism students pursue careers in journalism and news. Many communication graduates also go on to law school, to business school for an MBA, or to graduate school.

Students who elect the Corporate Communication concentration have the option of pursuing either a Bachelor of Arts degree or a Bachelor of Science degree. Students who elect the Technical and Science Communication concentration must pursue the Bachelor of Science degree. Students in Global Journalism must complete the requirements for the Bachelor of Arts degree.

The department also offers minors in Anthropology, Communication, and Sociology, each of which requires 24 credit hours of study.

B.A. in Communication/Corporate Communication

Degree Requirements: 182.0 credits

University requirements

ENGL 101 Expository Writing and Reading	**3.0**
ENGL 102 Persuasive Writing and Reading	**3.0**
ENGL 103 Analytical Writing and Reading	**3.0**
UNIV 101 The Drexel Experience	**2.0**
Mathematics courses	**6.0-8.0**
Science courses	**6.0-8.0**

College requirements

Foreign language courses	**8.0**
Humanities and fine arts courses	**12.0**
International studies courses	**6.0**
Social and behavioral sciences courses	**12.0**
Studies in diversity	**6.0**

Communication core requirements

COM 111 Introduction to Corporate Communication	**3.0**
COM 150 Mass Media and Society	**3.0**
COM 210 Theory and Models of Communication	**3.0**
COM 220 Introduction to Communications Research	**3.0**
COM 230 Techniques of Speaking	**3.0**
COM 240 New Technologies in Communication	**3.0**

COM 340 Desktop Publishing	3.0
COM 491 Senior Project in Communication I	3.0
COM 492 Senior Project in Communication II	3.0
PHIL 305 Communication Ethics	3.0

Corporate Communication concentration requirements

COM 260 WI Fundamentals of Journalism	3.0
COM 270 WI Business Communication	3.0
COM 280 Public Relations	3.0
COM 330 Professional Presentations	3.0
COM 370 WI Advanced Business Writing	3.0
COM 380 Special Studies in Communication Theory	3.0

Humanities/other program requirements

LING 101 Introduction to Linguistics MKTG 301 WI Introduction to Mktg Management	3.0 3.0 -5.0
or	
MKTG 311 Introduction to Marketing Management ORGB 300 Organizational Behavior PHIL 105 Critical Reasoning	3.0- 5.0 4.0 3.0
Literature elective (300-level)	3.0
Free electives	32.0-37.0

One of the following courses:

HIST 220 History of American Business	3.0
HIST 222 A History of Work and Workers in America	3.0
HIST 285 Technology in Historical Perspective	3.0
PSCI 330 Public Opinion and Propaganda	3.0
PSCI 335 Political Communication	3.0

One of the following courses:

PHIL 251 Ethics	3.0
PHIL301 Business Ethics	3.0
PHIL 311 Computer Ethics	3.0
PHIL 331 Philosophy and Public Policy	3.0

Two of the following courses:

FMVD 105 Fundamentals of Video Production	3.0
FMVD 125 Basic Television Studio	3.0
FMVD 210 Documentary Video Production	3.0
FMVD 225 Advanced Television Studio	3.0
FMVD 230 Basic Filmmaking	3.0
FMVD 270 Screenwriting I	3.0
FMVD 285 Writing for Non-Fiction Film	3.0
FMVD 330 Advanced Filmmaking	3.0
PHTO 110 Photography	3.0

B.S. in Communication: Corporate Communication

Degree Requirements: 182.0 credits

University requirements

ENGL 101 Expository Writing and Reading	3.0
ENGL 102 Persuasive Writing and Reading	3.0
ENGL 103 Analytical Writing and Reading	3.0
MATH 101 Introduction to Analysis I **or** MATH 121 Calculus I	4.0 4.0
MATH 102 Introduction to Analysis II **or** MATH 122 Calculus II	4.0 4.0
UNIV 101 The Drexel Experience	2.0

One of the following course sequences 8.0

BIO 102 Biology I: Cells and Tissues BIO 104 Biology II: Growth and Heredity	4.0 4.0
or	
CHEM 101 General Chemistry I CHEM 102 General Chemistry II	4.0 4.0
or	
PHYS 103 General Physics I PHYS 104 General Physics II	4.0 4.0

College requirements

ANTH 101 Cultural Diversity **or** ANTH 110 The Human Past	3.0 3.0

COM 150 Mass Media and Society	3.0
ECON 201 Economics I	4.0
ECON 202 Economics II	4.0
HIST 140 Europe and the Modern World I	4.0
HIST 141 Europe and the Modern World II	4.0
ENGL 202 Romanticism to Modernism	3.0
ENGL 204 Post-Colonial Literature II	3.0
MUSC 130 Introduction to Music	3.0
PSCI 100 Introduction to Political Science	4.0
PSY 101 General Psychology	3.0
SOC 101 Introduction to Sociology	3.0
STAT 211 Quantitative Methods for Research I	4.0

One of the following courses:

HIST 201 US History to 1815	3.0
HIST 202 US History, 1815-1900	3.0
HIST 203 US History since 1900	3.0
PSCI 110 American Government	4.0

Communication core requirements

COM 111 Introduction to Corporate Communication	3.0
COM 150 Mass Media and Society	3.0
COM 210 Theory and Models of Communication	3.0
COM 220 Introduction to Communications Research	3.0
COM 230 Techniques of Speaking	3.0
COM 240 New Technologies in Communication	3.0
COM 340 Desktop Publishing	3.0
COM 491 Senior Project in Communication I	3.0
COM 492 Senior Project in Communication II	3.0
PHIL 305 Communication Ethics	3.0

Corporate Communication concentration requirements

COM 260 WI Fundamentals of Journalism	3.0
COM 270 WI Business Communication	3.0
COM 280 Public Relations	3.0
COM 330 Professional Presentations	3.0
COM 370 WI Advanced Business Writing	3.0
COM 380 Special Studies in Communication Theory	3.0

Humanities/other program requirements

LING 101 Introduction to Linguistics	3.0
MKTG 301 WI Introduction to Marketing Mgmt or MKTG 311 Introduction to Marketing Management	3.0 - 5.0
ORGB 300 Organizational Behavior	4.0
PHIL 105 Critical Reasoning	3.0
Literature elective (300-level)	3.0
Free electives	31.0-33.0

One of the following courses:

HIST 220 History of American Business	3.0
HIST 222 A History of Work and Workers in America	3.0
HIST 285 Technology in Historical Perspective	3.0
PSCI 330 Public Opinion and Propaganda	3.0
PSCI 335 Political Communication	3.0

One of the following courses:

PHIL 251 Ethics	3.0
PHIL301 Business Ethics	3.0
PHIL 311 Computer Ethics	3.0
PHIL 331 Philosophy and Public Policy	3.0

Two of the following courses:

FMVD 105 Fundamentals of Video Production	3.0
FMVD 125 Basic Television Studio	3.0
FMVD 210 Documentary Video Production	3.0
FMVD 225 Advanced Television Studio	3.0
FMVD 230 Basic Filmmaking	3.0
FMVD 270 Screenwriting I	3.0
FMVD 285 Writing for Non-Fiction Film	3.0

FMVD 330 Advanced Filmmaking	3.0
PHTO 110 Photography	3.0

B.A. in Communication: Global Journalism

Degree Requirements: 182.0 credits

University requirements

ENGL 101 Expository Writing and Reading	3.0
ENGL 102 Persuasive Writing and Reading	3.0
ENGL 103 Analytical Writing and Reading	3.0
UNIV 101 The Drexel Experience	2.0
Mathematics courses	6.0-8.0
Science courses	6.0-8.0

College requirements

Foreign language courses	8.0
Humanities and fine arts courses	12.0
International studies courses	6.0
Social and behavioral sciences courses	12.0
Studies in diversity	6.0

Communication core requirements

COM 111 Introduction to Corporate Communication	3.0
COM 150 Mass Media and Society	3.0
COM 210 Theory and Models of Communication	3.0
COM 220 Introduction to Communications Research	3.0
COM 230 Techniques of Speaking	3.0
COM 240 New Technologies in Communication	3.0
COM 340 Desktop Publishing	3.0
COM 491 Senior Project in Communication I	3.0
COM 492 Senior Project in Communication II	3.0
PHIL 305 Communication Ethics	3.0

Global Journalism concentration requirements

COM 260 WI Fundamentals of Journalism	3.0
COM 280 Public Relations	3.0
COM 300 WI Computer-Assisted Journalism	3.0
COM 360 International Communication	3.0
COM 380 Special Studies in Communication Theory	3.0
COM 380 Special Studies: Writing for the World Wide Web	3.0
COM 390 WI Global Journalism	3.0

Humanities/other program requirements

ANTH 312 Approaches to Intercultural Behavior	3.0
BLAW 340 International Business Law	4.0
ECON 342 Economic Development	4.0
FMVD 105 Fundamentals of Video Production	3.0
IAS 399 Interdisciplinary Independent Study	3.0
LING 101 Introduction to Linguistics	3.0
ENGL 202 WI Romanticism to Modernism	3.0
ENGL 260 Literature and Society or ENGL 325 Topics in World Literature	3.0
PHIL 105 Critical Reasoning	3.0
PSCI 150 International Politics or PSCI 255 International Political Economy	4.0
PSCI 340 Politics of Developing Nations	3.0
SOC 220 Wealth and Power or SOC 260 WI Classical Social Theory	3.0
Free electives	23.0-28.0

B.A. in Communication: Technical and Science Communication

Degree Requirements: 182.0 credits

University requirements

ENGL 101 Expository Writing and Reading	3.0
ENGL 102 Persuasive Writing and Reading	3.0
ENGL 103 Analytical Writing and Reading	3.0
MATH 101 Introduction to Analysis I	

or	
MATH 121 Calculus I	4.0
MATH 102 Introduction to Analysis II	
or	
MATH 122 Calculus II	4.0
UNIV 101 The Drexel Experience	2.0

One of the following course sequences

BIO 102 Biology I: Cells and Tissues	4.0
BIO 104 Biology II: Growth and Heredity	4.0
or	
CHEM 101 General Chemistry I	4.0
CHEM 102 General Chemistry II	4.0
or	
PHYS 103 General Physics I	4.0
PHYS 104 General Physics II	4.0

College requirements

ANTH 101 Cultural Diversity	3.0
or	
ANTH 110 The Human Past	3.0
COM 150 Mass Media and Society	3.0
CS 170 Computer Programming	3.0
ECON 201 Economics I	4.0
ECON 202 Economics II	4.0
HIST 140Europe and the Modern World I	4.0
HIST 141 Europe and the Modern World II	4.0
ENGL 202 Romanticism to Modernism	3.0
ENGL 204 Post-Colonial Literature II	3.0
MUSC 130 Introduction to Music	3.0
PSCI 100 Introduction to Political Science	4.0
PSY 101 General Psychology	3.0
SOC 101 Introduction to Sociology	3.0
STAT 111 Quantitative Methods for Research I	4.0

One of the following courses:

HIST 201 US History to 1815	3.0
HIST 202 US History, 1815-1900	3.0
HIST 203 US History since 1900	3.0
PSCI 110 American Government	4.0

Communication core requirements

COM 111 Introduction to Corporate Communication	3.0
COM 150 Mass Media and Society	3.0
COM 210 Theory and Models of Communication	3.0
COM 220 Introduction to Communications Research	3.0
COM 230 Techniques of Speaking	3.0
COM 240 New Technologies in Communication	3.0
COM 340 Desktop Publishing	3.0
COM 491 Senior Project in Communication I	3.0
COM 492 Senior Project in Communication II	3.0
PHIL 305 Communication Ethics	3.0

Technical and Science concentration requirements

COM 310 WI Technical Communication	3.0
COM 320 WI Science Writing	3.0
COM 330 Professional Presentations	3.0
COM 350 WI Message Design and Evaluation	3.0
COM 380 Special Studies in Communication Theory	3.0
COM 410 WI Advanced Technical Writing	3.0
COM 420 Technical Editing	3.0

Humanities/other program requirements

FMVD 105 Fundamentals of Video Production	
or	
FMVD 270 Screenwriting I	3.0
HIST 280 History of Science I	
or	
HIST 285 Technology in Historical Perspective	3.0
ISYS 110 Human-Computer Interaction	3.0
LING 101 Introduction to Linguistics	3.0
ENGL 300 WI Literature and Science	3.0
PHIL 105 Critical Reasoning	3.0
PHIL 361 Philosophy of Science	3.0

Science electives	**8.0**
Free electives	**up to 27.0**

Minor in Communication

The minor in communication is a 24-credit curriculum designed to familiarize students with business issues and communication theory while providing training in print and electronic communication skills. The minor teaches students how organizations communicate effectively with the public and internally, including the media, customers, and employees. The minor thus provides a strong complement for majors that emphasize presentations, interpersonal skills, publicity, and marketing.

Required courses

COM 111 Principles of Corporate Communication	**3.0**
COM 210Theory and Models of Communication	**3.0**
COM 270 WI Business Communication **or** **COM 310 Technical Communication** **or** **COM 370 WI Advanced Business Writing*** **or** **COM 410 Advanced Technical Communication**	**3.0**
COM 280 Public Relations** **or** **COM 260 WI Journalism**	**3.0**
HIST 220 History of American Business **or** **PHIL 305 Communication Ethics**	**3.0**
One audiovisual skills course	**3.0**
Electives* **	**6.0**

***Students who take one of these courses for their major must take the other for the minor.**
****Or a comparable course approved by the director of the corporate communication program.**
*****Two courses from the communication curriculum.**

Minor in Anthropology

The anthropology minor provides students in other fields with a cross-cultural awareness that will enable them to interact with a variety of people in a wide range of situations. By giving students a respect for and understanding of the basis of cultural variation, the minor can facilitate working in international settings. Even for students working within the United States, anthropology offers increased sensitivity to ethnic and population diversity. Medicine, law, counseling, nursing, and nutrition are only a few of the fields in which clients and professionals may come from different parts of our heterogeneous society.

Required courses

ANTH 101 Cultural Diversity	**3.0**
ANTH 110 The Human Past	**3.0**
ANTH 210 Worldview: Science, Religion, Magic	**3.0**
ANTH 410 Cultural Theory	**3.0**

Four of the following courses:

ANTH 120 Biblical Archaeology	**3.0**
ANTH 212 Topics in World Ethnography	**3.0**
ANTH 220 Aging in Cross-Cultural Perspectives	**3.0**
ANTH 310 Societies in Transition	**3.0**
ANTH 312 Approaches to Intercultural Behavior	**3.0**
ANTH 380 Special Topics: Ethnographic Methods	**3.0**
SOC 230 Women and Men in a Changing Society	**3.0**
SOC 330 Developing Nations	**3.0**

Criminal Justice

Issues of crime and justice affect every individual at some point in their lives if only as tax- paying citizens and voters. Criminal justice legislation, policy and decision-making and matters of community safety and well being require well-educated professionals to administer, legislate, communicate, and implement the work of the criminal justice system. Students in Drexel's criminal justice program will be well prepared to assume these roles and responsibilities.

About the Curriculum

The required courses provide the essential foundation for further study in the various areas of criminal justice. Students will acquire theoretical and methodological skills as well as courses in written and oral communication so necessary for professional careers in this field. The students in Drexel’s criminal justice program will also have a robust foundation in statistics, and computer applications. Additional required courses focus on the areas of forensic sciences, law and political and social sciences.

Program Goals

The goals for the criminal justice program include the following:

- To provide academic course work and supervised field experiences to prepare its graduates for a wide variety of careers in criminal justice.
- To provide excellent preparation for students planning to enter the study of law and law-related programs at the graduate level. Students interested in careers in forensic studies will be well prepared by majoring in bioscience and biotechnology or chemistry with a minor in criminal justice.
- To provide a strong foundation in theory and research as well as experiential learning opportunities primarily through structured internships, site visits and interaction with visiting guest professionals.

B.S. in Criminal Justice

Degree Requirements: 182.0 credits

University requirements

UNIV 101 The Drexel Experience	2.0
ENGL 101 Expository Writing and Reading	3.0
ENGL 102 Persuasive Writing and Reading	3.0
ENGL 103 Analytical Writing and Reading	3.0

One of the following math sequences:

MATH 101 Introduction to Analysis I	4.0
MATH 102 Introduction to Analysis II	4.0
or	
MATH 121 Calculus I	4.0
MATH 122 Calculus II	4.0

One of the following science sequences:

BIO 102 Biology I: Cells and Tissues	4.0
BIO 104 Biology II: Growth and Heredity	4.0
or	
BIO 117 Bioscience III: Molecular and Cellular Genetics	5.5
or	
CHEM 101 General Chemistry I	4.0
CHEM 102 General Chemistry II	4.0

College requirements

ANTH 101 Cultural Diversity	3.0
CS 161 Introduction to Computing	3.0
COM 150 Mass Media and Society	3.0
PSCI 100 Introduction to Political Science	4.0
PSY 101 General Psychology	3.0
SOC 101 Introduction to Sociology	3.0
Economics elective	4.0
Fine arts elective	3.0
History electives	6.0
Philosophy elective	3.0

One of the following English sequences:

ENGL 201 Renaissance to the Enlightenment	3.0
ENGL 202 Romanticism to Modernism	3.0
or	
ENGL 203 Post-Colonial Literature I	3.0
ENGL 204 Post-Colonial Literature II	3.0

Criminal Justice Core Requirements
Justice Sequence:

SOC 115 Social Problems	3.0
SOC 204 Criminology	3.0
SOC 206 Criminal Justice	3.0
SOC 320 Sociology of Deviant Behavior	3.0
SOC 360 Juvenile Justice	3.0

Methods Sequence:

COM 220 Introduction to Communications Research	3.0
SOC 250 Research Methods I	3.0
SOC 364 Data Analysis I	3.0

Theory Sequence:

SOC 460 WI Contemporary Social Theory	3.0
COM 210Theory and Models of Communication	3.0

Writing/Communication:

Students must take a minimum of two of the following courses:

COM 310 WI Technical Communication	3.0
COM 230Techniques of Speaking	3.0
COM 375 Grant Writing	3.0

Students select at least one, but no more than two, courses from the following:

SOC 210 Race and Ethnic Relations	3.0
COM 345 Intercultural Communication	3.0

or

ANTH 312 Intercultural Behavior	3.0

Other program requirements:

SOC 371 Criminal Justice Practicum	2.0 - 6.0
SOC 390 Internship in Criminal Justice	3.0 - 9.0
BLAW 342 Criminal Law	4.0
PSY 150 Introduction to Social Psychology	3.0
PSY 370 Forensic Psychology	3.0
PSCI 365 Politics, Law & Society	3.0
PHIL 330 Ethical Issues in Criminal Justice	3.0

Students select five of the following Sociology/Political Science electives:

SOC 120 Sociology of the Family	3.0
SOC 220 Wealth and Power	3.0
SOC 240 Urban Sociology	3.0
SOC 380 Special Topics in Sociology	3.0
PSCI 329 Theories of Justice	3.0
PSCI 360 The Constitution and the Judicial Process	3.0
PSCI 363 Civil Liberties	3.0

Minor in Criminal Justice

Students from any major who are interested in the law, legal issues and the forensic sciences may envision a future connection with the criminal justice system. These students could enhance their career possibilities by adding a minor in criminal justice to their major field of study.

The minor consists of four required courses and four criminal justice electives chosen from two categories, for a total of 24.0 credits. Students minoring in criminal justice are assumed to have already taken SOC 101, Introduction to Sociology.

Required courses

SOC 204 Criminology	3.0
SOC 206 Criminal Justice	3.0
SOC 360 Juvenile Justice	3.0
SOC 320 Deviant Behavior	3.0

Criminal Justice elective courses

Students select courses from the following two categories of criminal justice electives.

Category I: Students select at least one, but no more than two, courses from the following:

SOC 210 Race and Ethnic Relations	3.0
COM 345 Intercultural Communication or ANTH 312 Intercultural Behavior	3.0 3.0

Category II: Students select two to three courses from the following list to arrive at a minimum* of 24 .0 credits in total for the minor:

COM 355 Ethnography of Communication	3.0
COM 365 Journalists, the Courts, and the Law	3.0
SOC 115 Social Problems	3.0
SOC 120 Sociology of the Family	3.0
SOC 370 Practicum in Criminal Justice	2.0
SOC 390 Internships in Criminal Justice	3.0
SOC 380 Special Topics in Criminal Justice	3.0
PSCI 365 Politics, Law, and Justice	3.0
PSY 150 Introduction to Social Psychology	3.0
PSY 240 Abnormal Psychology	3.0
PSY 370 Forensic Psychology	3.0

*** Note: if the practicum and internship are selected in Category II, students will end-up completing 26.0 credits for the minor.**

English and Philosophy

Specifically designed to engage students in critical thinking and applied writing skills, the English major offers a wide-ranging curriculum on British, American and World literatures and stresses the cultural, historical and political contexts that shape and affect literary production. The Department of English and Philosophy also offers variety of courses on periods and genres; creative writing; and the

relationship between literature and the visual arts, science and technology.

B.A. in English

Degree Requirements: 182.0 credits

University requirements

ENGL 101 Expository Writing and Reading	3.0
ENGL 102 Persuasive Writing and Reading	3.0
ENGL 103 Analytical Writing and Reading	3.0
UNIV 101 The Drexel Experience	2.0
Two mathematics courses	6.0-8
Two science courses	6.0-8.0

College requirements*
Foreign language:

Any two (2) consecutive courses (completing level 201)	8.0

Humanities and fine arts: four (4) of the following:

ARTH 101 History of Art I: Ancient to Medieval	3.0
ARTH 102 History of Art II: Renaissance to Modern	3.0
ARTH 103 History of Art III: Early Modern to Postmodernism	3.0
FMVD 150 American Classic Cinema	3.0
MUSC 130 Introduction to Music	3.0
MUSC 231 WI Music History I	3.0
MUSC 232 Music History II	3.0
PHIL 101 Introduction to Philosophy	3.0
PHIL 105 Critical Reasoning	3.0
PHIL 121 History of Ideas	3.0
PHIL 231 Aesthetics	3.0
THTR 120 Introduction to Theatre	3.0

Social and behavioral sciences: four(4) of the following:

ANTH 101 Cultural Diversity	3.0
ANTH 210 Worldview: Science, Religion, Magic	3.0
COM 150 Mass Media and Society	3.0
HIST 161 Themes in World Civilization I	3.0
HIST 162 Themes in World Civilization II	3.0
HIST 163 Themes in World Civilization III	3.0
PSCI 120 History of Political Thought	4.0
PSY 101 General Psychology	3.0
PSY 120 Developmental Psychology	3.0
PSY 140 Approaches to Personality	3.0
SOC 101 Introduction to Sociology	3.0
SOC 115 Social Problems	3.0
SOC 120 Sociology of the Family	3.0

International studies: two (2) of the following courses

HIST 209 The US and Central America	3.0
HIST 259 History of Europe in the 19th Century	3.0
HIST 270 Introduction to Latin American History	3.0
MUSC 331 World Musics	3.0
PSCI 150 International Politics	4.0

Studies in diversity: two (2) of the following:

AFAM 101 Foundations African-American Experience	3.0
AFAM 201 African-American Aesthetics	3.0
SOC 210 Race and Ethnic Relations	3.0
HIST 212 Themes in African-American History	3.0
HIST 214 The Civil Rights Movement in the US	3.0
WMS 101 Introduction to Women's Studies	3.0
WMS 240 Women and Society in a Global Context	3.0
Any Judaic Studies course	3.0

Major requirements
Foundational and professional courses

ENGL 205 WI American Literature I	3.0
ENGL 206 WI American Literature II	3.0
ENGL 211 WI British Literature I	3.0
ENGL 212 British Literature II	3.0
ENGL 315 WI Shakespeare	3.0
ENGL 499 WI Senior Project in English	4.0

PHIL 381 WI Philosophy in Literature	3.0

Two (2) of the following:

ENGL 200 WI Classical to Medieval Literature	3.0
ENGL 201 Renaissance to the Enlightenment	3.0
ENGL 202 WI Romanticism to Modernism	3.0
ENGL 203 WI Post-Colonial Literature I	3.0
ENGL 204 Post-Colonial Literature II	3.0
ENGL 207 WI African American Literature	3.0

Three (3) of the following:

ENGL 214 Readings in Fiction	3.0
ENGL 215 WI Readings in Poetry	3.0
ENGL 216 WI Readings in Drama	3.0
WRIT 225 WI Creative Writing	3.0
WRIT 301 Writing Poetry	3.0
WRIT 304 Topics in Writing	3.0

Three (3) of the following:

ENGL 310 WI Period Studies	3.0
ENGL 320 WI Major Authors	3.0
ENGL 325 Topics in World Literature	3.0
ENGL 335 Mythology	3.0
ENGL 355 WI Women and Literature	3.0

One (1) of the following:

ENGL 490 (WI) Seminar in English/American Literature	4.0
ENGL 492 (WI) Seminar in World Literature	4.0

Two (2) of the following literature electives:

ENGL 305 WI The Mystery Story	3.0
ENGL 307 Literature of the Holocausts	3.0
ENGL 323 Literature and the Other Arts	3.0
ENGL 330 The Bible as Literature	3.0
ENGL 345 American Ethnic Literature	3.0
ENGL 350 Jewish Literature and Civilization	3.0
ENGL 360 WI Literature and Society	3.0
ENGL 395 WI Special Studies in Literature	3.0

Applied Writing and Communication
Four (4) of the following:

COM 260 WI Fundamentals of Journalism	3.0
COM 300 WI Computer-Assisted Journalism	3.0
COM 310 WI Technical Communication	3.0
COM 340 Desktop Publishing	3.0
FMVD 270 Scriptwriting I	3.0
FMVD 275 Scriptwriting II	3.0
ISYS 101 Introduction to Information Systems I	3.0
ISYS 102 Introduction to Information Systems II	3.0
WRIT 210 WI Writing/Peer Tutoring Workshop	3.0
WRIT 220 WI Creative Nonfiction Writing	3.0
WRIT 400 WI Writing in Cyberspace	4.0

Science and Technology in the Humanities
Four (4) of the following:

ENGL 300 WI Literature and Science	3.0
ENGL 303 Science Fiction	3.0
HIST 280 History of Science I	3.0
HIST 281 History of Science II	3.0
HIST 285 Technology in Historical Perspective	3.0
HIST 294 Technology in American Life	3.0
PHIL 311 Computer Ethics	3.0
PHIL 351 Philosophy of Technology	3.0
PHIL 361 Philosophy of Science	3.0

Free electives	27.0 - 33.0

*Substitutions of college requirements permissible only if approved by the Program Director.

Minor in English

The English minor provides students from other majors with a more intensive background in literature. Coursework in the minor exposes students to literature from a variety of periods, cultures and genres and also provides practice in critical thinking, literary analysis and writing. These courses enrich students' intellectual lives and provide them with skills that are valuable in a variety of professional situations.

Students complete 24.0 credits (8 courses), distributed as follows:

Three of the following survey courses:

ENGL 200 WI Classical to Medieval Literature	**3.0**
ENGL 201 Renaissance to the Enlightenment	**3.0**
ENGL 202 WI Romanticism to Modernism	**3.0**
ENGL 203 WI Post-Colonial Literature I:	**3.0**
ENGL 204 Post-Colonial Literature II:	**3.0**
ENGL 205 WI American Literature I	**3.0**
ENGL 206 WI American Literature II	**3.0**
ENGL 207 WI African American Literature	**3.0**
ENGL 211 WI British Literature I	**3.0**
ENGL 212 British Literature II	**3.0**

One of the following genre courses:

ENGL 214 Readings in Fiction	**3.0**
ENGL 215 WI Readings in Poetry	**3.0**
ENGL 216 WI Readings in Drama	**3.0**

Three of the following literature electives:

ENGL 300 WI Literature and Science	**3.0**
ENGL 310 WI Period Studies	**3.0**
ENGL 315 WI Shakespeare	**3.0**
ENGL 320 WI Major Authors	**3.0**
ENGL 325 Topics in World Literature	**3.0**
ENGL 335 Mythology	**3.0**
ENGL 355 WI Women and Literature	**3.0**

One of the following writing electives:

WRIT 220 Creative Nonfiction	**3.0**
WRIT 225 Creative Writing	**3.0**
WRIT 400 WI Writing in Cyberspace	**3.0**

NOTE: Where a course required for the minor is already required for a student's major, the student is directed to choose another English elective. Please note that substitutions are permissible at the discretion of the Program Director.

Minor in Philosophy

The minor in philosophy combines the rigor of traditional philosophical inquiry with an interest in practical contemporary problems. The emphasis, both in the structure of the course requirements and in content, is on a critical concern with actual issues and modes of reasoning in determining solutions. This focus serves Drexel University's mission of providing practical professional instruction. It will also serve students who seek employment in industry and business (employers have noted an interest in graduates trained in careful philosophical and logical analysis) as well as those applying to graduate school in the professions. Besides familiarity with professional issues, philosophically trained students score second only to mathematics majors on Graduate Record Examinations (GREs).

Students who have completed 30 credit hours at Drexel University may apply for the academic minor in Philosophy. The student will apply by completing the "Declaration of Minor" form available in the Office of Student Information and Records, and submitting it to the Director of the Program in Philosophy. Upon receipt of the "Declaration of Minor" form, the Director will review the student's academic record to ascertain that the student has completed the required number of credit hours and that he or she is in good standing at the University. Permission to undertake the Minor in Philosophy will require the approval of both the Director of the Program in Applied Philosophy and the Dean of the college in which the student is enrolled.

The Minor in Philosophy requires completion of 8 courses (24 credit hours) in philosophy, as follows:

Required courses

PHIL 101 Introduction to Philosophy	**3.0**
PHIL 105 Critical Reasoning **or** **PHIL 111 Beginning Logic**	**3.0**

PHIL 211 Metaphysics	3.0
PHIL 221 Epistemology	3.0
PHIL 251 Ethics	3.0

One of the following courses:	3.0
PHIL 301 Business Ethics PHIL 311 Computer Ethics PHIL 315 Engineering Ethics PHIL 305 Communications Ethics PHIL 321 Biomedical Ethics	

One of the following courses:	3.0
PHIL 231 Aesthetics PHIL 381 WI Philosophy in Literature PHIL 391 Philosophy of Religion	

One of the following courses:	3.0
PHIL 241 Social and Political Philosophy PHIL 351 Philosophy of Technology PHIL 361 Philosophy of Science PHIL 371 Philosophy of Social Sciences	

Environmental Science

Environmental science is a multidisciplinary field designed to 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. Solving some of our environmental problems also requires some knowledge of anthropology and agriculture as well as sociology, ethics, and economics.

B.S in Environmental Science

Degree Requirements: 185.5 credits

The program is designed to prepare students for careers in environmental science, environmental assessment, waste management, teaching, atmospheric science, environmental health, marine science, applied ecology, and biodiversity and conservation. Each student is required to complete the environmental core curriculum, listed below.

Required courses

BIO 114 Bioscience I: Growth of Organisms and Populations	5.5
BIO 115 Bioscience II: Organismal Physiology	5.5
BIO 117 Bioscience III: Molecular and Cellular Genetics	5.5
BIO 221 Microbiology or ENVR 324 Microbial Ecology	5.0 4.5
CHEM 101 General Chemistry I	4.0
CHEM 102 General Chemistry II	4.0
CHEM 103 General Chemistry III	5.0
CHEM 230 Quantitative Analysis	4.0
CHEM 231 WI Quantitative Analysis Laboratory	2.0
CHEM 241 Organic Chemistry	4.0
CHEM 242 Organic Chemistry II	4.0
CHEM 244 Organic Chemistry I Laboratory	3.0
EGEO 200 Physical Geology	3.0
ENVR 260 Environmental Science and Society I	3.0
ENVR 261 Environmental Science and Society I Lab	1.0
ENVR 262 WI Environmental Science and Society II	3.0
ENVR 263 Environmental Science and Society II Lab	1.0
ENVR 284 WI Ecology I: Physiological and Population	5.0
ENVR 286 WI Ecology II: Communities and Ecosystems	5.0
ENVR 310 Environmental Data Analysis	3.0
ENVR 316 Sanitary Microbiology	3.0
ENVR 342 WI Bioclimatology	3.0
ENVR 360 Environmental Movements in America	3.0
ENVR 460 Evolution	3.0
ENVR 480 Biostatistics	3.0
MATH 121 Calculus I	4.0
MATH 122 Calculus II*	4.0
MATH 123 Calculus III	4.0
PHEV 141 WI Atmospheric Science I	3.0
PHEV 142 WI Atmospheric Science I Laboratory	1.0
PHEV 441 Issues in Global Change I: Seminar	2.0
PHEV 442 Issues in Global Change II: Research	2.0

PHYS 111 Physics I	4.5
PHYS 112 Physics II	4.5
PHYS 211 Physics III	4.0

Humanities requirements

COM 310 WI Technical Communication	3.0
ECON 211 Principles of Economics I (Micro)	3.0
ECON 212 Principles of Economics I (Macro)	3.0
ENGL 101 Expository Writing and Reading	3.0
ENGL 102 Persuasive Writing and Reading	3.0
ENGL 103 Analytical Writing and Reading	3.0
UNIV 101 The Drexel Experience	2.0
Electives	9.0

In addition, each student selects 18 to 32 credits of specified courses in one of the following areas of specialization:

Atmospheric science

MATH 200 Calculus IV	4.0
MATH 201 Linear Algebra	4.0
PHEV 143 Atmospheric Science II	3.0
PHEV 144 WI Atmospheric Science II Laboratory	1.0
PHEV 346 Atmospheric Dynamics	3.0
PHEV 347 Atmospheric Physics and Remote Sensing	3.0

Biodiversity and conservation

CIVE 450 Urban and Regional Planning I	3.0
ENVR 338 Biodiversity and Conservation	3.0
PSCI 100 Introduction to Political Science	4.0
Animal diversity elective	3.0-5.0
Plant diversity elective	3.0-5.0
Environmental policy elective	3.0

Ecology

ENVR 330 Aquatic Ecology	3.0
ENVR 336 Terrestrial Ecology	5.0
ENVR 338 Biodiversity and Conservation	3.0
Animal diversity elective	3.0-5.0
Plant diversity elective	3.0-5.0

Environmental education

EDUC 310 Computer Applications in Teaching	3.0
EDUC 320 WI Professional Studies in Instruction	9.0
EDUC 322 Evaluation of Instruction	4.0
EDUC 323 WI Diagnostic Teaching	4.0
EDUC 324 Current Research in Curriculum and Instruction	3.0
EDUC 325 Multimedia in Instructional Design	3.0
EDUC 410 Student Teaching (serves as a co-op)	9.0
ENVR 338 Biodiversity and Conservation	3.0
Environmental science elective	3.0

Environmental health and safety

ENVR 321 Environmental Health	3.0
ENVR 331 Industrial Hygiene I	3.0
ENVR 332 Industrial Hygiene II	3.0
ENVR 333 Industrial Hygiene Laboratory	3.0
ENVR 431 Epidemiology	3.0
ENVR 436 Toxicology and Human Physiology	3.0

Environmental hydrology

CHE 311 Fluid Flow	3.0
CIVE 330 Hydraulics I	3.0
CIVE 430 Hydrology	3.0
EGEO 220 Engineering Geology	4.0
MATH 200 Calculus IV	4.0
MATH 201 Linear Algebra	4.0

Environmental policy

ECON 351 Resource and Environmental Economics	4.0
ENVR 365 Introduction to Environmental Policy Analysis	3.0
ENVR 370 Practice of Resource and Environmental Econ	3.0
PHIL 341 Philosophy of the Environment	3.0
PSCI 100 Introduction to Political Science	3.0
SOC 250 Research Methods I	3.0
SOC 260 WI Classic Social Theory	3.0
SOC 460 WI Contemporary Social Theory	3.0

Environmental technology

BIO 201 Human Physiology I	4.0
BIO 303 Biochemistry I	3.5
BIO 305 Biochemistry I Laboratory	2.0
BIO 307 Biochemistry II	3.5
CHEM 256 Physical Chemistry for Biological Sciences	4.5
ENVR 324 Microbial Ecology	4.5

Marine science

ENVR 330 Aquatic Ecology	3.0
ENVR 690 Marine Ecology	3.0
SEA Semester (off campus)	17.0

Marine science is a special program in cooperation with the Sea Education Association. Students have a unique opportunity to concentrate on deep-water oceanographic studies in Woods Hole, Massachusetts, and on a sailing vessel. Through the rigors of hands-on research and practical seamanship, students will collect and analyze data for an individual research project and obtain advanced knowledge of marine science. The shore component of the SEA semester consists of Maritime Studies, Oceanography, and Nautical Science. The sea component consists of Practical Oceanography I and II.

Additional electives are chosen according to the specialty area in consultation with the student's advisor to give a total of 75.5 credits in environmental science. Other

required or elective courses in the humanities, mathematics and other sciences, and general electives make up the total 188.5 credits required for the degree.

Field experience includes quantitative environmental measurements in local aquatic and terrestrial habitats, such as streams, lakes, the Delaware Bay, the Poconos, and the New Jersey Pine Barrens.

Students are required to consult frequently with their academic advisors for curriculum planning. Many of the graduate courses in environmental science are also open to qualified seniors who wish to become familiar with some of the applications in the field. Prerequisites and descriptions of available graduate courses appear in the graduate catalog.

Minor in Ecology

The minor in ecology meets the needs of engineering, science, arts, applied arts, information, and business students. The minor gives engineering students the ecology, atmospheric science, and chemistry needed for a working knowledge of environmental science. Economics is essential to this minor, since all regulations are now reviewed on a cost-benefit effectiveness basis before they are approved; cost-effectiveness is an essential part of any environmental action. The biodiversity and conservation course pulls all of the environmental information together in the context of the majors of the students in the course and allows students from different majors to interact as they will in the real world after graduation.

Required Courses

CHEM 241 Organic Chemistry I	4.0
ECON 212 Principles of Economics II (Macro)	3.0
ENVR 110 Environmental Biology	3.0
ENVR 111 Environmental Biology Laboratory	1.0
ENVR 284 WI Ecology I: Psychological and Population	5.0
ENVR 286 WI Ecology II: Communities and Ecosystems	5.0

One of the following sequences

PHEV 141 WI Atmospheric Science I	3.0
PHEV 142 WI Atmospheric Science I Laboratory	1.0
or	
CHEM 230 Quantitative Analysis	3.0
CHEM 231 WI Quantitative Analysis Laboratory	2.0

Minor in Environmental Health

The minor in environmental health offers practical course material to complement programs in nutrition, dietetics, biology, environmental science, and biomedical science. It could also complement some engineering disciplines, such as chemical engineering and biomedical engineering. The course selection gives students a significant introduction to the effect of various environmental factors—including intrinsic biological rhythms, pathogenic microbes, and toxic chemicals—on the health and well-being of people.

The minor requires a minimum of 24 credits. As many as 9 of these credits can be counted toward some majors, such as bioscience and environmental science.

Required courses

BIO 201 Human Physiology I	4.0
or	
ENVR 436 Toxicology and Physiology	3.0
BIO 221 Microbiology	5.0
or	
ENVR 316 Sanitary Microbiology	3.0
BMES 330 Biological Rhythms in Pharm and Toxicology	3.0
ENVR 321 Environmental Health	3.0
ENVR 331 Industrial Hygiene I	3.0
ENVR 332 Industrial Hygiene II	3.0
ENVR 431 Epidemiology	3.0
A statistics course	3.0

Possible electives:

BMES 380 The Medical and Biological Effects of Light	3.0
ENVE 335 Industrial Safety	3.0
ENVR 551 Industrial Hygiene Laboratory	3.0
ENVR 727 Risk Assessment	3.0
ENVR 736 Toxicology	3.0

Minor in Environmental Issues

The cross-cultural, interdisciplinary minor in environmental issues responds to the growing importance of environmental issues both in this country and in other major areas of the world. It offers in-depth study of issues about which future professionals will need to be well informed in order to operate effectively in the fields of diplomacy, government, politics, developmental policy, international business, and international trade.

The environmental issues minor requires a minimum of 24 credits, including a directed independent study and a minor thesis on environmental issues and public policy. There is also a prerequisite of 6 to 8 credits in environmental biology, ecology, and/or atmospheric science. The minor is administered through the Office of the Dean of the College of Arts and Sciences and is open to students in all disciplines.

History & Politics

The Department of History & Politics offers a major in history and politics as well as six minors.

In the major program, required courses in history introduce students to historical interpretations in the specific context of selected time periods, geographic areas, and themes. Introductory courses in political science expose students to the particular approaches and subject matter of the five recognized branches of the discipline. Research methods in history and political science, followed by research seminars during the junior and senior years, complete the core curriculum.

Beyond core introductory and seminar requirements, the department believes the most desirable curriculum offers students a wide degree of flexibility and independence. The curriculum plan permits students to design a course of study that reflects individual interest and meets a wide variety of pre-professional needs, such as pre-law or pre-civil service. This course of study is selected after close, continuing consultation with a faculty advisor chosen by the student or by the department head.

B.A. in History & Politics

Degree Requirements: 182.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
UNIV 101 The Drexel Experience 2.0
Two math courses 6.0-8.0
Two science courses 6.0-8.0

Foundation requirements
Two diversity electives 6.0
Two foreign language courses (must complete level 201) 8.0
Four humanities and arts electives 12.0
Four social science electives 12.0
Two international studies electives 6.0

Departmental requirements
HIST 161 Themes in World Civilization I 3.0
HIST 162 Themes in World Civilization II 3.0
HIST 163 Themes in World Civilization III 3.0
HIST 301 The Study of History 3.0
HIST 332 WI Junior Seminar in History 3.0
or
PSCI 470 WI Junior Seminar in Political Science
PSCI 120 History of Political Thought 4.0
PSCI 210 American Political System 4.0
PSCI 240 Comparative Government 3.0
PSCI 255 International Political Economy 4.0
PSCI 300 Research Methods in Political Science 4.0
Any History of Latin America, Africa, or Asia 3.0
History & Politics electives 30.0

Two of the following:
HIST 201 US History to 1815 3.0
HIST 202 US History, 1815-1900 3.0
HIST 203 US History since 1900 3.0

History & Politics senior sequence 6.0
HIST 490 WI Senior Seminar in History I 3.0
HIST 491 WI Senior Seminar in History II 3.0
or
PSCI 490 WI Senior Seminar in Political Science I 3.0
PSCI 491 WI Senior Seminar in Political Science II 3.0

Free electives 30.0- 34.0

B.S. in History & Politics

Degree Requirements: 182.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
UNIV 101 The Drexel Experience 2.0
Any 8-credit science sequence 8.0

Math sequence
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
or
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0

Foundation requirements
ANTH 101 Cultural Diversity 3.0
or
ANTH 110 The Human Past 3.0
COM 150 Mass Media and Society 3.0
ECON 201 Economics I 4.0
ECON 202 Economics II 4.0
HIST 140 Europe and the Modern World I 4.0
HIST 141 Europe and the Modern World II 4.0
ENGL 202 WI Romanticism to Modernism 3.0
ENGL 204 Post-Colonial Literature II 3.0
MUSC 130 Introduction to Music 3.0
PSY 101 General Psychology 3.0
SOC 101 Introduction to Sociology 3.0
PHIL 101 Introduction to Philosophy 3.0

or
PHIL 105 Critical Reasoning 3.0
Any 4-credit statistics course 4.0

Departmental requirements
HIST 161 Themes in World Civilization I 3.0
HIST 162 Themes in World Civilization II 3.0
HIST 163 Themes in World Civilization III 3.0
HIST 301 The Study of History 3.0
HIST 332 WI Junior Seminar in History 3.0
or
PSCI 470 WI Junior Seminar in Political Science
PSCI 120 History of Political Thought 4.0
PSCI 210 American Political System 4.0
PSCI 240 Comparative Government 3.0
PSCI 255 International Political Economy 4.0
PSCI 300 Research Methods in Political Science 4.0
Any History of Latin America, Africa, or Asia 3.0
History & Politics electives 30.0

Two of the following:
HIST 201 US History to 1815 3.0
HIST 202 US History, 1815-1900 3.0
HIST 203 US History since 1900 3.0

History & Politics senior sequence
HIST 490 WI Senior Seminar in History I 3.0
HIST 491 WI Senior Seminar in History II 3.0
or
PSCI 490 WI Senior Seminar in Political Science I 3.0
PSCI 491 WI Senior Seminar in Political Science II 3.0

Free electives 38.0

Minor in American Studies

American studies is an interdisciplinary approach to studying American life and culture. Drawing on the expertise and methodologies of a variety of subjects, American studies offers students the opportunity to examine their world critically and understand their place in it. American studies is an ideal minor for students planning for graduate work or professional careers in business, engineering, and law because it grounds these practical fields in a strong humanistic tradition.

Students are required to take 24 credits of coursework from the following categories:

One of the following:
HIST 104 Issues in US History to 1877 3.0
HIST 105 Issues in US History since 1877 3.0
HIST 201 US History to 1815 3.0
HIST 202 US History, 1815-1900 3.0
HIST 203 US History since 1900 3.0

Two of the following:
HIST 210 African-American History, 19th Century 3.0
HIST 211 African-American History, 20th Century 3.0
HIST 220 History of American Business 3.0
HIST 221 Labor in the Age of Technology 3.0
HIST 224 Women in American History 3.0
HIST 232 The American Revolution 3.0
HIST 234 US Civil War 3.0

PSCI 110 American Government* 4.0

Two of the following:
PSCI 310 American Political Parties and Pressure Groups 3.0
PSCI 313 State and Local Government 3.0
PSCI 330 Public Opinion and Propaganda 3.0
PSCI 360 Constitution and the Judicial Process 3.0
PSCI 363 Civil Liberties 3.0
PSCI 365 Politics, Law, and Justice 3.0

Two of the following:
ENGL 205 WI American Literature I 3.0
ENGL 206 WI American Literature II 3.0
ENGL 245 American Ethnic Literature 3.0
MUSC 336 History of Jazz 3.0
MUSC 338 WI American Popular Music 3.0
SOC 210 Race and Ethnic Relations 3.0

*** Or, if a History & Politics major, PSCI 110 may be substituted with a third course from the PSCI courses listed.**

Minor in European Studies

This minor provides students with exposure to the historical, political, social, and cultural development of European civilization. The program focuses on the modern period, but students gain an awareness of the deep historical roots and currents on which the modern experience has been built.

Students are required to take 24 credits of coursework from the following categories:

One of the following course sequences

HIST 140 Europe and the Modern World I 4.0
HIST 141 Europe and the Modern World II 4.0
PSCI 120 History of Political Thought 4.0
or
HIST 140 Europe and the Modern World I 4.0
HIST 141 Europe and the Modern World II 4.0
PSCI 140 Introduction to Comparative Political Analysis 4.0
or
HIST 141 Europe and the Modern World II 4.0
PSCI 120 History of Political Thought 4.0
PSCI 140 Introduction to Comparative Political Analysis 4.0
or
HIST 162 Themes in World Civilization II 3.0
HIST 163 Themes in World Civilization III 3.0
PSCI 120 History of Political Thought 4.0
or
HIST 162 Themes in World Civilization II 3.0
HIST 163 Themes in World Civilization III 3.0
PSCI 140 Introduction to Comparative Political Analysis 4.0

Three of the following:
HIST 235 The Great War, 1914-1918 3.0
HIST 236 World War II 3.0
HIST 241 Modern France 3.0
HIST 242 Modern Italy 3.0
HIST 243 Germany and the World of Hitler 3.0
HIST 244 20th-century Russia and the USSR 3.0
HIST 247 Modern England, 1815 to Present 3.0
HIST 251 Fascism 3.0
HIST 252 Europe between Wars, 1919-1939 3.0

One of the following:
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
ENGL 200 WI Classical to Medieval Literature 3.0
ENGL 201 Renaissance to the Enlightenment 3.0
ENGL 202 WI Romanticism to Modernism 3.0
ENGL 250 Themes in Literature and the Arts 3.0
ENGL 310 WI Period Studies 3.0
ENGL 315 WI Shakespeare 3.0
MUSC 231 WI Ancient, Medieval, and Renaissance Music 3.0
MUSC 233 Music of the Baroque Era 3.0
MUSC 235 WI 18th- and 19th-century Music 3.0
MUSC 237 20th-century Music 3.0

Minor in History

Students are required to take 24 credits of coursework from the following categories:

One of the following history sequences:

HIST 140 Europe and the Modern World I 4.0
HIST 141 Europe and the Modern World II 4.0
or
HIST 161 Themes in World Civilization I 3.0
HIST 162 Themes in World Civilization II 3.0
HIST 163 Themes in World Civilization III 3.0
or
HIST 167 Twentieth-century World I 3.0
HIST 168 Twentieth-century World II 3.0
or
HIST 201 US History to 1815 3.0
HIST 202 US History, 1815-1900 3.0
HIST 203 US HIstory since 1900 3.0

History & Politics electives 15.0-18.0

Minor in Political Science

Students are required to take 24 credits of coursework from the following categories:

Three of the following:
PSCI 100 Introduction to Political Science 4.0
PSCI 110 American Government 4.0
PSCI 120 History of Political Thought 4.0
PSCI 140 Introduction to Comparative Political Analysis 4.0
PSCI 150 International Politics 4.0
PSCI 300 Research Methods in Political Science 4.0

Four of the following:
PSCI 240 Comparative Government 3.0
PSCI 255 International Political Economy 4.0
PSCI 270 Problems of Ind. Liberty vs. Govern. Authority 3.0
PSCI 310 American Political Parties and Pressure Groups 3.0
PSCI 313 State and Local Government 3.0
PSCI 315 Public Administration 3.0
PSCI 317 Legislative Behavior 3.0
PSCI 319 Executive Behavior 3.0
PSCI 327 Democratic Theory 3.0
PSCI 329 Theories of Justice 3.0
PSCI 330 Public Opinion and Propaganda 3.0
PSCI 340 Politics of Developing Nations 3.0
PSCI 345 Comparative Politics of the Middle East 3.0
PSCI 355 American Foreign Policy 3.0
PSCI 358 Political Economy of Japan 3.0
PSCI 360 The Constitution and the Judicial Process 3.0
PSCI 363 Civil Liberties 3.0
PSCI 365 Politics, Law, and Justice 3.0
PSCI 370 Topics in Public Policy 3.0

Minor in Science, Technology, and Human Affairs

This minor affords students the opportunity to obtain in-depth exposure to the political and social issues related to modern science and technology. The program provides knowledge and skills useful in many areas of professional employment or as preparation for graduate and professional study.

Students are required to take 24 credits of coursework from the following categories:

HIST 280 History of Science I 3.0
HIST 281 History of Science II 3.0

Three of the following:
HIST 220 History of American Business 3.0
HIST 285 Technology in Historical Perspective 3.0
HIST 290 Technology and the World Community 3.0
HIST 292 Technology in American Life 3.0
PSCI 371 Science, Technology, and Public Policy 3.0

Three of the following:
ANTH 210 Worldview: Science, Religion, Magic 3.0
ENGL 255 Women and Literature 3.0
ENGL 300 WI Literature and Science 3.0
PHIL 351 Philosophy of Technology 3.0
PHIL 361 Philosophy of Science 3.0
SOC 110 Sociology of the Future 3.0

Minor in World History and Politics

This minor introduces students to the historical and political development of societies beyond the American and European context. The 20th-century experiences of decolonization, modernization, and development in Africa,

Asia, Latin America, and the Islamic world are given special attention.

Students are required to take 24 credits as follows:

One of the following:
HIST 141 Europe and the Modern World II 3.0
HIST 163 Themes in World Civilization III 3.0
HIST 167 Twentieth-century World I 3.0
HIST 168 Twentieth-century World II 3.0

Two of the following:
HIST 238 The Vietnam War 3.0
HIST 263 The World and China 3.0
HIST 264 East Asia in Modern Times 3.0
HIST 270 WI Introduction to Latin American History 3.0
HIST 271 History of Mexico 3.0

Three of the following:
PSCI 150 International Politics 4.0
PSCI 240 Comparative Government 3.0
PSCI 323 Comparative Political Thought 3.0
PSCI 340 Politics of Developing Nations 3.0.
PSCI 345 Comparative Politics of the Middle East 3.0
PSCI 355 American Foreign Policy 3.0
PSCI 358 Political Economy of Japan 3.0

One course each from two of the following sequences:
ENGL 203 WI Post-Colonial Literature I 3.0
ENGL 204 Post-Colonial Literature II 3.0
ENGL 325 Topics in World Literature 3.0

ECON 340 International Business 3.0
ECON 342 Economic Development

ANTH 101 Cultural Diversity 3.0
ANTH 210 Worldview: Science, Religion, Magic
ANTH 310 Societies in Transition
SOC 330 Developing Nations International Division of Labor

MUSC 331 World Musics 3.0
Appropriate art course

International Area Studies

The Department of International Studies and Modern Languages offers both a B.A. and a B.S. in international area studies and minors in international area studies and in the seven languages—Chinese, French, German, Italian, Japanese, Russian, and Spanish—that it offers.

International area studies is a language-based interdisciplinary major designed to prepare students for careers in the international arena. It combines a comprehensive liberal arts background with a specialization in the politics, history, culture, and values of a major world area, as determined by the language or languages studied, and substantive coursework in international business, marketing, and economics. Area specializations include Asian studies, European studies, and Latin American studies.

Students majoring in the program study one or more languages as part of their area specialization, and they may qualify for the University's advanced-level Certification of Proficiency in their target language or languages. French, German, Italian and Spanish are the Western languages available; non-Western languages include Chinese, Japanese, and Russian. The major enrolls a number of students from abroad as well as students who lived or studied in Europe, Latin America, or Asia during high school.

Drexel Abroad programs give international area studies students the option of fall-term study programs in Brussels, Bonn, Berlin, Madrid, Paris, and London. The programs feature academic internships with national legislatures, the European Parliament, international law firms and nongovernmental service agencies, and multinational corporations. Drexel Abroad programs are also available in China, Japan, Russia, and Costa Rica.

B.A. in International Area Studies

Degree Requirements: 182.0 credits

University Requirements
CS 161 Introduction to Computing 3.0
UNIV 101 The Drexel Experience 2.0

One of the following humanities sequences:
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
or
ENGL 105 Honors Freshman English 3.0
ENGL 103 Analytical Writing and Reading 3.0
Literature elective 3.0

One of the following math sequences:
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
or
MATH 279 Special Topics: Fundamentals of Math 4.0
MATH 119 Math for Design 4.0

One of the following science sequences:
PHEV 141 WI Atmospheric Science I 3.0
PHEV 143 Atmospheric Science II 3.0
or
ENVR 260 Environmental Science and Society I 3.0
ENVR 262 WI Environmental Science and Society II 3.0
or
BIO 102 Biology I: Cells and Tissues 4.0
BIO 104 Biology II: Growth and Heredity 4.0
or
CHEM 111 General Chemistry I 4.0
CHEM 112 General Chemistry II 4.0

College of Arts & Sciences Requirements
ANTH 101 Cultural Diversity 3.0
ECON 201 Economics I 4.0
ECON 202 Economics II 4.0
HIST 161 Themes in World Civilization I 3.0
HIST 162 Themes in World Civilization II 3.0
HIST 163 Themes in World Civilization III 3.0
ENGL 202 WI Romanticism to Modernism* 3.0
ENGL 204 Post-Colonial Literature II * 3.0
or
ENGL 325 Topics in World Literature 3.0
PHIL 105 Critical Reasoning 3.0
PSCI 150 International Politics 4.0
PSY 101 General Psychology 3.0
SOC 250 Research Methods 3.0
SOC 260 WI Classical Social Theory 3.0

*** ENGL 325 or a literature course in a foreign language may be substituted for ENGL 202 or ENGL 204.**

Language Requirements
Students must demonstrate proficiency in a language appropriate to the area of study (European, Latin American or Asian). Students with fewer than 15 hours of college credit in that language must pass the Certification of Proficiency examinations offered by the department of International Studies and Modern Languages. Otherwise, the language requirement is to be completed as follows:

Students with no previous work in the language selected complete a minimum of 33 credits, including one course at the third year (300) level of language study or the equivalent.

Students who place above the beginning levels of study complete a minimum of 18 credits, including level 311 (for Western languages) or level 301 (for non-western languages) of language study or the equivalent.

Western languages: French, German, Italian, and Spanish
101-201 Reading, writing and, speaking levels I-IV
202-203 Advanced Conversation and Composition
311-313 Stylistics
332, 333 Literature
351, 353 Business and Professional
371, 471 Civilization
399, 499 Special Topics

Non-Western languages: Chinese, Japanese, and Russian
101-103 Reading, writing, and speaking levels I-III
201-203 Intermediate reading, writing, and speaking levels IV-VI
301-303 Advanced reading, writing, and speaking levels VII-IX
411 Stylistics
RUSS 499 Advanced Seminar in Russian Literature

Patterns of Civilization Requirements
Core Curriculum
IAS 359 Culture and Values 3.0
IAS 360 Civilization 3.0
WMST 240 Cross-Cultural Women's Studies 3.0

Area-specific courses and electives

Students select 15 credits from the following courses, with at least one course from each section.

English
ENGL 200 WI Classical to Medieval Literature 3.0
ENGL 201 Renaissance to the Enlightenment 3.0
ENGL 250 Great Themes in Literature II 3.0
ENGL 315 WI Shakespeare 3.0
ENGL 323 Literature and Other Arts 3.0
ENGL 325 Topics in World Literature 3.0
ENGL 330 The Bible as Literature 3.0
ENGL 335 Mythology 3.0
ENGL 360 WI Literature and Society 3.0
FREN 431 Special Studies in Advanced French Literature 3.0
GER 431 Special Studies in Advanced German Literature 3.0
ITAL 431 Special Studies in Advanced Italian Literature 3.0
SPAN 431 Special Studies in Advanced Spanish Literature 3.0
RUSS 431 Introduction to Russian Literature 3.0
Applied philosophy
PHIL 111 Beginning Logic 3.0
PHIL 203 History of Western Philosophy III 3.0
PHIL 231 Aesthetics 3.0
PHIL 241 Social and Political Philosophy 3.0
PHIL 251 Ethics 3.0
PHIL 301 Business Ethics 3.0
PHIL 331 Philosophy and Public Policy 3.0
PHIL 341 Philosophy of the Environment 3.0
PHIL 391 Philosophy of Religion 3.0
Music, art, and media
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
ARTH 495 Asian Art 3.0
COM 150 Mass Media and Society 3.0
MUSC 130 Introduction to Music 3.0

Historical, Social, and Political Framework Requirements
Core Curriculum: Students take each of the following courses

ANTH 312 Approaches to Intercultural Behavior 3.0
PSCI 243 Economic Geography 3.0
PSCI 367 International Law 3.0
SOC 330 Developing Nations and the International Division of Labor 3.0
or
ANTH 310 Societies in Transition 3.0

Area-specific courses and electives
Students select two courses from Area-Specific History and Politics, and one from each other section. Students select one additional elective course from any section.

Area-specific History & Politics
HIST 209 The U.S. and Central America 3.0
HIST 241 Modern France 3.0
HIST 242 Modern Italy 3.0
HIST 243 Germany and the World of Adolf Hitler 3.0
HIST 244 20th-Century Russia and the USSR 3.0
HIST 247 Modern England 3.0
HIST 248 History of Spain 3.0
HIST 251 Fascism 3.0
HIST 252 Europe Between the Wars, 1919-1939 3.0
HIST 263 The World and China 3.0
HIST 264 East Asia in Modern Times 3.0
HIST 270 WI Introduction to Latin American History 3.0

HIST 271 History of Mexico 3.0
PSCI 357 The European Union 3.0
PSCI 358 Political Economy of Japan 3.0
International social and Political systems
ANTH 210 Worldview: Science, Religion, Magic 3.0
ANTH 212 Topics in World Ethnography 3.0
ANTH 410 Cultural Theory 3.0
PSCI 323 Comparative Political Thought 3.0
PSCI 365 Politics, Law, and Justice 3.0
SOC 220 Wealth and Power 3.0
SOC 310 Political Sociology 3.0
SOC 435 Organization of American States 3.0
International Politics
HIST 235 The Great War: 1914-1918 3.0
HIST 236 World War II 3.0
HIST 238 The Vietnam War 3.0
HIST 252 Europe Between the Wars 3.0
HIST 290 Technology and the World Community 3.0
PSCI 240 Comparative Government 3.0
PSCI 245 Introduction to the 20th-Century Middle East 3.0
PSCI 255 International Political Economy 3.0
PSCI 345 Comparative Politics of the Middle East 3.0
PSCI 355 American Foreign Policy 3.0

Economic and Business Dimension Requirements
Core Curriculum: Students take each of the following courses

COM 270 WI Business Communication 3.0
or
COM 260 WI Fundamentals of Journalism 3.0
INTB 334 International Trade 3.0
PHIL 335 Global Ethical Issues 3.0

Business Sequence Option
Students take one of the following sequences. Students interested in international business careers are urged to take both sequences.

International Economics Sequence (at least two of the following)
ECON 301 Microeconomics 4.0
ECON 321 WI Macroeconomics 4.0
ECON 342 Economic Development 4.0
ECON 344 Comparative Economic Systems 4.0
International Marketing Sequence (at least two of the following)
ECON 340 WI International Business 3.0
INTB 332 WI Multinational Corporations 3.0
MKTG 301 WI Introduction to Marketing Management 5.0
MKTG 322 Advertising and Advertising Management 4.0
MKTG 351 Marketing for Nonprofit Organizations 4.0
MKTG 357 WI International Marketing 4.0
Electives 6.0-22.0 Credits

B.S. in International Area Studies

Degree Requirements: 182.0 credits

University Requirements
CS 161 Introduction to Computing 3.0
UNIV 101 The Drexel Experience 2.0

One of the following humanities sequences:
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
or
ENGL 105 Honors Freshman English 3.0
ENGL 103 Analytical Writing and Reading 3.0
Literature elective 3.0

One of the following math sequences:
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
or
MATH 279 Special Topics: Fundamentals of Math 4.0
MATH 119 Math for Design 4.0

One of the following science sequences:
PHEV 141 WI Atmospheric Science I 3.0
PHEV 143 Atmospheric Science II 3.0
or
ENVR 260 Environmental Science and Society I 3.0
ENVR 262 WI Environmental Science and Society II 3.0
or
BIO 102 Biology I: Cells and Tissues 4.0
BIO 104 Biology II: Growth and Heredity 4.0
or
CHEM 111 General Chemistry I 4.0
CHEM 112 General Chemistry II 4.0

College of Arts & Sciences Requirements
ANTH 101 Cultural Diversity 3.0
ECON 201 Economics I 4.0
ECON 202 Economics II 4.0
HIST 161 Themes in World Civilization I 3.0
HIST 162 Themes in World Civilization II 3.0
HIST 163 Themes in World Civilization III 3.0
ENGL 202 WI Romanticism to Modernism* 3.0
ENGL 204 Post-Colonial Literature II * 3.0
or
ENGL 325 Topics in World Literature 3.0
MUSC 331 World Musics 3.0
PHIL 105 Critical Reasoning 3.0
PSCI 150 International Politics 4.0
PSY 101 General Psychology 3.0
SOC 250 Research Methods 3.0
SOC 260 WI Classical Social Theory 3.0

*** ENGL 325 or a literature course in a foreign language may be substituted for ENGL 202 or ENGL 204.**

Language Requirements
Students must demonstrate proficiency in a language appropriate to the area of study (European, Latin American or Asian). Students with fewer than 15 hours of college credit in that language must pass the Certification of Proficiency examinations offered by the department of International Studies and Modern Languages. Otherwise, the language requirement is to be completed as follows:

Students with no previous work in the language selected complete a minimum of 27 credits, including one course at the third year (300) level of language study or the equivalent.

Students who place above the beginning levels of study complete a minimum of 15 credits, including level 311 (for Western languages) or level 301 (for non-western languages) of language study or the equivalent.

Western languages: French, German, Italian, and Spanish
101-201 Reading, writing and, speaking levels I-IV
202-203 Advanced Conversation and Composition
311-313 Stylistics
332, 333 Literature
351, 353 Business and Professional
371, 471 Civilization
399, 499 Special Topics

Non-Western languages: Chinese, Japanese, and Russian
101-103 Reading, writing, and speaking levels I-III
201-203 Intermediate reading, writing, and speaking levels IV-VI
301-303 Advanced reading, writing, and speaking levels VII-IX
411 Stylistics
RUSS 499 Advanced Seminar in Russian Literature

Patterns of Civilization Requirements
Core Curriculum
IAS 359 Culture and Values 3.0

Area-specific courses and electives
Students select 15 credits from the following courses, with at least one course from each section.

English
ENGL 200 WI Classical to Medieval Literature 3.0
ENGL 201 Renaissance to the Enlightenment 3.0
ENGL 250 Great Themes in Literature II 3.0
ENGL 315 WI Shakespeare 3.0
ENGL 323 Literature and Other Arts 3.0
ENGL 325 Topics in World Literature 3.0
ENGL 330 The Bible as Literature 3.0
ENGL 335 Mythology 3.0
ENGL 360 WI Literature and Society 3.0
FREN 431 Special Studies in Advanced French Literature 3.0
GER 431 Special Studies in Advanced German Literature 3.0
ITAL 431 Special Studies in Advanced Italian Literature 3.0
SPAN 431 Special Studies in Advanced Spanish Literature 3.0
RUSS 431 Introduction to Russian Literature 3.0
Applied philosophy
PHIL 111 Beginning Logic 3.0
PHIL 203 History of Western Philosophy III 3.0
PHIL 231 Aesthetics 3.0
PHIL 241 Social and Political Philosophy 3.0
PHIL 251 Ethics 3.0
PHIL 301 Business Ethics 3.0
PHIL 331 Philosophy and Public Policy 3.0
PHIL 341 Philosophy of the Environment 3.0
PHIL 391 Philosophy of Religion 3.0
Music, art, and media
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
ARTH 495 Asian Art 3.0
COM 150 Mass Media and Society 3.0
MUSC 130 Introduction to Music 3.0

Historical, Social, and Political Framework
Core Curriculum: Students take each of the following courses
PSCI 243 Economic Geography 3.0
PSCI 367 International Law 3.0
SOC 330 Developing Nations and the International Division of Labor 3.0
or
ANTH 310 Societies in Transition 3.0

Area-specific courses and electives
Students select two courses from Area-Specific History and Politics, and one from each other section. Students also select two additional elective courses from any section.
Area-specific History & Politics
HIST 209 The U.S. and Central America 3.0
HIST 241 Modern France 3.0
HIST 242 Modern Italy 3.0
HIST 243 Germany and the World of Adolf Hitler 3.0
HIST 244 20th-Century Russia and the USSR 3.0
HIST 247 Modern England 3.0
HIST 248 History of Spain 3.0
HIST 251 Fascism 3.0
HIST 252 Europe Between the Wars, 1919-1939 3.0
HIST 263 The World and China 3.0
HIST 264 East Asia in Modern Times 3.0
HIST 270 WI Introduction to Latin American History 3.0
HIST 271 History of Mexico 3.0
PSCI 357 The European Union 3.0
PSCI 358 Political Economy of Japan 3.0
International social and Political systems
ANTH 210 Worldview: Science, Religion, Magic 3.0
ANTH 212 Topics in World Ethnography 3.0
ANTH 410 Cultural Theory 3.0
PSCI 323 Comparative Political Thought 3.0
PSCI 365 Politics, Law, and Justice 3.0
SOC 220 Wealth and Power 3.0
SOC 310 Political Sociology 3.0
SOC 435 Organization of American States 3.0
International Politics
HIST 235 The Great War: 1914-1918 3.0
HIST 236 World War II 3.0
HIST 238 The Vietnam War 3.0
HIST 252 Europe Between the Wars 3.0
HIST 290 Technology and the World Community 3.0
PSCI 240 Comparative Government 3.0
PSCI 245 Introduction to the 20th-Century Middle East 3.0
PSCI 255 International Political Economy 3.0
PSCI 345 Comparative Politics of the Middle East 3.0
PSCI 355 American Foreign Policy 3.0

Economic and Business Dimension Requirements
Core Curriculum: Students take each of the following courses
COM 270 WI Business Communication 3.0
HIST 220 History of American Business 3.0
INTB 334 International Trade 3.0
PHIL 301 Business Ethics 3.0

Business Sequence Option
Students take all of the courses in one of the following sequences. Students interested in international business careers are urged to take both sequences.

International Economics Sequence
ECON 301 Microeconomics 4.0
or
ECON 321 WI Macroeconomics 4.0
ECON 342 Economic Development 4.0
ECON 344 Comparative Economic Systems 4.0

International Marketing Sequence
ECON 340 WI International Business 3.0
INTB 332 WI Multinational Corporations 3.0
MKTG 301 WI Introduction to Marketing Management 5.0
MKTG 357 WI International Marketing 4.0

Electives 9.0-24.0

Minor in International Area Studies

The minor requires 24 credits, 12 of which must be in a designated geographical area of focus as determined by the language studied.

Language study through level 201 is a prerequisite for the minor.

Core requirements
IAS 359 Culture and Values 3.0
PSCI 243 Economic Geography 3.0
INTB 334 International Trade 3.0
or
INTB 336 International Money and Finance 3.0
ECON 340 International Business 3.0
or
MKTG 357 WI International Marketing 4.0

Area studies electives 12.0

Language courses at level 312 and above and/or courses in literature, history, politics, social theory, and business in the area of specialization

Minors in Modern Languages

Minors in Chinese, French, German, Italian, Japanese, Russian, and Spanish are offered. All courses are oral-intensive, with additional hours required in the Language Laboratory, and include individual oral examinations at the end of each term.

In Western languages, enrollments are limited to 15 to 18 students in the first three years of study; fourth-year courses use a seminar format, with a usual enrollment of four to eight students. Chinese, Japanese, and Russian are taught in a tutorial or "self-instructional" format, with enrollments limited to three to six students. Examinations in these languages are primarily oral and are administered by external examiners appointed by the University. All instructors in Chinese, Japanese, and Russian and most instructors in Western languages are native speakers.

Language study is open to all students in the University, and validation of minimal language competence is required for co-operative education placement abroad in countries where English is not the national language. Study for two consecutive terms or through level 103 is the minimum requirement for the B.A. degree, but additional language course work is required by most departments offering this degree.

Students are placed in language courses in accordance with language placement testing administered during freshman orientation and at the beginning of the fall term. Students who do not take advantage of this option must comply with the department's enrollment guidelines.

Certification of Proficiency

The University offers an advanced-level Certification of Proficiency in Western language, based on successful completion of a series of written examinations and an "advanced" rating on the ACTFL oral examination.

Language Minors
Requirements, Western languages:
24 credits of language study above the 103 level 24.0

Certification of Proficiency
Minor thesis in the target language (3.0-4.0 credits possible)
Oral defense of the minor thesis

Course options (subject to placement level)
201-203 Advanced Conversation and Composition
311-313; 411 Stylistics; Advanced Stylistics
332; 333 Literature; Advanced Studies in Literature
351 Business and the Professions
451 Advanced Topics in Business and Professions: European Union
371; 471 Civilization; Advanced Studies in Civilization
399; 499 Special Topics: Literature; Business and Civilization*

***Special topics courses may be repeated for credit.**

Requirements, non-Western languages:
24 credits of language study above the 103 level 24.0
Minor thesis in the target language (3.0-4.0 credits possible)
Oral defense of the minor thesis

Course options (subject to placement level)
201-202 Advanced reading, writing, and speaking, Levels IV-VI
301-303 Stylistics, Levels VII-IX
RUSS 499 Advanced Seminar in Russian Literature

Mathematics

Mathematics is a discipline devoted to developing methods for analyzing and solving problems in science, engineering, computer science, and finance, among others. The mathematics major at Drexel, which emphasizes the theory and techniques of applied mathematics, can lead to a wealth of professional and educational opportunities beyond graduation. Applied mathematics focuses on applications of mathematical modeling to solve real-world problems.

Mathematics majors may choose a four-year internship program or a five-year co-operative education program. The program is flexible, and students are encouraged to study in related fields that complement their work in mathematics, such as actuarial science, decision sciences, statistics, economics, finance, or computer science. This enhances the student's career prospects and chances for academic success if graduate school is contemplated. In addition, students may obtain teacher certification while completing a full mathematics major.

Students interested in a dual major, a minor, or the four-year internship program should consult with their advisor or contact the Department of Mathematics.

About the curriculum
The major is built around a core curriculum and the choice of an area of specialization. The major is extremely flexible and students are able to tailor their studies toward particular career interests. Various computer technologies are available to solve mathematical problems.

After completing a core program in basic mathematics, the natural sciences, the humanities, and the social sciences, students elect upper-level courses to specialize in one of the six options described below:

Actuarial science
Actuaries determine the cost of assumed risks for future financial transactions and provide an evaluation of the results for their companies to use in making strategic management decisions. Professional opportunities exist in insurance, government agencies, banking, and other areas. This concentration provides excellent preparation for the first series of actuarial tests.

Economics and finance
This option prepares students to enter the business world with a strong quantitative background and a knowledge of economics and finance. Students prepare for career opportunities in banking, finance, and related fields or continue their education to obtain the MBA degree.

Probability and statistics
These fields involve mathematical techniques for the analysis and interpretation of mathematical models where there is uncertainty.
Government agencies, medical and pharmaceutical firms, insurance companies, and many other organizations require extensive use of statistical data and models for making policy and economic decisions.

Computational mathematics
The explosive growth of the computer industry has made the theory of computation one of the most rapidly developing areas of mathematics. Coursework emphasizes computational techniques, discrete mathematics, computer algebra systems, and optimization theory.

Industrial and applied mathematics
This track emphasizes applications of mathematical techniques and modeling to real-world problems in the sciences, engineering, and mechanics. Coursework includes both theoretical and numerical methods with an emphasis on problem solving.

Operations research
This field focuses on developing efficient methods and increasing productivity for operations of all sorts, from transportation scheduling to inventory management, from natural resource management to optimal resource allocation, from traffic control to control of power systems.

Graduate studies preparation
Graduate study in applied mathematics requires a rigorous background in theoretical and applied methods. This track emphasizes the core areas of mathematics essential for graduate study in one of the areas described above.

(In place of these options, students may choose a dual major in Mathematics and Computer Science, or Teacher Certification.)

B.S. in Mathematics

Degree Requirements: 182.5 credits

General education requirements
COM 310 WI Technical Writing 3.0
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
UNIV 101 The Drexel Experience 2.0
History elective 3.0
Humanities electives 9.0
Social sciences elective 3.0
Economics/history/social sciences electives 6.0
Free electives 30.0

Science requirements

BIO 102 Biology I: Cells and Tissues 4.0
CHEM 101 General Chemistry I 4.0
PHYS 111 Physics I 4.5

Mathematics requirements
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0

MATH 200 Calculus IV 4.0
MATH 201 Linear Algebra 4.0
MATH 210 Differential Equations 4.0
MATH 220 Techniques of Proof 3.0
MATH 221 Discrete Mathematics 3.0
MATH 300 Numerical Analysis 4.0
MATH 311 Probability and Statistics I 4.0
MATH 312 Probability and Statistics II 4.0
MATH 331 Abstract Algebra I 4.0
MATH 401 Elements of Modern Analysis I 3.0
MATH 402 Elements of Modern Analysis II 3.0
or
MATH 332 Abstract Algebra II
Two focus sequences* 12.0
Two mathematics programming courses 6.0**

***Focus sequences:**
MATH 321 Vector Analysis and MATH 322 Complex Variables
MATH 310 Numeric. Solut Differential Equations and MATH 323 Partial Differential Equations
MATH 305 Introduction to Optimization Theory and MATH 480 Graph Theory
MATH 480 Bio-informatics I and MATH 480 Bio-informatics II
MATH 319 Techniques of Data Analysis and MATH 480 Statistical Programming
MATH 480 Math of Finance I and MATH 480 Math of Finance II
MATH 480 Non-Parametric Statistics and MATH 480 Linear Regression

****See department for list of mathematics programming courses.**

Mathematics and applied fields
Additional math electives or applied fields electives (see department for list) 20.0

Computer science requirements (see department for optional courses)

CS 131 Computer Programming A 3.0
CS 132 Computer Programming B 3.0
CS 133 Computer Programming C 3.0

Minor in Mathematics

The minor in mathematics consists of a core requirement of six courses and at least 18 credits of electives from a specified group of mathematics courses, for a total of 41 credits. Please should consult the department for additional information.

Courses
MATH 121 Calculus I * 4.0
MATH 122 Calculus II* 4.0
MATH 123 Calculus III* 4.0
MATH 200 Calculus IV* 4.0
MATH 201 Linear Algebra* 4.0
Electives 18.0

***Or equivalent.**

Nutrition and Foods

Nutrition and foods includes the study of foods as nutrient sources and the role of nutrients for humans at the cellular, organ system, and complete human levels. Together with the composition, treatment, and metabolism of foods, this major emphasizes the relationship among nutrition, safety, and function of food components as they are affected by processing, production, and preservation, and by metabolic function. The regulatory, chemical, and microbiological aspects of foods are stressed.

The program in nutrition and foods requires four years of study, with 11 terms of classroom work and two terms of co-op experience. The curriculum is designed to provide a sound basis for careers in dietetics and the application of the principles of nutrition and food science to the nutritional care of individuals and groups—such as in school food service or community nutrition—or in the food and pharmaceutical industries. Students are prepared to work as dietitians in hospitals and nursing care facilities, or enter technical positions in food-product control and development, pharmaceutical and food-ingredient development and function, institutional food-service management, and other nutrition- and food-related service fields.

The study of the biochemical nature of nutrients and foods, their interaction with the environment, and their eventual metabolic fate is a strong career path for more research-minded students and provides a unique base for graduate study. The curriculum has been approved by the Council on Education Division of the Education Accreditation/Approval of the American Dietetic Association as a Didactic Program in Dietetics. With appropriate electives, it provides the premedical course recommended by leading medical schools.

Co-op/internship employment is an option for nutrition and foods students. The major offers two distinct plans:

Four-year option with co-op/internship experience: The degree includes one six-month and one three-month period of full-time employment. After the start of the sophomore year, students study or work through all terms, including summer.

Four-year option without co-op experience: The degree can be completed in four years without co-op/internship employment. Students are not required to pursue studies during any of the summer terms.

B.S. in Nutrition and Foods

Degree Requirements: 181.0 credits

Required Nutrition and Foods courses

NFS 101 Introduction to Nutrition and Foods 3.0
NFS 150 Foods I: Components and Properties 3.0
NFS 152 Foods II: Formulations and Interactions 3.0
NFS 200 WI Nutrition I: Principles of Nutrition 4.0
NFS 203 Nutrition II: Nutrition in the Life Cycle 4.0
NFS 265 Professional Issues in Nutrition and Foods 3.0
NFS 275 Quantity Foods I 3.0
NFS 276 Quantity Foods II 3.0
NFS 345 WI Foods and Nutrition of World Cultures 3.0
NFS 350 WI Experimental Foods: Product Development 3.0
NFS 365 WI Nutrition Laboratory: Food and Nutrient Analysis 4.0
NFS 371 Institutional Organization and Administration 3.0
NFS 373 Food Service Planning and Equipment Selection 3.0
NFS 391 WI Community Nutrition 4.0
NFS 415 Advanced Nutrition I: Macronutrients 4.0
NFS 416 Advanced Nutrition II: Micronutrients 4.0
NFS 431 Nutrition Counseling 4.0
NFS 443 Therapeutic Nutrition I 3.0
NFS 444 WI Therapeutic Nutrition II 3.0
NFS 445 Advanced Seminar in the Dietetics Profession 3.0
NFS 480 WI Senior Project I 2.0
NFS 480 WI Senior Project II 2.0
NFS 480 WI Senior Project III 2.0

Biological sciences courses
BIO 115 Bioscience II: Organismal Physiology 5.5
BIO 117 Bioscience III: Principles of Genetics 5.5
BIO 480 Human Anatomy and Physiology I 4.0
BIO 480 Human Anatomy and Physiology II 4.0
NFS 270 Microbial Food Safety and Sanitation 4.0
NFS 400 Nutritional Chemistry 3.0
NFS 404 WI Nutritional Chemistry Laboratory 1.0

Chemistry courses
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
CHEM 103 General Chemistry III 5.0

Mathematics/statistics/computing courses
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
STAT 201 Statistics I 4.0

Communications courses
COM 230 Techniques of Speaking 3.0
COM 310 WI Technical Communication 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0

Humanities and social sciences
ANTH 101 Cultural Diversity
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
PSY 101 General Psychology 3.0
PSY 230 Psychology of Learning
or
PSY 320 Educational Psychology 3.0
PSY 342 Counseling Psychology 3.0
UNIV 101 The Drexel Experience 4.0

Business courses
ACCT 111 Financial Accounting I 3.0
HRMT 323 Principles of Human Resource Administration 3.0
ORGB 300 Organizational Behavior 4.0

Free electives 9.0

Minor in Food Science

The minor in food science is designed for students interested in applying the basic sciences to the world's largest industry. The minor should be especially attractive to students in the premedical, chemical, and biological sciences, as it provides a background for excellent employment and post-baccalaureate study opportunities in areas closely allied to their basic disciplines.

The minor consists of 25 credits. Interested students should consult with a nutrition and foods faculty member to schedule courses appropriate for their background and goals.

Required courses
NFS 200 WI Nutrition I: Principles of Nutrition 4.0
NFS 203 Nutrition II: Nutrition in the Life Cycle 4.0
NFS 270 Microbial Food Safety and Sanitation 4.0
NFS 452 Microbiology and Chemistry of Food Safety 3.0
NFS 458 Nutritional Impact of Food Processing Methods 3.0
NFS 460 WI Food Chemistry 3.0
NFS 461 Food Chemistry Laboratory 4.0

Minor in Nutrition

The minor in nutrition is designed for students interested in enhancing their major with an application in human nutrition. The nutrition minor should be especially attractive to students in the premedical, biological, and behavioral neurological sciences, as it provides a background for enhanced employment and post-baccalaureate study opportunities in areas closely allied to their basic disciplines.

The minor consists of 25 credits. Interested students should consult with a nutrition and foods faculty member to schedule courses appropriate for their background and goals.

Required courses
NFS 200 WI Nutrition I: Principles of Nutrition 4.0
NFS 203 Nutrition II: Nutrition in the Life Cycle 4.0
NFS 415 Advanced Nutrition I: Macronutrients and Energy 4.0
NFS 416 Advanced Nutrition II: Micronutrients and Control 4.0

Three of the following:
NFS 101 Introduction to Nutrition and Foods 3.0
NFS 150 Foods I: Components and Properties 3.0
NFS 152 Foods II: Formulations and Interactions 3.0
NFS 345 WI Foods and Nutrition of World Cultures 3.0
NFS 391 WI Community Nutrition 4.0
NFS 431 Nutrition Counseling 4.0
NFS 443 Therapeutic Nutrition I 3.0
NFS 444 WI Therapeutic Nutrition II 3.0

Physics

The physics degree provides a sound basis either for entering graduate school or for pursuing a variety of industrial careers. The Laboratory for High-Performance Computational Physics is now in place, and courses allow students to become proficient in numerical techniques, parallel processing, electronic communication, and the basic computer languages and software relevant to advanced studies and research in physics and atmospheric science.

Virtually every course in the physics major has an associated computational component designed to extend the students' ability to handle real-world problems solved by state-of-the-art techniques. An important feature of the program is the large number of electives, which allow a student to pursue topics of special interest. There are elective sequences in biology for those preparing to enter biophysics or medicine and advanced topics for those interested in atomic, nuclear, solid-state, theoretical, or atmospheric physics. Students can also choose electives to meet teacher certification requirements

The Department of Physics exposes students to both traditional and more cutting-edge areas of 20th-century physics: astrophysics and general relativity; atomic physics; biological physics; condensed-matter physics, including superconductivity and nanotechnology; laser physics and quantum optics; nonlinear physics and chaos; nuclear physics; nuclear astrophysics; and particle and cosmic ray physics. Drexel also offers teacher certification as an additional option for physics students.

B.S. in Physics

Degree Requirements: 185.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
UNIV 101 The Drexel Experience 2.0
History of science elective 3.0
Liberal studies electives* 9.0
Business electives 6.0
Free electives 6.0

***It is strongly recommended that a student's liberal studies and/or free electives include COM 230 (Techniques of Speaking) and COM 310 WI (Technical Communication).**

Mathematics/computer science requirements
CS 170 Computer Programming I 3.0
CS 171 Computer Programming I 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
MATH 200 Calculus IV 4.0
MATH 201 Linear Algebra 4.0
MATH 210 Differential Equations 4.0

Chemistry requirements
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
BIO 102 Biology I: Cells and Tissues 4.0
or
CHEM 103 General Chemistry III 5.0

Physics requirements
PHYS 480 Special Topics: Contemporary Physics I 5.0
PHYS 480 Special Topics: Contemporary Physics II 5.0
PHYS 480 Special Topics: Contemporary Physics III 5.0
PHYS 105 Computational Physics I 3.0
PHYS 223 WI Modern Physics Laboratory 3.0
PHYS 226 WI Instrumentation for Scientists I 3.0
PHYS 305 Computational Physics II 3.0
PHYS 311 Classical Mechanics I 4.0
PHYS 312 Classical Mechanics II 4.0
PHYS 316 Thermodynamics 4.0
PHYS 317 Statistical Mechanics 3.0
PHYS 321 Electromagnetic Fields I 4.0
PHYS 322 Electromagnetic Fields II 4.0
PHYS 324 Topics in Mathematical Physics 3.0
PHYS 326 Quantum Mechanics I 4.0
PHYS 327 Quantum Mechanics II 4.0
PHYS 328 Advanced Laboratory 3.0
PHYS 408 Physics Seminar 3.0
PHYS 428 Quantum Mechanics III 3.0
PHYS 491 Senior Research I 3.0
PHYS 492 Senior Research II 3.0
PHYS 493 WI Senior Research III 3.0

Physics lab requirements 3.0 - 4.0
PHYS 227 WI Instrumentation for Scientists II 3.0
or
PHYS 306 Computational Physics Laboratory I 2.0
and
PHYS 307 Computational Physics Laboratory II 2.0

Topical course requirements 12.0
Physics majors must complete four (4)Topical courses designated by the Physics department. Advanced Computational Physics (Phys 405) will also satisfy a topical requirement. In Any course which is not explicitly in the department's roster of topical courses must be approved by the department head or director of undergraduate advising.

Topical courses
PHYS 431 Astrophysics I 3.0
PHYS 432 Astrophysics II 3.0
PHYS 480 Special Topics: Solid State Physics 3.0
PHYS 480 Special Topics: Nanoscience 3.0
PHYS 480 Special Topics: Biophysics 3.0
PHYS 480 Special Topics: Computational Biophysics 3.0
PHYS 480 Special Topics: Nonlinear Dynamics 3.0
PHYS 476 Nuclear and Particle Physics 3.0

In addition to these Topical course options, the Department of Physics will count any non-required course at the 400-level or higher (for example, PHYS 405 Advanced Computational Physics or PHYS 451 Quantum Structure of Materials), Special Relativity (taught at the 200-level in the Honors College), or directly appropriate advanced courses in related fields. The appropriateness of the latter is determined by obtaining a signed letter to that effect from the Physics Department's Director of Undergraduate Studies

Minor in Physics

A minor in physics requires a total of 37.5 credits from among the following courses:

PHYS 480 Special Topics: Contemporary Physics I 5.0
PHYS 480 Special Topics: Contemporary Physics II 5.0
PHYS 480 Special Topics: Contemporary Physics III 5.0
PHYS 311 Classical Mechanics I 4.0
PHYS 312 Classical Mechanics II 4.0
PHYS 321 Electromagnetic Fields I 4.0
PHYS 326 Quantum Mechanics I 4.0

Electives**
PHYS 305 Computational Physics II 3.0
PHYS 480 Special Topics: Nonlinear Dynamics 3.0
PHYS 322 Electromagnetic Fields II 4.0
PHYS 327 Quantum Mechanics II 4.0
PHYS 480 Special Topics: Principles of Laser Physics 3.0
PHYS 433 Topics in Astrophysics 3.0
PHYS 451 Quantum Structure of Materials 4.0
PHYS 476 Nuclear and Particle Physics 4.0

***PHYS 222 is preferred.**
****The remaining 10.5 credits must be taken at or above the 300-level. See the department for a full list of possible courses.**

Psychology

Psychology seeks the answers to a broad variety of questions regarding the behavior, thoughts, and emotions of individuals. These questions range from the biochemical basis of memory and the effects of stress on health to understanding the causes of emotional problems or such experiences as falling in love. These questions are studied by using scientific research techniques both in the laboratory and the “real” world. The answers are applied in fields such as business, the health sciences, law, education, counseling, and the design of useful and usable technologies.

One of the unique aspects available to Drexel psychology undergraduates is the co-operative education/internship programs, through which students mix periods of full-time, career-related employment with their academic studies. This allows students to have “hands on” experience in a variety of clinical settings throughout the Philadelphia metropolitan region, and makes them more competitive for employment after graduation. Another strength of the psychology program at Drexel is its emphasis on psychological statistics and research methodology. Psychology majors are well trained in data analysis and find employment opportunities in research and corporate settings more readily.

B.S. in Psychology

Degree Requirements: 182.0 credits

College/University requirements
CS 161 Introduction to Computing 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
or
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
PSCI 100 Introduction to Political Science 4.0
UNIV 101 The Drexel Experience 2.0
Economics elective 4.0
Fine arts elective 3.0
History electives 6.0
Philosophy elective 3.0

One of the following courses 3.0
ENGL 200 WI Classical to Medieval Literature
ENGL 201 Renaissance to the Enlightenment
ENGL 202 WI Romanticism to Modernism

One of the following courses 3.0
ENG 203 Post-Colonial Literature I
ENG 204 Post-Colonial Literature II
One of the following course sequences
BIO 102 Biology I: Cells and Tissues 4.0
BIO 104 Biology II: Growth and Heredity 4.0
or
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
or
PHYS 103 General Physics I 4.0
PHYS 104 General Physics II 4.0

Departmental requirements
General Psychology requirements
PSY 111 Preprofessional Psychology I* 3.0
PSY 112 Preprofessional Psychology II* 3.0
*** Students with AP psychology or transfer students with PSY 101 credit do not take the PSY 111and PSY 112 series, but use their approved credit and a 100-level Psychology elective to satisfy the general Psychology requirement.**

Sociology/Anthropology requirements
Any Sociology course 3.0
Any Anthropology course 3.0

Other courses
100-level requirements (Two of the following courses)
PSY 120 Developmental Psychology 3.0
PSY 140 Approaches to Personality 3.0
PSY 150 Introduction to Social Psychology 3.0

Required Psychology courses
PSY 212 Physiological Psychology 3.0
PSY 230 Psychology of Learning 3.0
PSY 240 Abnormal Psychology 3.0
PSY 260 Research Methods in Psychology 3.0
PSY 330 Cognitive Psychology 3.0
PSY 340 Psychological Testing and Assessment 3.0
PSY 360 Experimental Psychology 3.0
PSY 364 Computer-Assisted Data Analysis I 3.0
PSY 365 Computer-Assisted Data Analysis II 3.0
PSY 401 History and Systems 3.0

Advanced Psychology electives (Four of the following courses)
PSY 210 Comparative Psychology 3.0
PSY 213 Sensation and Perception 3.0
PSY 245 WI Sports Psychology 3.0
PSY 250 WI Industrial Psychology 3.0
PSY 252 Death and Dying 3.0
PSY 310 Drugs and Human Behavior 3.0
PSY 322 Advanced Developmental Psychology 3.0
PSY 332 Human Factors and Cognitive Engineering 3.0
PSY 337 The Psychology of Human-Computer Interaction 3.0
PSY 340 Psychological Testing and Assessment 3.0
PSY 342 Counseling Psychology 3.0
PSY 350 Advanced Social Psychology 3.0
PSY 410 Neuropsychology 3.0
PSY 440 Advanced Personality Seminar 3.0
PSY 442 Theories and Practice in Clinical Psychology 3.0

Senior seminar sequence*
PSY 490 Psychology Research Seminar I* 4.0
PSY 491 Psychology Research Seminar II* 4.0
PSY 492 Psychology Research Seminar III* 4.0
*** Students who do not wish to elect the research seminar sequence are required to take four additional advanced psychology electives instead.**

Minor in Human Factors and Ergonomics

The minor in human factors and ergonomics is intended to meet the needs of the students who have an interest in any type of design and who recognize the importance of taking account of human characteristics, both strengths and weaknesses, in the design of artifacts intended for human use (e.g., equipment, computer software, consumer products, and even entire work environments).

The minor should also be of particular interest to students who have an interest in doing graduate work in human factors, ergonomics, industrial design, etc.

Entry into the minor requires that General Psychology (or an equivalent introductory course) be taken as a prerequisite. Students who have completed PSY101 and who are interested in a minor in psychology are expected to meet with a Psychology Department faculty member to discuss the selection of appropriate courses. No more than three courses that are required for a student's major can count towards fulfilling requirements for the minor.

Required prerequisite
General Psychology course (PSY 101 or equivalent) 3.0

Required courses
PSY 212 Physiological Psychology 3.0
PSY 213 Sensation and Perception 3.0
PSY 250 WI Industrial Psychology 3.0
PSY 330 Cognitive Psychology 3.0
PSY 332 Human Factors and Cognitive Engineering 3.0
PSY 337 The Psychology of Human-Computer Interaction 3.0
PSY 360 Experimental Psychology 3.0

One additional course from the following:
BMES 330 Biological Rhythms in Pharm. and Toxicology 3.0
BMES 350 The Medical and Biological Effects of Light 3.0
BMES 411 Chronoengineering I: Biological Rhythms 3.0
BMES 412 Chronoengineering II: Sleep Functions 3.0
INTR 150 Issues of the Interior Environment 3.0
PSY 150 Introduction to Social Psychology 3.0
PSY 230 Psychology of Learning 3.0
PSY 310 Drugs and Human Behavior 3.0
PSY 340 Psychological Testing and Assessment 3.0
PSY 350 Advanced Social Psychology 3.0

Minor in Psychology

The minor in psychology is intended to meet the needs of students who recognize that an understanding and analysis of individual psychological processes is an important component of their education. The minor may also be of interest to students who have an interest in a double major but are unable to satisfy all of the requirements in two major fields.

Entry into the minor requires that General Psychology (or an equivalent introductory course) be taken as a prerequisite. Students who have completed PSY101 and who are interested in a minor in psychology are expected to meet with a Psychology Department faculty member to discuss the selection of courses appropriate to their major and their own personal interests. No more than three courses that are required for a student's major can count towards fulfilling requirements for the minor.

Required prerequisite
General Psychology course (PSY 101 or equivalent)

Required courses (Select eight of the following courses)

PSY 120 Developmental Psychology 3.0
PSY 140 Approaches to Personality 3.0
PSY 150 Introduction to Social Psychology 3.0
PSY 210 Comparative Psychology 3.0
PSY 212 Physiological Psychology 3.0
PSY 213 Sensation and Perception 3.0
PSY 230 Psychology of Learning 3.0
PSY 240 Abnormal Psychology 3.0
PSY 260 Research Methods in Psychology 3.0
PSY 330 Cognitive Psychology 3.0
PSY 340 Psychological Testing and Assessment 3.0
PSY 245 WI Sports Psychology 3.0
PSY 250 WI Industrial Psychology 3.0
PSY 252 Death and Dying 3.0
PSY 310 Drugs and Human Behavior 3.0
PSY 322 Advanced Developmental Psychology 3.0
PSY 332 Human Factors and Cognitive Engineering 3.0
PSY 337 The Psychology of Human-Computer Interaction 3.0
PSY 340 Psychological Testing and Assessment 3.0
PSY 343 Counseling Psychology 3.0
PSY 350 Advanced Social Psychology 3.0
PSY 360 Experimental Psychology 3.0
PSY 364 Computer-Assisted Data Analysis I 3.0
PSY 365 Computer-Assisted Data Analysis II 3.0
PSY 401 History and Systems 3.0
PSY 410 Neuropsychology 3.0
PSY 442 Theories and Practice in Clinical Psychology 3.0
PSY 480 Directed Studies in Psychology Variable

Sociology

Sociology is a broad discipline dealing with interpersonal behavior. It examines the behavior of social units as small as the family or two people riding an elevator and as large as a company, a city, a country, or the entire world. Because sociology critically examines “truths” frequently taken for granted, it does more than offer its own distinctive area of information. Training in sociology leads to a mode of critical thinking that enables one to push beyond established boundaries. Such a skill is invaluable in a wide range of professions.

Community-based research is done with and for community groups. It is research in which the community groups themselves help set the agenda of research questions so that the results are directly useful to them. It is a way through which the University as a whole can become more engaged with the wider community. Students play a central role in this approach. They go out into the community to acquire hands-on experience relating to their classroom work.

B.S. in Sociology

Degree Requirements: 182.0 credits

College/University requirements
CS 161 Introduction to Computing 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
ENGL 203 WI Post-Colonial Literature I
or
ENGL 204 Post-Colonial Literature II 3.0
MATH 101 Introduction to Analysis I
or
MATH 121 Calculus I 4.0
MATH 102 Introduction to Analysis II
or
MATH 122 Calculus II 4.0
PSCI 100 Introduction to Political Science 4.0
PSY 101 General Psychology 3.0
UNIV 101 The Drexel Experience 2.0
Economics elective 4.0
Fine arts elective 3.0
History electives 6.0
Philosophy elective 3.0

One of the following courses 3.0
ENGL 200 WI Classical to Medieval Literature
ENGL 201 Renaissance to the Enlightenment
ENGL 202 WI Romanticism to Modernism

One of the following course sequences 8.0
BIO 102 Biology I: Cells and Tissues 4.0
BIO 104 Biology II: Growth and Heredity 4.0
or
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
or
PHYS 103 General Physics I 4.0
PHYS 104 General Physics II 4.0

Free electives 40.0-46.0

Departmental requirements
ANTH 101 Cultural Diversity 3.0
ANTH 210 Worldview: Science, Religion, Magic 3.0
ANTH 370 Ethnographic Methods 3.0
ANTH 410 Cultural Theory 3.0
SOC 364 Computer-Assisted Data Analysis I 3.0
SOC 365 Computer-Assisted Data Analysis II 3.0
SOC 101 Introduction to Sociology 3.0
SOC 250 Research Methods I 3.0
SOC 260 WI Classical Social Theory 3.0
SOC 270 Theory of Applied and Community Sociology 3.0
SOC 350 Research Methods II 3.0
SOC 370 Practicum in Applied and Community Sociology 3.0-9.0
SOC 470 WI Social Change and Social Planning 3.0
SOC 490 Directed Studies: Sociology Research Seminar I* 4.0
SOC 491 Sociology Research Seminar II* 4.0
SOC 492 Sociology Research Seminar III* 4.0
Substantive sociology electives 24.0**

***Students who do not wish to elect the research seminar sequence are required to take four additional sociology electives.**

****Substantive electives**
ANTH 110 The Human Past 3.0
ANTH 120 Biblical Archaeology 3.0
ANTH 220 Aging in Cross-Cultural Perspective 3.0
ANTH 310 Societies in Transition 3.0
SOC 110 Sociology of the Future 3.0
SOC 115 Social Problems 3.0

SOC 120 Sociology of the Family 3.0
SOC 125 Sociology of the Aging 3.0
SOC 205 Criminology and Social Justice 3.0
SOC 210 Race and Ethnic Relations 3.0
SOC 215 Industrial Sociology 3.0
SOC 220 Wealth and Power 3.0
SOC 235 Sociology of Health 3.0
SOC 230 Women and Men in a Changing Society 3.0
SOC 240 Urban Sociology 3.0
SOC 245 Sociology of the Environment 3.0
SOC 320 WI Sociology of Deviant Behavior 3.0
SOC 330 Developing Nations 3.0
SOC 335 Sociology of Education I 3.0
SOC 336 Sociology of Education II 3.0
SOC 460 WI Contemporary Social Theory 3.0

Minor in Anthropology

The anthropology minor provides students in other fields with a cross-cultural awareness that will enable them to interact with a variety of people in a wide range of situations. By giving students a respect for and understanding of the basis of cultural variation, the minor can facilitate working in international settings. Even for students working within the United States, anthropology offers increased sensitivity to ethnic and population diversity. Medicine, law, counseling, nursing, and nutrition are only a few of the fields in which clients and professionals may come from different parts of our heterogeneous society.

Required courses

ANTH 101 Cultural Diversity	**3.0**
ANTH 110 The Human Past	**3.0**
ANTH 210 Worldview: Science, Religion, Magic	**3.0**
ANTH 410 Cultural Theory	**3.0**

Four of the following courses:

ANTH 120 Biblical Archaeology	**3.0**
ANTH 212 Topics in World Ethnography	**3.0**
ANTH 220 Aging in Cross-Cultural Perspectives	**3.0**
ANTH 310 Societies in Transition	**3.0**
ANTH 312 Approaches to Intercultural Behavior	**3.0**
ANTH 380 Special Topics: Ethnographic Methods	**3.0**
SOC 230 Women and Men in a Changing Society	**3.0**
SOC 330 Developing Nations	**3.0**

Minor in Sociology

The sociology minor is designed to give students specializing in other fields a broader knowledge of contemporary social issues and the ability to analyze them in a reasoned fashion. For students majoring in such fields as business and engineering, the minor helps develop skills in critical thinking that go beyond the acquisition of specialized, professional techniques. For students majoring in another area of the liberal arts, the minor offers the opportunity to place the issues raised in the major discipline within a larger social context.

Required courses
SOC 250 Research Methods I 3.0
SOC 260 WI Classical Social Theory 3.0
SOC 460 WI Contemporary Social Theory 3.0

Five of the following:
ANTH 220 Aging in Cross-Cultural Perspective 3.0
ANTH 310 Societies in Transition 3.0
SOC 110 Sociology of the Future 3.0
SOC 115 Social Problems 3.0
SOC 120 Sociology of the Family 3.0
SOC 125 Sociology of the Aging 3.0
SOC 205 Criminology and Social Justice 3.0
SOC 210 Race and Ethnic Relations 3.0
SOC 215 Industrial Sociology 3.0
SOC 220 Wealth and Power 3.0
SOC 225 Technology and Aging in Industrial Societies 3.0
SOC 230 Women and Men in a Changing Society 3.0
SOC 235 Sociology of Health 3.0
SOC 310 Topics in Political Sociology 3.0
SOC 320 WI Sociology of Deviant Behavior 3.0
SOC 330 Developing Nations/International Division of Labor 3.0
SOC 335 Sociology of Education and Literacy I 3.0
SOC 336 Sociology of Education and Literacy II 3.0
SOC 340 Working with the Older Adult 3.0
SOC 350 Research Methods II 3.0
SOC 470 WI Social Change and Social Planning 3.0

Unified Science

A growing number of careers require a strong foundation in science and mathematics, one that emphasizes a broad, balanced view rather than an intensive study of a single discipline. Patent attorneys, science writers and illustrators, textbook editors, and high school science and mathematics teachers are among those who require such a background.

The unified science major provides a strong grounding in science and mathematics. The foundation in chemistry, biology, physics, and mathematics, combined with electives, permits students adequate latitude to plan with an advisor a highly individualized program. Special requirements, such as courses for entrance to medical school or law school, should be identified as early as possible so they can be scheduled into the program.

Unified science students also complete a range of liberal arts requirements, and they have the opportunity to take a wide variety of electives in the sciences and other areas. Because of this flexibility, each student can develop a highly individualized program.

Unified science may be an appropriate choice for students preparing for professional studies in medicine, dentistry, veterinary medicine, law, or other areas. It is an ideal option for those who wish to combine science studies with another field, such as business or technical and science communication.

Because the major includes much flexibility in course scheduling, unified science students are able to complete one or two minors, or even a second major. Teacher certification is also available as a complement to the unified science major. Drexel offers certification in elementary education and secondary education (biology, chemistry, earth and space science, environmental education, general science, mathematics, or physics).

Students who are interested in the sciences but who aren't yet sure of a specific major should also explore the unified science option. The major allows these students to start their undergraduate studies while considering their interests in science and mathematics, bioscience and biotechnology, chemistry, computer science, environmental science, mathematics, nutrition and food science, and physics and atmospheric science. Unified science students may also take advantage of the University's offerings in the humanities and social sciences, business, design arts, engineering, and information science and technology.

B.S. in Unified Science

Degree Requirements: 185.5 credits

General education requirements

ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
MATH 200 Calculus IV 4.0
MATH 201 Linear Algebra 4.0
MATH 210 Differential Equations 4.0
UNIV 101 The Drexel Experience 2.0
Business electives 6.0
Computer programming 3.0
Liberal studies electives 12.0
Free electives 40.0

Science requirements
BIO 114 Bioscience I: Growth of Organisms and Populations 5.5
BIO 115 Bioscience II: Organismal Physiology 5.5
BIO 117 Bioscience III: Molecular and Cellular Genetics 5.5
BIO 254 Invertebrate Morphology and Physiology 5.0
BIO 256 Vertebrate Morphology and Physiology 5.0
BIO 303 Biochemistry I: Biomolecules 3.5
BIO 305 Biochemistry I Laboratory 2.0
BIO 307 Biochemistry II: Metabolism 3.5
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
CHEM 241 Organic Chemistry I 4.0
CHEM 242 Organic Chemistry II 4.0
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 211 Physics III 4.5
PHYS 212 Physics IV 4.0
PHYS 316 Thermodynamics 4.0
Science sequence 8.5
Science elective 8.0

Interdisciplinary Minors

Minor in African-American Studies

The minor in African-American studies was created to provide the opportunity for undergraduate students throughout the University to gain an understanding of and background in the history and cultures of peoples of African descent in North and South America, the Caribbean, and Africa. This interdisciplinary minor includes courses in anthropology, history, literature, music, political science, and sociology, and provides an opportunity for directed study in areas of particular interest to the students. The African-American studies minor has intrinsic intellectual value and helps prepare individuals to become contributors to an increasingly pluralistic society. At the same time, this minor allows students who plan vocations in business, the sciences, engineering, government, and social services to present to prospective employers a unique academic background that includes specialized knowledge in the history and cultures of African peoples.

Students are required to take 24 credits of coursework.

Required courses
AFAM 101 Foundations of the African-American Experience 3.0
AFAM 298 Independent Study: African-American Studies up to 6.0

Six of the following:
AFAM 201 African-American Aesthetics
AFAM 295 Special Topics
ANTH 212 Topics in Ethnography: Sub-Saharan Africa
ANTH 310 Societies in Transition: Modernization: Third World
DANC 350 Jazz Dance Technique
ENGL 245 American Ethnic Literature
ENGL 295 Special Studies in Literature
ENGL 325 Topics in World Literature: Modern African Literature
HIST 210 African-American History in the 19th Century
HIST 211 African-American History in the 20th Century
HIST 212 Themes in Afro-American History
HIST 213 History of Slavery in British Colonial America
HIST 214 Civil Rights Movement in the U.S.

HIST 279 in African, Asian, and Latin American History
MUSC 107 Jazz Ensemble and Combo
MUSC 333 African-American Music in the U.S.
MUSC 336 History of Jazz
PSCI 365 Politics, Law, and Justice
PSCI 573 Gender, Race, and Science*
SOC 210 Race and Ethnicity

***By permission only.**

The Louis Stein Minor in Judaic Studies

The Louis Stein Minor in Judaic Studies, housed within the College of Arts and Sciences, is designed to give students the opportunity to explore and understand the history, culture, politics, and religion of the Jewish people. Through interdisciplinary coursework and directed field study, students investigate the Jewish experience from both a contemporary and a historical perspective.

The Louis Stein Minor in Judaic Studies requires 24 credits: 9 from required courses, and 15 from electives. Students can apply a maximum of 6 credits toward the minor from field study under the supervision of the academic advisor. Currently, the required courses are as follows:

Required courses
ENGL 350 Jewish Literature and Civilization 3.0
HIST 298 Jewish Life and Culture in the Middle Ages 3.0
HIST 249 Modern Jewish History 3.0

Courses offered as electives have included: Contemporary Jewish Life, Introduction to Yiddish Culture, Israel: Language and Society, The Holocaust, A Thousand Years of Jewish Life Through Yiddish Literature, Jewish Ethical Literature, The American Jewish Experience, Language and Cultural Diversity in the USA, Jewish Spirituality and the Psychology of Happiness, Jewish Women in Literature and History, Biblical Narrative: Images of Leadership, Jewish Cultural Tapestry, Jewish American Writers, and Israeli Cinema.

Minor in Women's Studies

The minor in women's studies is intended to give students a broad, interdisciplinary understanding of the ways in which gender interacts with race, age, class, and sexual orientation to shape human consciousness and the social, political, and cultural organization of society. In addition, the minor is intended to enrich the educational experience of students. It may also provide both men and women with tools for understanding and coping with the larger societal systems in which they must operate as both students and professionals. Because business and industry are increasingly sensitive to issues such as sex discrimination, sexual harassment, equal pay for comparable work, parental leave, and day care, students with a minor in women's studies will have a definite edge over other applicants for managerial and policy-making positions. Students are required to take 24 credits.

Required courses
WMST 101 Introduction to Women's Studies 3.0
WMST 301 Seminar in Feminist Theory 3.0
Electives* 18.0
***Chosen from an approved list including departmentally cross-linked courses and WMST 201 (Special Topics) courses.**

Possible electives
ENGL 355 WI Women and Literature 3.0
HIST 223 Women and Work in America 3.0
HIST 224 Women in American History 3.0
HIST 286 Explore in Tech/Gender: World Without Women 3.0
HIST 586 Gender and Technology* 3.0
PSCI 573 Gender, Race, and Science* 3.0
PSY 480 WI Women and Health Psychology 3.0
SOC 230 Women and Men in a Changing Society 3.0
WMST 201 Special Topics in Women's Studies 3.0
WMST 299 Independent Study up to 6.0
***By permission only.**

The LeBow College of Business

The mission of the Bennett S. LeBow College of Business is to educate students for successful business and professional careers. At the undergraduate and master's levels, this objective is accomplished by providing high-quality educational programs that integrate theory and practice through a combination of academic coursework and complementary professional work experience. Our highly regarded co-operative education program, in which students interchange periods of academic study and full-time, off-campus employment with partner companies, sets us apart from other business schools. At the Ph.D. level, our programs provide both a rigorous understanding of the disciplines of business and the research skills that enable exploration and discovery of new knowledge within those disciplines.

The vitality of all our academic programs is maintained by the scholarship of the College's distinguished faculty. The College is committed to advancing the science and practice of management through basic, applied, and instructional research in the various disciplines of business.

The College and its faculty maintain strong connections to business professions and the community through participation in professional organizations, a commitment to community service, and dedication to providing opportunities for lifelong learning.

Drexel's LeBow College of Business--fully accredited by AACB-International--offers three distinct undergraduate major degrees and one minor in business administration.

The Bachelor of Science in Business Administration program is designed to prepare students for managerial positions in business and other institutions. To accomplish this, the undergraduate curriculum has the following characteristics and goals:

- An early exposure to the structure and functions of business enterprises
- The bridging of theory and concepts with professional practice
- The integration of material across disciplines within business as well as between business and other fields
- The enhancement of effective communication, problem-solving, and interpersonal skills
- Coverage of the ethical issues inherent in a business setting
- Coverage of the global, political, social, and legal/regulatory environment in which businesses operate
- Coverage of the impact of technology and technological changes on the operation of the business enterprise
- An emphasis on career preparation
- Opportunities for experiential learning through traditional co-op programs and other "hands-on" opportunities

The Bachelor of Science in Commerce and Engineering program has the same characteristics and goals as the Bachelor of Science in Business Administration, with the additional goal of providing students with foundation-level knowledge in engineering and science. The Commerce and Engineering program prepares students for managerial and administrative positions in any business organization, especially where competence in engineering science and technology is critical.

The Bachelor of Science in Economics program is designed to provide students with an understanding of the market system, as well as economic institutions, policies and development. In addition to this deep coverage of economics, the major includes liberal arts and sciences requirements. The program is flexible, allowing the student to customize the curriculum and choose areas of emphasis ranging from political economy to mathematical economics, as well as to select a coordinating field from other majors and minors at Drexel.

About the Curriculum

All business administration curricula require a minimum of 186 credits. All commerce and engineering curricula require a minimum of 187 credits. The courses in each curriculum may be grouped into three categories:

General Education
The liberal arts comprise 50 percent or more of total credits required. Courses in communications, economics, English, history, mathematics, natural science, political science, psychology, sociology, and statistics teach students to think effectively and to communicate ideas to others. In addition, they provide a good understanding of the economic, social, and political systems within which we live and business operates.

Common Body of Knowledge in Business
Courses in accounting, business strategy and social responsibility, finance, law, organizational behavior, management information systems, production management, and marketing introduce students to all the functional areas of business, the quantitative aspects of decision-making, and the behavioral factors common to all organizational structures.

Specialization
The curriculum permits a limited degree of specialization in a student-chosen area of concentration. The area of concentration and the common body of knowledge in business together comprise not more than 50 percent of the total credits required for graduation.

Writing-Intensive Course Requirements
In order to graduate, all students beginning with the entering class of 2002/01 (Fall 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid “clustering” these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term.

Co-operative Education
The five-year co-operative education programs consist of 12 terms in college and six terms in co-operative

employment. During the freshman year, students spend three terms in school (fall, winter, and spring) and have a summer vacation. For each of the next three years, students alternate two terms in school with two terms of co-op. The senior year consists of three terms in college with no co-operative employment.

The four-year co-operative education program consists of 12 terms in college and two terms in co-operative employment. The two terms of co-op experience take place in the third year.

The non–co-operative four-year program comprises 12 terms in school with vacations during the summers.

Special Programs
The College's Drexel in London Program offers flexible schedules for study abroad, ranging from six-week summer sessions to six-month (two-term) combined study and co-operative education programs in which students can earn up to 18 credits and fulfill one of their co-op requirements. The program's emphasis is on international business in general, with a particular focus on the United Kingdom and the European Union. Business course selections each year will be selected from the list of courses that constitute the international business concentration, but students in other concentrations may participate in the program. Housing is provided in South Kensington, one of central London's most desirable residential sections. Drexel in London applications are administered by the Study Abroad office, 215-895-1704.

Co-operative education, academic eligibility requirements, acceptance of transfer students, and placement services are described in detail in other sections of this catalog.

Students wishing to prepare for admission to professional schools may obtain pre-professional counseling from the Office of Pre-professional Programs, 215-895-2437.

The LeBow College of Business offers graduate work leading to the degrees of Master of Business Administration, Master of Science, and Doctor of Philosophy. Certificate programs are also offered. Undergraduate students may not enroll in graduate-level courses. For additional information, please contact the LeBow College of Business.

Business Administration

The co-operative four-year and five-year curricula in business administration offer a balanced program of general education, studies in the common body of knowledge, and an area of concentration in one or more of the functional fields of business. Students have the advantages of the co-operative education plan with alternating terms in industry and classes after the freshman year.

The course content of the non-co-operative four-year curriculum is the same as that of the five-year program. The curriculum is offered for those students who wish to complete their education in a four-year period without the benefits of co-op experiences.

Fields of Concentration
In selecting a field of concentration, students are encouraged to consult with their academic advisor and the department head of the field in which they are interested. Many students choose to enhance their educational experience by taking two concentrations.

There are nine fields of concentration currently offered:

Accounting
Economics
Finance
General Business
Human Resource Management
International Business
Management Information Systems
Marketing
Operations Management

B.S. in Business Administration

Degree Requirements: 187.0 credits

General education requirements
BIO 151 Applied Biology 3.0
CHEM 151 Applied Chemistry 3.0
COM 111 Principles of Communication 3.0
COM 270 WI Business Communication 3.0
CS 161 Introduction to Computing 3.0
HIST 162 Themes in World Civilization II 3.0
HIST 163 Themes in World Civilization III 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
PHIL 105 Critical Reasoning 3.0
PHYS 151 Applied Physics 3.0
PSY 101 General Psychology 3.0
ANTH 101 Cultural Diversity 3.0
or
SOC 101 Introduction to Sociology
UNIV 101 The Drexel Experience 2.0
English literature elective: (ENGL 200 through ENGL 300) 3.0
Non-business electives 17.0

One of the following political science courses:
PSCI 100 Introduction to Political Science 4.0
PSCI 110 American Government 4.0

PSCI 120 History of Political Thought 4.0
PSCI 140 Introduction to Comparative Political Analysis 4.0
PSCI 150 International Politics 4.0
PSCI 210 The American Political System 4.0
PSCI 255 International Political Economy 4.0

Business requirements
ACCT 115 Financial Accounting Foundations 5.0
ACCT 116 Managerial Accounting Foundations 5.0
BLAW 201 Business Law I 4.0
BLAW 202 Business Law II 4.0
BUSN 101 Foundations of Business I 3.0
BUSN 102 Foundations of Business II 3.0
ECON 201 Economics I 4.0
ECON 202 Economics II 4.0
FIN 301 Financial Management 5.0
MGMT 450 Business Policy and Social Responsibility 4.0
MGMT 451 Management Simulation 4.0
or
BUSN 444 WI Learning by DUing
MIS 300 Management Information Systems 4.0
MKTG 301 WI Introduction to Marketing Management 5.0
ORGB 300 Organizational Behavior 4.0
POM 300 WI Operations Management 4.0
STAT 201 Statistics I 4.0
STAT 202 Statistics II 4.0
Concentration/free electives 36.0

One of the following international business courses:
ACCT 336 Introduction to International Accounting 3.0
BLAW 340 International Business Law 4.0
ECON 340 WI International Business 3.0
FIN 346 Global Financial Management 3.0
INTB 332 WI Multinational Corporations 3.0
INTB 334 International Trade 3.0
INTB 336 International Money and Finance 3.0
MKTG 357 WI International Marketing 4.0

Minor in Business Administration

The minor in business administration is designed to provide some flexibility while at the same time assuring exposure to a number of critical business functional areas. Matriculated non-business students who have completed at least 30 credit hours and have a cumulative GPA of 2.0 may apply for an academic minor. Business students may not take the minor in business.

At least 24 credits (eight courses) are required to complete the minor. Under University policy, 9 credits (three courses) required by a student's major are permitted to count toward this total.

Part-time students may enroll in the business administration minor. All prospective students should meet with an advisor from the College as soon as possible. Call 215-895-2110 to set up an appointment.

Of the required credits and courses listed on the Application and Plan of Study form, certain courses are suggested by the College for this minor. However, to provide some flexibility, and to accommodate the restriction on courses that can count from those required by a student's major, additional courses are listed from which the minor can be constituted. The Application and Plan of Study form should be completed with the assistance of an advisor in the Dean's Office. These advisors are familiar with the College's requirements for the minor and with the University's general requirements for a minor field of study.

The Plan of Study can be changed, but only with prior approval of an advisor. This ensures that any change meets all of the requirements for the minor.

The Plan of Study is kept on file and compared to the student's record; a minor is granted only upon completion of the specific courses selected and acknowledged by the signatures on this form. A grade of C (2.0) or better must be earned in each course in the Plan of Study.

The only way to have the minor in business administration noted on a student's official transcript is to have an Application and Plan of Study approved prior to completing the requirements for the minor.

Students minoring in business administration are required to acknowledge all the constraints and conditions specified on the Application and Plan of Study. The minor in the LeBow College of Business is composed of a common body of knowledge in business administration, as opposed to a concentration in one specific business area. Therefore, business majors cannot minor in business, since their degree program is in business administration.

Required courses
ACCT 111 Financial Accounting* 3.0
BLAW 201 Business Law I*
or
Business law choice 4.0
ECON 201 Economics I* 4.0
or
ECON 211 Principles of Economics I (Micro) 3.0
ECON 202 Economics II 4.0
or
ECON 212 Principles of Economics II (Macro) 3.0
FIN 301 Introduction to Finance* 5.0
or
FIN 311 Financial Management 3.0
MIS 300 Management Information Systems 4.0
MKTG 301 WI Introduction to Marketing Management* 5.0
ORGB 300 Organizational Behavior* 4.0
POM 300 WI Operations Management* 4.0
or
POM 311 Management of Operations 3.0
STAT 201 Statistics I 4.0
STAT 202 Statistics II 4.0

***Recommended courses.**

Commerce and Engineering

The Commerce and Engineering degree is a powerful combination of technical skills with a business degree. Students enroll in the same general business courses and the same courses in their area of concentration as regular business students. In addition, they take courses in science, mathematics and engineering.

This program is designed primarily for students seeking to prepare for administrative positions in businesses where competence in engineering and science is important.

Four-year and five-year co-op programs, as well as a four-year non-co-op option, are available for the commerce and engineering major. The course content of the non-co-op curriculum is the same as that of the co-op program

B. S. in Commerce and Engineering

Degree Requirements: 188.0 credits

General education requirements
CS 170 Computer Programming 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
MATH 200 Calculus IV 4.0
MATH 201 Linear Algebra 4.0
PSY 101 General Psychology 3.0
UNIV 101 The Drexel Experience 4.0
Sociology elective: (SOC 101 through SOC 220) 3.0

One of the following:
PSCI 100 Introduction to Political Science 4.0
PSCI 110 American Government 4.0
PSCI 120 History of Political Thought 4.0
PSCI 140 Introduction to Comparative Political Analysis 4.0
PSCI 150 International Politics 4.0
PSCI 210 The American Political System 4.0
PSCI 255 International Political Economy 4.0

Science and engineering requirements
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
ECE 200 Fundamentals of Intelligent Systems 3.0
ECE 211 Electrical Engineering Principles 3.0
ECE 212 Electrical Engineering Principles Lab 1.0
MEM 201 Fundamentals of Computer-Aided Design 3.0
MEM 202 Engineering Mechanics: Statics 3.0
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 211 Physics III 4.5
TDEC 211 Materials I 3.0
TDEC 202 Energy II 3.0

Non-business elective* 3.0-5.0
***Science/engineering recommended.**

Business requirements
ACCT 115 Financial Accounting Foundations 5.0
ACCT 116 Managerial Accounting Foundations 5.0
BLAW 201 Business Law I 4.0
BLAW 202 Business Law II 4.0
BUSN 101 Foundations of Business I 3.0
BUSN 102 Foundations of Business II 3.0
ECON 201 Economics I 4.0
ECON 202 Economics II 4.0
FIN 301 Financial Management 5.0
MIS 300 Management Information Systems 4.0
MKTG 301 WI Introduction to Marketing Management 5.0
ORGB 300 Organizational Behavior 4.0
POM 300 WI Operations Management 4.0
STAT 205 Statistical Inference I 4.0
STAT 206 Statistical Inference II 4.0
Concentration/free electives 30.5.-32.5

One of the following:
BUSN 444 WI Learn by DUing 4.0
MGMT 450 Business Policy 4.0
MGMT 451 Management Simulation 4.0

Economics

The economics major is designed to provide students with an understanding of the market system, as well as economic institutions, policies and development. In addition to this deep coverage of economics, the major includes liberal arts and sciences requirements.

The program is flexible, allowing the student to customize the curriculum and choose areas of emphasis ranging from political economy to mathematical economics, as well as to select a coordinating field from other majors and minors at Drexel.

Four-year and five-year co-op programs, as well as a four-year non-co-op option, are available for the economics major. The course content of the non-co-op curriculum is the same as that of the co-op program.

B. S. in Economics

Degree Requirements: 187.0 credits

General education requirements
ANTH 101 Cultural Diversity 3.0
COM 270 WI Business Communication 3.0
or
COM 310 WI Technical Communication 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 101 Introduction to Math Analysis I 4.0
and
MATH 102 Introduction to Math Analysis II 4.0

or
MATH 121 Calculus I (recommended) 4.0
and
MATH 122 Calculus II (recommended) 4.0
PSY 101 General Psychology 3.0
SOC 101 Introduction to Sociology 3.0
UNIV 101 The Drexel Experience 4.0
Fine arts elective 3.0
Three laboratory science electives 9.0-12.0
Two English literature electives: (ENGL 200 through ENGL 300) 6.0
Two history electives 6.0-8.0
Two philosophy electives 6.0

One of the following:
CS 161 Introduction to Computing
CS 170 Computer Programming
CS 171 Computer Programming I

Professional requirements
ECON 201* Economics I 4.0
ECON 202* Economics II 4.0
ECON 301 Microeconomics 4.0
ECON 321 WI Macroeconomics 4.0
ECON 322 WI Economics Seminar 4.0
ECON 350 WI Applied Econometrics 4.0
INTB 334 International Trade 3.0
INTB 336 International Money and Finance 3.0
MATH 311 Probability and Statistics I 4.0
and
MATH 312 Probability and Statistics II 4.0
or
STAT 201 Statistics I 4.0
and
STAT 202 Statistics II 4.0
***ECON 211-212 may be substituted if the student has already taken 201 and 202 at the time of electing the major.**

Professional Electives (at least 20 credits from the following courses)
ECON 326 History of Economic Ideas 4.0
ECON 330 Managerial Economics 4.0
ECON 338 Industrial Organization 3.0
ECON 340 WI International Business 3.0
ECON 342 Economic Development 4.0
ECON 344 Comparative Economic Systems 4.0
ECON 348 Mathematical Economics 4.0
ECON 351 Resource and Environmental Economics 4.0
ECON 481 Special Topics in Economics .5 -12.0
ENVR 370 Environmental Economics 3.0
INTB 332 WI Multinational Corporations 3.0
FIN 301 Introduction to Finance 5.0
FIN 325 Money and Banking 4.0
SOC 240 Urban Sociology 3.0
SOC 260 WI Classical Social Theory 3.0

Additional Electives
Additional electives as required to satisfy a coordinating field (a second major or minor) and to meet the minimum requirement of 187.0 credits for the Bachelor of Science Degree.

Fields of Concentration

For any business majors, when selecting a field of concentration, students are encouraged to consult with their academic advisor and the department head of the field in which they are interested. Many students choose to enhance their educational experience by taking two concentrations.

There are nine fields of concentration currently offered:
Accounting
Economics
Finance
General Business
Human Resource Management
International Business
Management Information Systems
Marketing
Operations Management

Accounting Concentration

Accounting produces information for making decisions about organizations. The LeBow College of Business's accounting coursework is designed to provide basic conceptual accounting and business knowledge for careers in accounting and taxation in many settings. Courses cover accounting, auditing, tax preparation, and related topics.

The greatest range of career opportunities are in public, private and government accounting. Professional accountants are normally certified as public accountants (CPA) or managerial accountants (CMA) after passing professional examinations. Drexel's accounting concentration meets the education requirements needed in most states in order to sit for these exams. The University's co-op program provides an advantage to accounting students who plan to practice locally. Time spent working in co-op internship positions as a student is often accepted as part of the two years of accounting experience required for the Certified Public Accountant certificate in Pennsylvania and many other states.

Normally a student graduating with a concentration in accounting would qualify to sit for the CPA and CMA examinations. However, some states have specific requirements that may not be met by Drexel’s regular program. Interested students should contact the Department of Accounting at the beginning of the third year to ensure ample time to fulfill such requirements.

Students interested in pursuing a dual concentration in accounting and finance should contact the department heads.

Required courses

ACCT 321 Intermediate Accounting I 4.0
ACCT 322 Intermediate Accounting II 4.0
ACCT 323 WI Advanced Accounting 4.0
ACCT 331 Managerial Accounting II 4.0
ACCT 341 WI Principles of Auditing 4.0
TAX 341 Individual Income Taxes 4.0
TAX 342 Business Income Taxes 4.0

Recommended elective
BLAW 321 Law of Business Organizations 4.0

Economics Concentration

In conformity with current research in economics, Drexel's economics concentration places particular emphasis on developing student insight into the application of theory to the solution of specific problems.

For permission to substitute other courses for those listed, students should see the department head.

Required courses
ECON 301 Microeconomics 4.0
ECON 321 WI Macroeconomics 4.0
ECON 322 WI Economics Seminar 4.0

Plus two of the following
ECON 330 Managerial Economics 4.0
ECON 334 Introduction to Public Finance 4.0
ECON 336 Labor Economics 4.0
ECON 338 Industrial Organization 3.0
ECON 340 WI International Business 3.0
ECON 342 Economic Development 4.0
ECON 348 Mathematical Economics 4.0
ECON 350 WI Applied Econometrics 4.0
ECON 351 Resources and Environmental Economics 4.0
INTB 332 WI Multinational Corporations 3.0
INTB 334 International Trade 3.0
INTB 336 International Money and Finance 3.0

Finance Concentration

Throughout the finance curriculum, students develop and apply quantitative skills for financial decision making within the business environment.

The concentration prepares students for careers in private business firms, including positions involving forecasting and budgeting for financial resources, cost-effectiveness analysis, control of expenditures, evaluation and financing of new projects, and evaluation of alternative methods of financing; in the investment field, including positions in banks, brokerage houses, and financial institutions that participate in the various money and capital markets; and in the public sector, including positions at the federal, state, and local government levels.

Concentration requirements

All core mathematics and statistics courses should be completed before embarking on the finance concentration. Because of the relevance of financial accounting to the field of finance, it is strongly recommended that finance students complete ACCT 321 and ACCT 322 (Intermediate Accounting I and II) as two of their business electives.

Required courses
FIN 321 Investment Securities and their Markets 4.0
FIN 323 Risk Management 3.0
FIN 325 Money and Banking 4.0
FIN 327 Capital Budgeting 3.0
FIN 340 WI Seminar in Finance 4.0

One of the following courses
FIN 332 WI Investment Analysis 3.0
FIN 338 Money and Capital Markets 3.0
FIN 346 Global Financial Management 3.0
FIN 481 Special Topics in Finance 3.0-4.0

General Business Concentration

This option is provided for those students who do not want to specialize in any one area but want a more extensive exposure to all the various areas of business. The major courses and business electives should be selected from at least five of the following fields: accounting, economics, finance, international business, legal studies, management, marketing, and decision sciences.

The total credits for this concentration is 36.0 for business administration majors and 28.0 for commerce and engineering majors.

Human Resource Management Concentration

Human resource management focuses on issues involved with the "people" side of business—recruiting and hiring, salary and benefits, and so on. Drexel's program looks at human resources from the viewpoints of both industry and government.

Students develop an appreciation for the full utilization of all human resources by exploring such topics as labor law, corporate communication, counseling, industrial psychology and sociology, and race and ethnic relations.

Required courses
HRMT 321 Staffing in Organizations 4.0
HRMT 323 Principles of Human Resource Administration 3.0
HRMT 345 Seminar in Human Resource Management 3.0
PSY 250 WI Industrial Psychology 3.0
or
SOC 215 Industrial Sociology
Two of the following:
BLAW 334 Labor Law 4.0
BLAW 498 Employment Law 4.0
HRMT 330 Collective Bargaining 3.0
HRMT 498 Compensation and Benefits 3.0
POM 321 Planning of Production and Operations 4.0
POM 325 Control of Production and Operations 4.0
PSY 342 Counseling Psychology 3.0
SOC 210 Race and Ethnic Relations 3.0

International Business Concentration

The international business concentration explores the international business environment as well as the internal workings of international corporations and the impact of international considerations on the various functional areas of business.

This concentration must be taken in conjunction with another field of concentration within the LeBow College of Business.

Since half of all international business is conducted in English, foreign languages are not a required component of the program; however, students should strongly consider a second or even third language.

Required courses
Six of the following:
ACCT 336 Introduction to International Accounting 3.0
ANTH 312 Approaches to Intercultural Behavior 3.0
BLAW 340 International Business Law 4.0
ECON 322 WI Economic Seminar* 3.0
ECON 340 WI International Business 3.0**
ECON 342 Economic Development 4.0
ECON 344 Comparative Economic Systems 4.0
FIN 346 Global Financial Management 4.0
INTB 332 WI Multinational Corporations 3.0
INTB 334 International Trade 3.0
INTB 336 International Money and Finance 3.0
INTB 338 WI Economic Policy and International Business 3.0
MGMT 452 Global Management Strategy and Practices 3.0
MKTG 357 WI International Marketing 4.0

***The student should take this course only after completing all other requirements for the international business concentration.**
****Students who wish to take ECON 340, a survey course, should do so at the beginning of their concentration.**

Management Information Systems Concentration

The Management Information Systems (MIS) concentration prepares students for many opportunities in the information technology field and business. These inlude careers as managers of computer service units, or applications staff members supporting computer-using organizations. Aimed at producing graduates who bridge the gap between technical knowledge and business functions, the program focuses on a mix of applied computer systems content, interpersonal interaction, and a practical business orientation.

While administered by the Department of Management, the concentration in management information systems is interdisciplinary in nature. The courses may be taken by students in other colleges and departments who wish to complement other computer-related studies with business-oriented information systems subjects.

Drexel is a particularly exciting place to pursue any computer-oriented major. Drexel made history as the first university in the nation to require every student to have access to a personal computer. Today, Drexel's leadership continues with academic software development and major investments in the information infrastructure. Drexel University is a campus where computers are an integral part of all education, not just computer courses.

Required courses
MIS 341 Microcomputer Technologies for Business 3.0
MIS 342 Systems Analysis and Design 3.0
MIS 343 Database Design and Implementation 4.0
MIS 344 Networking Technologies for Business 4.0
MIS 345 Client/Server Computing for Business 3.0
MIS 359 Information Systems Seminar 3.0

Marketing Concentration

Marketing is one of the most dynamic areas of business because it focuses on satisfying the ever-changing wants and needs of people. Professional marketers research and identify target audiences, develop products and services, formulate pricing strategies, develop advertising and promotional campaigns, and implement methods of distribution so that customers receive products and services where and when they want them. Perhaps the most basic marketing skill is to be able to see your own organization's activities from the customer's viewpoint.

A concentration in marketing prepares students for the many opportunities that exist in product and brand management, marketing research, advertising, retailing, channel management, logistics and physical distribution, professional personal selling and sales management, purchasing, wholesaling, marketing planning and analysis, public relations, marketing entrepreneurship, and new-product development. In combination with the commerce and engineering curriculum, this concentration prepares students to fill marketing positions that require a technical background.

Required courses
MKTG 324 WI Marketing Channels and Distribution Systems 4.0
MKTG 344 Professional Personal Selling 4.0
MKTG 380 Seminar in Marketing Strategy 4.0
Track courses (see below) 8.0

Marketing Management Track
Two of the following:
MKTG 326 Marketing Research 4.0
MKTG 348 Services Marketing 4.0
MKTG 351 Marketing for Nonprofit Organizations 4.0
MKTG 353 Business-to-Business Marketing 4.0
MKTG 357 WI International Marketing 4.0

MKTG 358 Transportation and Logistics 4.0

Marketing Communications Track
Two of the following:
MKTG 321 Sales Management 4.0
MKTG 322 Advertising and Advertising Management 4.0
MKTG 352 Sales Promotion 4.0
MKTG 357 WI International Marketing 4.0
MKTG 356 Consumer Behavior 4.0

Marketing Analysis Track
Two of the following:
MKTG 326 Marketing Research 4.0
MKTG 347 Product Development and Marketing 4.0
MKTG 354 Database Marketing 4.0
MKTG 356 Consumer Behavior 4.0
MKTG 360 Multivariate Data Analysis for Marketers 4.0

Production Operations Management Concentration

Production operations management stresses a thorough knowledge of the rapidly accumulating analytical techniques in systems analysis, in addition to a full appreciation of all other phases of business.

With the proper choice of electives, this concentration also prepares students for graduate studies in industrial management, industrial engineering, management science, or operations research.

Required courses
POM 321 Planning of Production and Operations 4.0
POM 325 Control of Production and Operations 4.0
POM 331 Methods of Operations Research I 3.0
POM 335 Methods of Operations Research II 3.0
POM 341 Advanced Operations Planning and Control 3.0
POM 345 WI Seminar in Operations Management 3.0

The College of Engineering

The profession of engineering is concerned with turning the natural elements and energies to the service of mankind. The objectives of the undergraduate program in the College of Engineering are:

- To offer an education that will give graduates the flexibility to adjust to future changes in technology
- To develop a sense of professionalism
- To provide a framework for concentrated study in a professional area

To implement those objectives the curricula of the College of Engineering are designed to provide a firm grounding in basic science and liberal arts, along with broad-based engineering sciences and professional engineering subjects.

Degree Requirements
The degree of Bachelor of Science in the engineering specialties requires a minimum of 192 credits of academic work and six terms of co-op or engineering experience. Transfer students must complete a minimum of four terms of industrial/engineering experience in order to earn a co-operative engineering degree accredited by the Accreditation Board for Engineering and Technology (ABET). All full-time students in the college of engineering are required to complete the minimum four terms of co-op experience.

Engineering students must maintain an overall grade point average of 2.0 in all required courses in their major.

Curricular Organization
With the exception of Computer Science majors, all students in the College of Engineering study the same subjects during the three terms in the first year—the Drexel Engineering Curriculum (tDEC). During the two terms of the sophomore year, students continue in tDEC and begin taking department specific coursework.

The first five terms are devoted to those subjects that form the foundation of the engineering curriculum. Courses in the core engineering curriculum are organized and taught to provide an integrated view of the basic sciences and an introduction to the art of engineering through group projects that deal with open-ended problems characteristic of the practice of engineering. Students also learn to use the modern tools of engineering both on the computer and in the laboratory.

The college considers it essential that students entering the Drexel Engineering Curriculum be placed in courses that take advantage of their abilities and prior training. Student preparation level is determined by a review committee that evaluates the student's high school record, standardized test scores, and placement tests administered during freshman orientation.

Students who demonstrate the preparation and skills to succeed in our integrated engineering calculus course immediately will be placed in the sequences TDEC 110/112/114 and TDEC 111/113/115 starting in the fall term. Students who are not prepared for this sequence may participate in a special "pre-engineering" program before the fall term. These students may also have a

modified fall schedule and may need summer school during the following summer.

In the second year, two professional subjects are introduced, and all the first-level professional courses are completed by the junior year. The senior year in all curricula contains at least one elective sequence so that students can study some aspect of engineering more deeply. In addition, all curricula provide a design experience in the senior year. Recognizing the importance of liberal studies in the education of an engineer, all curricula require that courses be taken in this area

Mission Statement
The mission of the Drexel Engineering Curriculum is to research, develop, implement, and share educational programs that integrate the foundations of engineering practice, humanities and communications, mathematics, and sciences. The tDEC prepares students for professional practice and further education in their selected engineering disciplines. By emphasizing innovative and integrated teaching, the tDEC also trains the next generation of engineering educators.

Program Objectives

- Provide students with a foundation for applying principles of science and mathematics to their disciplinary programs.
- Provide students with the skills and technical knowledge to perform engineering design.
- Provide students with skills to communicate technical ideas and present persuasive arguments.
- Provide students with teamwork skills.
- Provide students with understanding of what engineers do through personal experience.

The Common First Year
Humanities and other courses
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
UNIV 101 The Drexel Experience (two semesters) 4.0

Engineering courses
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 140 Calculus and Physics Practicum for Engineers I 1.0
TDEC 141 Calculus and Physics Practicum for Engineers II 1.0
TDEC 142 Calculus and Physics Practicum for Engineers III 1.0
TDEC 199 Preparation for Engineering Studies 5.0

Liberal Studies Program
The Liberal Studies Program is designed to give engineering students a foundation in the following areas: English, history of the engineering profession and its impact on modern society, ethical standards required for the practice of the profession, and an in-depth study in a specific discipline in liberal studies.

All engineering majors must take 10 courses. Five of the 10 courses are designated as follows and must be completed by all majors:

Designated liberal studies course requirements
HIST 285 Technology in Historical Perspective
HUM 106 Humanities and Communications I
HUM 107 Humanities and Communications II
HUM 108 Humanities and Communications III
PHIL 315 Engineering Ethics

The five remaining liberal studies course requirements are undesignated and can be chosen from the disciplines listed below. Any course selected from the categories below meets this requirement, except language courses below 200 level and survey, performance, studio, or skills courses. Two of the five courses must comprise a sequence and therefore must be in the same discipline, but not necessarily sequentially numbered.

Anthropology
Architectural/Social History
Art History
Communications
Dance
Dramatic Writing
Film and Video
History
Language (200 level and above)
Literature
Music
Philosophy
Political Science
Psychology
Sociology
Theater

Architectural engineering students' liberal studies requirements are slightly different. The three-course ARCH 141–ARCH 143 (Architecture and Society) sequence, offered through the College of Media Arts and Design, is

required of all architectural engineering students, and fulfills the two-course sequence requirement.

Some engineering majors require a study in basic economic principles. Check curriculum guidelines for requirements. Any required economics courses will replace liberal studies requirements on a course-for-course basis. The acceptable economics courses for engineering majors are ECON 211/212 (Principles of Economics I and II) and ECON 201/202 (Economics I and II).

Electives
In addition to the electives in the Liberal Studies Program there are two types of elective sequences in the engineering curricula: technical electives and free electives. Technical electives are courses in engineering, science, or management that build on the required professional courses and lead to a specific technical specialization. Possible elective sequences should be discussed with and approved by advisors before the end of the junior year.Free electives are any courses for which students are eligible and that are not remedial in nature for engineering students.

Withdrawal from the College of Engineering
It is the policy of the College of Engineering that an engineering student who withdraws from the University cannot petition for readmission to the College of Engineering until at least one complete term has elapsed.

Writing-Intensive Course Requirements
In order to graduate, all students beginning with the entering class of 2002/01 (Fall 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid “clustering” these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term

Co-operative Education
In five-year co-operative programs, engineering majors spend a total of 12 terms in school and six terms on co-op assignment. Freshmen attend classes for three terms. During their sophomore, pre-junior, and junior years, students generally attend class for two terms and are assigned a co-operative employment position for two terms each year.

Architectural Engineering

The architectural engineering major prepares graduates for professional work in the analysis, design, construction, and operation of residential, commercial, institutional, and industrial buildings. The program develops engineers familiar with all aspects of safe and economical construction. Students study the principles of structural support and external cladding, building environmental systems, and project management and develop depth in at least one area.

The program integrates building disciplines, including coordination with architects; construction managers; civil, mechanical, and electrical engineers; and others. Students use computer-aided design tools to understand system interactions; perform analysis, design, scheduling, and cost analysis; and present their work.

The first two years of the curriculum cover fundamentals necessary for all engineers. The pre-junior and junior years emphasize building systems and the principles governing their performance. In addition to the core engineering and science, students learn architectural approaches through studio design. Seniors focus on either structural or building environmental systems design, as well as a full-year realistic design project. The academic program is complemented by exposure to professional practice in the co-op experience.

Mission Statement
The civil and architectural engineering faculty are responsible for delivering an outstanding curriculum that equips our graduates with the broad technical knowledge, design proficiency, professionalism, and communications skills required for them to make substantial contributions to society and to enjoy rewarding careers.

Program Objectives

- Provide students with a solid scientific and mathematical foundation, knowledge of engineering principles and their application to the solution of problems, and a sense of engineering judgment, which comprise the technical competencies necessary to plan, design, construct, operate, and maintain large-scale building systems and structures

- Develop an awareness of mitigating adverse impacts of projects on the social, economic, and natural environments locally, regionally, and globally
- Prepare students for professional practice through preparation for professional licensing, development of ethical judgment, and appreciation of lifelong learning and graduate and other advanced study
- Provide experience in and develop proficiency for working in multidisciplinary teams; working with the public; and acquiring necessary oral, writing, and graphical communication skills

Senior Design Projects
A special feature of the major is senior design. A group of students works with a faculty advisor to develop a significant design project selected by the group. All architectural engineering students participate in a design project.

B.S. in Architectural Engineering

Degree Requirements: 192.5 credits

General education requirements
ECON 211 Principles of Economics I (Micro) 3.0
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
UNIV 101 The Drexel Experience 2.0
Liberal studies electives 9.0
Free elective 3.0

Foundation requirements
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 201 Energy I 3.0
TDEC 202 Energy II 3.0
TDEC 211 Materials I 3.0
TDEC 212 Materials II 3.0
TDEC 221 Systems I 3.0
TDEC 222 Systems II 3.0
TDEC 231 Evaluation/Presentation of Experimental Data I 4.0
TDEC 232 Evaluation/Presentation of Experimental Data II 4.0

Major requirements
AE 210 Introduction to AE Building Systems 3.0
AE 220 Introduction to HVAC 3.5
AE 340 Architectural Illumination and Electrical Systems 3.0
AE 390 Architectural Engineering Design I 4.0
AE 391 Architectural Engineering Design II 4.0
AE 544 Building Envelope 4.0
ARCH 141 WI Architecture and Society I 3.0
ARCH 142 WI Architecture and Society II 3.0
ARCH 143 WI Architecture and Society III 3.0
ARCH 191 Studio I 3.0
ARCH 192 Studio 2 3.0
CAE 491 WI Senior Project Design I 3.0
CAE 492 WI Senior Project Design II 3.0
CAE 493 WI Senior Project Design III 3.0
CIVE 240 Engineering Economics 3.0
CIVE 250 Construction Materials 4.0
CIVE 330 Hydraulics 3.5
CIVE 370 Introduction to Structural Analysis 3.0
CIVE 371 Structural Design 3.0
CIVE 380 Special Topics: Fundamentals of Fluid Flow 3.0
CIVE 380 Special Topics: Structural Laboratory 1.0
EGEO 220 Engineering Geology 4.0
MEM 202 Engineering Mechanics: Statics 3.0
MEM 230 Mechanics of Materials I 4.0
STAT 201 Statistics I 4.0

Students select one of the following concentrations:

Mechanical concentration requirements
MEM 310 Thermal Analysis 4.0
MEM 345 Heat Transfer 4.0
MEM 413 Air Conditioning and Refrigeration I 3.0
MEM 414 Air Conditioning and Refrigeration II 3.0
Three technical electives 9.0

Structural concentration requirements
CIVE 310 Soil Mechanics 4.0
CIVE 400 Structural Design I 3.0
CIVE 401 Structural Design II 3.0
CIVE 402 Structural Design III 3.0
CIVE 410 Foundational Engineering 3.0
Two technical electives 6.0

Chemical Engineering

Chemical engineers are concerned primarily with process engineering, the conversion of raw materials into valuable products. The products may include pharmaceuticals, valuable chemical intermediates, or even specialized plastics. The processes, which usually start out at a small laboratory scale, must be developed for production at a large chemical plant scale. The large change in scale requires careful engineering to minimize environmental contamination and to insure public safety.

The Department of Chemical Engineering is responsible for equipping our graduates with the broad technical knowledge and teamwork skills required for them to make substantial contributions to society.

Program Objectives:
The Chemical Engineering major has four goals for its students:

- Provide students with a strong foundation of scientific principles, teamwork methods, and communication skills for the identification and solution of chemical engineering problems.
- Instill in our students the capacity for self and group-study and experience self-assessment so that they possess the attributes necessary to continue life-long learning.
- Apply elements of public health and safety, concern for the environment, and ethics in the course of studies.
- Familiarize our students with research methodologies.

To help students reach these goals, the curriculum is structured so that they progress through sequences in the fundamental physical sciences, humanities, engineering sciences, and design.

Since chemical engineers have the responsibility for translating the results of chemical research into products for the marketplace, and for preventing the wastes generated by industry from contaminating the environment, the physical sciences sequence includes a strong emphasis on chemistry, with courses in analytical, inorganic, organic, and physical chemistry. All the courses emphasize modern theories of chemistry and are designed to help students gain a clearer understanding of their eventual assignments in engineering science and design.

As students progress to courses in engineering science and design, problems of a textbook nature give way to real-world examples. By senior year, students are involved in comprehensive design projects.

Senior Design Projects
A special feature of the major is senior design. A student — or group of students — works with a faculty advisor to develop a significant design project. Some recent examples include:

- Design of a process to make petrochemical intermediates
- Plastics recycling design
- Process design for antibiotic products

B.S. in Chemical Engineering

Degree Requirements: 192.0 credits

General education requirements
HIST 285 Technology in Historical Perspective 3.0
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
PHIL 315 Engineering Ethics 3.0
UNIV 101 The Drexel Experience 2.0
Liberal studies electives 15.0
Free electives 6.0

Foundation requirements
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 201 Energy I 3.0
TDEC 202 Energy II 3.0
TDEC 211 Materials I 3.0
TDEC 212 Materials II 3.0
TDEC 221 Systems I 3.0
TDEC 222 Systems II 3.0
TDEC 231 Evaluation/Presentation of Experimental Data I 4.0
TDEC 232 Evaluation/Presentation of Experimental Data II 4.0

Professional requirements
CHE 201 Process Material Balances 3.0
CHE 202 Process Energy Balances 3.0
CHE 301 WI Process Thermodynamics 3.0
CHE 302 Process Fluid Mechanics 4.0
CHE 303 Process Heat Transfer 3.0
CHE 304 Process Mass Transfer 4.0
CHE 305 Process Separations 4.0
CHE 307 Process Modeling I 4.0
CHE 308 Process Modeling II 4.0
CHE 332 WI Chemical Engineering Laboratory I 2.0
CHE 333 WI Chemical Engineering Laboratory II 2.0
CHE 334 WI Chemical Engineering Laboratory III 2.0
CHE 335 Statistics and Design of Experiments 3.0
CHE 420 Process Systems Engineering 3.0
CHE 424 Chemical Kinetics and Reactor Design 4.0
CHE 481 WI Process Design I 3.0
CHE 482 WI Process Design II 3.0
CHE 483 WI Process Design III 3.0
CHEC 352 Physical Chemistry and Applications II 4.0
CHEC 353 Physical Chemistry and Applications III 4.0
CHEM 241 Organic Chemistry I 4.0
CHEM 242 Organic Chemistry II 4.0
CHEM 356 Physical Chemistry Laboratory I 2.0
Concentration electives 14.0

Civil Engineering

Civil engineers are active in the planning, design, construction, research and development, operation, maintenance, and rehabilitation of large engineering systems. A particular focus is the reconstruction of the nation’s infrastructure through solutions that minimize the disruption of social and natural environments.

Civil engineering graduates are grounded in the fundamental principles necessary for the practice of this profession in any of its modern branches, including construction management, water resources engineering, structural engineering, geotechnical engineering, transportation engineering, and environmental engineering.

Seven of the required courses in the discipline include integral laboratories or field projects for both educational illustration and professional practice exposure.

Careful selection of the electives specified in the curriculum can lead to a wide variety of career objectives. For instance, students with an interest in water resources engineering may elect advanced courses in hydrology, ecology, and chemistry; select senior professional electives in the geotechnical and water resources areas; and choose appropriate topics for senior design and senior seminar. Seniors, with the approval of the department head, can elect certain graduate courses.

Mission Statement
The civil and architectural engineering faculty are responsible for delivering an outstanding curriculum that equips our graduates with the broad technical knowledge, design proficiency, professionalism, and communications skills required for them to make substantial contributions to society and to enjoy rewarding careers.

Program Objectives

- Provide students with a solid scientific and mathematical foundation, knowledge of engineering principles and their application to the solution of problems, and a sense of engineering judgment, which comprise the technical competencies necessary to plan, design, construct, operate, and maintain large-scale infrastructure, environmental, and natural resource systems and structures
- Develop an awareness of mitigating adverse impacts of projects on the social, economic, and natural environments locally, regionally and globally
- Prepare students for professional practice through preparation for professional licensing, development of ethical judgment, and appreciation of lifelong learning and graduate and other advanced study
- Provide experience in and develop proficiency for working in multidisciplinary teams; working with the public; and acquiring necessary oral, writing, and graphical communication skills

Senior Design Projects

A special feature of the major is senior design. A group of students works with a faculty advisor to develop a significant design project selected by the group. All civil engineering students participate in a design project.

B.S. in Civil Engineering

Degree Requirements: 192.5 credits

General education requirements
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
HIST 285 Technology in Historical Perspective 3.0
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
MATH 201 Linear Algebra 4.0
STAT 201 Business Statistics I 4.0
UNIV 101 The Drexel Experience 2.0
Liberal studies electives 9.0
Free electives 3.0

Foundation requirements
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 201 Energy I 3.0
TDEC 202 Energy II 3.0
TDEC 211 Materials I 3.0
TDEC 212 Materials II 3.0
TDEC 221 Systems I 3.0
TDEC 222 Systems II 3.0
TDEC 231 Evaluation/Presentation of Experimental Data I 4.0
TDEC 232 Evaluation/Presentation of Experimental Data II 4.0

Major requirements
CAE 491 WI Senior Project Design I 3.0
CAE 492 WI Senior Project Design II 3.0
CAE 493 WI Senior Project Design III 3.0
CHE 311 Transport Phenomena 3.0
CIVE 240 Engineering Economics 3.0
CIVE 250 Construction Materials 4.0
CIVE 251 Engineering Surveying 3.0
CIVE 252 Introduction to Transportation Infrastructure 3.0
CIVE 300 Theory of Structures I
or
CIVE 370 Introduction to Structural Analysis 3.0
CIVE 301 Theory of Structures II
or
CIVE 371 Introduction to Structural Design 3.0
CIVE 310 Soil Mechanics I 4.0
CIVE 330 Hydraulics I 3.5
CIVE 341 Municipal Water Facilities 3.0
CIVE 360 Water Quality Infrastructure 3.0

CIVE 375 In Situ Material Behavior 3.0
CIVE 430 Hydrology 3.0
CIVE 477 WI Seminar I 2.0
CIVE 478 Seminar II 1.0
EGEO 220 Engineering Geology 4.0
MEM 202 Engineering Mechanics: Statics 3.0
MEM 230 Mechanics of Materials I 4.0
Senior professional electives* 18.0

***A sequence of three courses in a major area of study is required, with a total of six 3-credit professional electives.**

Computer Engineering

Computer engineers design smaller, faster, and more reliable computers and digital systems; embed microprocessors in larger systems (e.g. anti-lock brake systems); work in theoretical issues in computing; use object-oriented programming languages; and design large-scale software systems and computer networks. Computer engineers may work in positions that apply computers in control systems, digital signal processing, telecommunications, and power systems, and may design very large-scale integration (VLSI) integrated circuits and systems.

The computer engineering degree program is designed to provide our students with breadth in engineering, the sciences, mathematics, and the humanities, as well as depth in both software and hardware disciplines appropriate for a computer engineer. It embodies the philosophy and style of the Drexel Engineering Curriculum, and will develop the student's design and analytical skills. In combination with the co-op experience, it opens to the student opportunities in engineering practice, advanced training in engineering or in other professions, and an entry to business and administration.

The computer engineering program's courses in ECE are supplemented with five courses from the departments of Mathematics and Computer Science: Programming I and II, Discrete Mathematics, Data Structures, and Software Engineering. Students gain the depth of knowledge of computer hardware and software essential for the computer engineer.

Mission Statement

The Department of Electrical and Computer Engineering prepares men and women to lead productive and rewarding professional lives at the forefront of engineering in the 21st century, and pursues research to advance the state of the art in electrical and computer engineering and engineering education.

Program Objectives

- Provide our students with the core technical competencies in computer engineering, in a manner that recognizes the diversity of our profession and affords the flexibility to pursue different specialization areas
- Provide our students with the opportunity to learn in multidisciplinary courses to function as effective team members in an increasingly diverse engineering environment.
- Provide our students with the broad education necessary to understand the impact of technology in a global and societal context
- Provide our students with practical experiences to facilitate their development as educated professionals in a global and diverse workplace. Through these experiences, expose our student to the need for and desirability of lifelong learning
- Develop awareness among our students that research advances the state of knowledge in our profession to serve society better, and provide our qualified students with the opportunity to conduct research as undergraduates

B.S. in Computer Engineering

Degree Requirements: 192.0 credits

General education requirements
ECON 211 Principles of Economics I (Micro) 3.0
HIST 285 Technology in Historical Perspective 3.0
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
PHIL 315 Engineering Ethics 3.0
UNIV 101 The Drexel Experience 2.0
Liberal studies electives 12.0

Foundation requirements
ECE 200 Foundations of Intelligent Systems 3.0
ECE 201 Foundations of Electric Circuits 3.0
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 201 Energy I 3.0
TDEC 202 Energy II 3.0
TDEC 211 Materials I 3.0
TDEC 212 Materials II 3.0
TDEC 221 Systems I 3.0
TDEC 222 Systems II 3.0
TDEC 231 Evaluation/Presentation of Experimental Data I 4.0
TDEC 232 Evaluation/Presentation of Experimental Data II 4.0

Professional requirements
CS 171 Computer Programming I 3.0
CS 172 Computer Programming II 3.0
CS 260 Data Structures 3.0
CS 451 Software Engineering 3.0
ECE 491 Senior Project Design I 2.0
ECE 492 Senior Project Design II 2.0
ECE 493 Senior Project Design III 4.0
ECEC 302 Digital System Projects 4.0
ECEC 304 Design with Microcontrollers 4.0
ECEC 352 Secure Computing 4.0
ECEC 355 Computer Structures 4.0
ECEL 301 ECE Laboratory I 2.0
ECEL 302 ECE Laboratory II 2.0
ECEL303 ECE Laboratory III 2.0
ECEL 304 ECE Laboratory IV 2.0
ECES 302 Transform Methods and Filtering 4.0
ECES 490 Special Topics: Errors, Uncertainty, Reliability 4.0
MATH 221 Discrete Mathematics 3.0
MATH 290 Linear Modeling for Engineers 4.0
Computer engineering senior sequence 9.0-12.0
ECE technical electives 9.0-12.0
Free electives 4.0-10.0

Computer Science

The program of study in computer science is designed to prepare students for careers in a rapidly changing profession and to allow easy entrance to graduate education in the field. In addition to the courses in the major, the Bachelor of Science program emphasizes foundation courses in the sciences and in applied mathematics, leading to careers involving applications in science and engineering. The Bachelor of Arts degree emphasizes foundation courses in the humanities and the social sciences, leading to careers involving applications in those areas.

Core courses in both programs include programming and data structures, programming language concepts, computer systems architecture, and a track of courses in software methodology and engineering. Students also choose two other tracks from the following: artificial intelligence, data structures and algorithms, numerical and scientific computation, operating systems, programming languages, and human-computer interaction. Please contact the department for a current list of computer science elective and track courses.

The B.S. program has been accredited by the Computing Accreditation Commission (CAC) of the Accreditation Board of Engineering and Technology (ABET) since 1986. Accreditation of the B.A. program will be sought as soon as the program is eligible.

Mission Statement

To educate students for computer science careers in industry and research with an emphasis on analysis of problems, understanding of fundamental concepts, and interest in lifelong learning. To integrate real-world experiences, e.g., as obtained through the cooperative education program, into the academic curriculum.

Specific Objectives

- For students to understand and be able to apply the underlying principles of Computer Science to a variety of problem domains.
- To develop strong analytical skills and good communication skills so that students can quickly assess how to solve problems and communicate their solution. To be able to work in groups and appreciate the dynamic and collaborative nature of problem solving.
- To equip students with a thorough understanding of the development process of software including design, implementation, documentation, and testing.
- To provide students with the skills to keep current in an ever changing technological world.
- To enable students to appreciate the role that computers play in society and to be able to direct the use of technology in a beneficial way and to solve new problems.

The Department of Computer Science offers both a Bachelor of Science (B.S.) and a Bachelor of Arts (B.A.). Students may choose the program that best fits their needs and future goals.

The Bachelor of Arts (B.A) program emphasizes foundation courses in the humanities and the social sciences, leading to careers involving applications in those areas.

The Bachelor of Science (B.S.) program emphasizes foundation courses in the sciences and in applied mathematics, leading to careers involving applications in science and engineering.

B. A. in Computer Science

Degree Requirements: 186.5 credits

General education requirements
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
PHIL 311 Computer Ethics 3.0
UNIV 101 The Drexel Experience 2.0
Humanities/fine arts electives 9.0
International area studies 6.0
Sociology/behavior science electives 12.0

Diversity studies electives 6.0

Science requirements 18.0
Students must take one full year of a laboratory science and take courses in more than one science field. (Other options for the laboratory sequence are available; see the Computer Science department for list.)

BIO 102 Biology I: Cells and Tissues 4.0
BIO 104 Biology II: Growth and Heredity 4.0
BIO 106 Biology III: Organismal Biology 4.0
or
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
CHEM 103 General Chemistry III 5.0

Mathematics requirements
MATH 101 Introduction to Analysis I 4.0
or
MATH 121 Calculus I
MATH 102 Introduction to Analysis II 4.0
or
MATH 122 Calculus II
MATH 239 Intermediate Calculus 4.0
or
MATH 123 Calculus III
MATH 221 Discrete Mathematics 3.0
STAT 201 Statistics I 4.0

Computer science requirements
CS 164 Introduction to Computer Science 3.0
CS 171 Computer Programming I 3.0
CS 172 Computer Programming II 3.0
CS 260 Data Structures 3.0
CS 265 Advanced Programming Tools and Techniques 3.0
CS 270 Mathematical Foundations of Computer Science 3.0
CS 281 Systems Architecture I 4.0
CS 350 WI Software Design 3.0
CS 360 Programming Language Concepts 3.0
CS 451 Software Engineering 3.0
CS 452 WI Software Engineering Workshop I 3.0
CS 453 WI Software Engineering Workshop II 3.0
ECE 200 Fundamentals of Intelligent Systems 3.0
Computer science track* courses 18.0
Computer science electives 9.0

Free electives 30.5

***Computer Science Tracks**
Students must complete two of the following Computer Science tracks for a total of 18.0 credits:

Algorithms and Data Structures
CS 440 Theory of Computation 3.0
CS 457 Data Structures & Algorithms I 3.0
CS 458 Data Structures & Algorithms II 3.0

Artificial Intelligence
CS 380 Artificial Intelligence 3.0
CS 481 Advanced Artificial Intelligence 3.0
CS 485 Special Topics in Artificial Intelligence 3.0

Human-Computer Interactions
CS 337 Psychology of Human-Computer Interactions 3.0
CS 338 Graphical User Interfaces 3.0
CS 430 Computer Graphics 3.0
or
PSY 330 Cognitive Psychology 3.0

Numeric and Symbolic Computation
CS 300 Applied Symbolic Computation 3.0
MATH 300 Numerical Analysis 4.0
MATH 305 Introduction to Optimization Theory 4.0
or
MATH 301 Numeric Solutions to Differential Equations 3.0

Operating Systems
CS 361 Concurrent Programming 3.0
CS 370 Operating Systems 3.0
CS 472 Computer Networks 3.0

Programming Languages
CS 440 Theory of Computation 3.0
CS 441 Compiler Workshop I 3.0
CS 442 Compiler Workshop II

B.S. in Computer Science

Degree Requirements: 186.5 credits

General education requirements
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
PHIL 311 Computer Ethics 3.0
UNIV 101 The Drexel Experience 2.0
General education electives 12.0
Humanities and communication electives 9.0
History electives 6.0

Science requirements 25.0
The 25 science credits must include a three-term sequence from one of the laboratory sciences. (Other options for the laboratory sequence are available; see the Computer Science department for list.)

BIO 102 Biology I: Cells and Tissues 4.0
BIO 104 Biology II: Growth and Heredity 4.0
BIO 106 Biology III: Organismal Biology 4.0
or
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
CHEM 103 General Chemistry III 5.0
or
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 211 Physics III 4.5

Mathematics requirements
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
MATH 200 Calculus IV 4.0

MATH 201 Linear Algebra 4.0
MATH 221 Discrete Mathematics 3.0
MATH 311 Probability and Statistics I 4.0
MATH 312 Probability and Statistics II 4.0

Computer science requirements
CS 164 Introduction to Computer Science 3.0
CS 171 Computer Programming I 3.0
CS 172 Computer Programming II 3.0
CS 260 Data Structures 3.0
CS 270 Mathematical Foundations of Computer Science 3.0
CS 281 Systems Architecture I 4.0
CS 282 Systems Architecture II 4.0
CS 350 WI Software Design 3.0
CS 360 Programming Language Concepts 3.0
CS 265 Advanced Programming Tools and Techniques 3.0
CS 451 Software Engineering 3.0
CS 452 WI Software Engineering Workshop I 3.0
CS 453 WI Software Engineering Workshop II 3.0
ECE 200 Fundamentals of Intelligent Systems 3.0
Computer science track* courses 18.0
Computer science electives 9.0

Free electives 10.5

***Computer Science Tracks**
Students must complete two of the following Computer Science tracks for a total of 18.0 credits:

Algorithms and Data Structures
CS 440 Theory of Computation 3.0
CS 457 Data Structures & Algorithms I 3.0
CS 458 Data Structures & Algorithms II 3.0

Artificial Intelligence
CS 380 Artificial Intelligence 3.0
CS 481 Advanced Artificial Intelligence 3.0
CS 485 Special Topics in Artificial Intelligence 3.0

Human-Computer Interactions
CS 337 Psychology of Human-Computer Interactions 3.0
CS 338 Graphical User Interfaces 3.0
CS 430 Computer Graphics 3.0
or
PSY 330 Cognitive Psychology 3.0

Numeric and Symbolic Computation
CS 300 Applied Symbolic Computation 3.0
MATH 300 Numerical Analysis 4.0
MATH 305 Introduction to Optimization Theory 4.0
or
MATH 301 Numeric Solutions to Differential Equations 3.0

Operating Systems
CS 361 Concurrent Programming 3.0
CS 370 Operating Systems 3.0
CS 472 Computer Networks 3.0

Programming Languages
CS 440 Theory of Computation 3.0
CS 441 Compiler Workshop I 3.0
CS 442 Compiler Workshop II 3.

Minor in Computer Science

The computer science minor provides students with a breadth of knowledge in areas which form the foundation of computer science. The student adds some depth by selecting courses from a list of advanced computer science courses.

Mathematics prerequisites:
One of the following two-term mathematics sequences must be completed before entering the program

TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
or
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
or
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0

Computer science requirements:
Students must complete at least 26 credits from courses listed below, subject to the following restrictions:

Not more than 9 credit hours may overlap with those counted toward the student's academic major. All courses listed as required must be completed. Remaining credits are to be earned from the list of elective courses.

Required courses
CS 171 Computer Programming I 3.0
CS 172 Computer Programming II 3.0
CS 260 Data Structures 3.0

CS 270 Mathematical Foundations of Computer Science 3.0
or
MATH 221 Discrete Mathematics 3.0
or
MATH 180 Discrete Computational Structures 4.0

CS 281 Systems Architecture I 4.0
CS 360 Programming Language Concepts 3.0
ECE 200 Fundamentals of Intelligent Systems 3.0

Electives*
CS 282 Systems Architecture II 4.0
CS 361 Concurrent Programming 3.0
CS 338 Graphical User Interfaces 3.0
CS 350 Software Design 3.0
CS 370 Operating Systems 3.0
CS 380 Artificial Intelligence 3.0
CS 440 Theory of Computation 3.0
CS 451 Software Engineering I 3.0
CS 472 Computer Networks 3.0

***Other courses may be approved by the Department for this purpose; contact the Computer Science Undergraduate Advisor.**

Electrical Engineering

The Department of Electrical and Computer Engineering has implemented "ECE 21," the new ECE curriculum for the 21st century. ECE 21 emphasizes computer-aided design and hands-on laboratory experience, and flexibility is a major hallmark of the new program. State-of-the-art interdisciplinary courses have been developed to prepare the Drexel engineer for the technical challenges and the business atmosphere of the 21st century. Strong emphasis is given to the role of the engineer in the global competitive economy, and to the need to work closely with experts and practitioners in many fields.

ECE 21 balances technical depth and breadth: depth through the selection of a track and breadth through courses selected in other tracks and the laboratories. It also provides for special cases and special needs.

The track structure, which starts in the pre-junior year and continues through the end of the senior year, allows students to spend time concentrating in one major area of electrical engineering. The structure can accommodate a number of student types and career objectives. Most students will continue to receive traditional or near-traditional ECE education. Those who have non-ECE career objectives can use the senior year to get exposure to languages, business, or management, for example.

The ECE 21 curriculum offers three different tracks, or areas of study: telecommunications/digital signal processing, electronics, and electrical engineering. To fulfill their track requirements, all ECE students will select eight courses. The majority of the core courses will be in their track, while others will be chosen from other tracks or from the computer engineering program. Descriptions and course requirements for each track follow the basic degree requirements.

Mission Statement
The Department of Electrical and Computer Engineering prepares men and women to lead productive and rewarding professional lives at the forefront of engineering in the 21st century, and pursues research to advance the state of the art in electrical and computer engineering and engineering education.

Program Objectives

- Provide our students with the core technical competencies in electrical engineering, in a manner that recognizes the diversity of our profession and affords the flexibility to pursue different specialization areas
- Provide our students with the opportunity to learn in multidisciplinary courses to function as effective team members in an increasingly diverse engineering environment
- Provide our students with the broad education necessary to understand the impact of technology in a global and societal context
- Provide our students with practical experiences to facilitate their development as educated professionals in a global and diverse workplace. Through these experiences, expose our student to the need for and desirability of lifelong learning
- Develop awareness among our students that research advances the state of knowledge in our profession to serve society better, and provide our qualified students with the opportunity to conduct research as undergraduates

Electrical Engineering Tracks
Telecommunications/DSP Track
Telecommunications and digital signal processing (DSP) are two of the fastest-growing fields of electrical engineering. The telecommunications/DSP track prepares students for mastery of fundamental and applied knowledge in the theory and the technology of the transmission and processing of information-bearing signals such as voice, audio, data, images, and video. The curriculum includes core courses in electromagnetic propagation, communication devices and media, signal processing, modulation, and coding. Complementary electives can be taken in computers, electronics, control systems, and electric power systems. Senior-level sequence options are available in digital signal processing and communications.

Career opportunities include design and development of digital communications systems and telephony, speech recognition systems, fiber-optic networks, digital radio, medical diagnostic image processing, high-definition television, cellular and wireless communications, satellite communications, networked multimedia communications, and personal communication systems.

Track courses Credits

ECEE 302 Electronic Devices 4.0
ECEE 304 Electromagnetic Fields and Waves 4.0
ECES 302 Transform Methods and Filtering 4.0
ECES 306 Introduction to Modulation and Coding 4.0
ECES 352 Introduction to Digital Signal Processing 4.0
ECES 354 Wireless, Mobile, and Cellular Communications 4.0
Additional 300-level core courses 8.0

Electronics Track
The electronics track constitutes the study of electronic and optical semiconductor devices; analog and digital electronic circuits; and generation, transmission, and reception of information both in optical and microwave frequency ranges and guided or free-space conditions.

Career opportunities include jobs in telecommunications (optical, wireless, wired, satellite, and radar), VLSI (analog and digital), aerospace, remote sensing and instrumentation, computer circuitry interface, biomedical instrumentation, semiconductor device fabrication, and transportation.

Track courses
ECEE 302 Electronic Devices 4.0
ECEE 304 Electromagnetic Fields and Waves 4.0
ECEE 352 Analog Electronics 4.0
ECEE 354 Introduction to Wireless and Optical Electronics 4.0
ECES 302 Transform Methods and Filtering 4.0
Additional 300-level core courses 12.0

Electrical Engineering Track
The electrical engineering track has at its core the areas of controls engineering and electric power engineering, the classic core of electrical engineering, and exploits the synergies between these two areas. The track explores subjects such as modeling, analysis and control of dynamic systems including power systems, planning and optimization, electromechanical energy conversion, motor operation and control, transformers, power electronics, sensors and actuators, and the electrical and economic structure of the power industry. The track offers access to two state-of-the-art laboratories. In the Interconnected Power System Laboratory, students can operate and control a small power system through the fusing of computer software and hardware technology with high-voltage, high-power technology. The Ortlip Systems Laboratory houses various experiments in sensing, feedback, and control. Both laboratories stress the use of modeling software, especially MATLAB, and the integrated use of computers and hardware.

Career opportunities include options ranging from manufacturing, the power industry (generation, transmission, distribution, marketing, and consumption), robotics, and transportation to Wall Street.

Track courses
ECEE 302 Electronic Devices 4.0
ECEP 352 Electric Motor Control Principles 4.0
ECES 302 Transform Methods and Filtering 4.0
ECES 304 Dynamic Systems and Stability 4.0
ECES 356 Theory of Control 4.0
Additional 300-level core courses 12.0

B. S. in Electrical Engineering

Degree Requirements: 192.0 credits

General education requirements
ECON 211 Principles of Economics I (Micro) 3.0
HIST 285 Technology in Historical Perspective 3.0
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
PHIL 315 Engineering Ethics 3.0
UNIV 101 The Drexel Experience 2.0
Liberal studies electives 12.0

Foundation requirements
ECE 200 Foundations of Intelligent Systems 3.0
ECE 201 Foundations of Electric Circuits 3.0
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 201 Energy I 3.0
TDEC 202 Energy II 3.0
TDEC 211 Materials I 3.0
TDEC 212 Materials II 3.0
TDEC 221 Systems I 3.0
TDEC 222 Systems II 3.0
TDEC 231 Evaluation/Presentation of Experimental Data I 4.0
TDEC 232 Evaluation/Presentation of Experimental Data II 4.0

Professional requirements
ECE 491 Senior Project Design I 2.0
ECE 492 Senior Project Design II 2.0
ECE 493 Senior Project Design III 4.0
ECEL 301 ECE Laboratory I 2.0
ECEL 302 ECE Laboratory II 2.0
ECEL303 ECE Laboratory III 2.0
ECEL 304 ECE Laboratory IV 2.0
ECES 490 Errors, Uncertainty, Reliability 4.0
MATH 290 Linear Modeling for Engineers 4.0
Additional interdisciplinary courses (1) 4.0
ECE track courses (8) 32.0
Electrical engineering senior sequence 9.0-12.0
ECE technical electives 9.0-12.0
Free electives 0.0-5.0

Environmental Engineering

Environmental engineering is concerned with protecting human, animal, and plant populations from the effects of adverse environmental factors, including toxic chemicals and wastes, pathogenic bacteria, and global warming.

Environmental engineers also try to minimize the effect of human activities on the physical and living environment so that we can all live more healthy lives. This field builds on other branches of engineering, especially civil, chemical, and mechanical engineering. It also builds on information from many of the sciences, such as chemistry, physics, hydrology, geology, atmospheric science, and several specializations of biology (ecology, microbiology, and biochemistry). Students who elect to study environmental engineering will become familiar with many of these areas because maintaining and improving the environment requires that problems be evaluated and solutions found using a multidisciplinary approach.

Mission

The mission of the undergraduate environmental engineering program at Drexel University is to graduate outstanding engineers who can identify, evaluate and solve complex environmental problems, and who desire to continue their education on a lifelong basis.

Program Objectives

- To provide students with a knowledge of the fundamentals underlying environmental engineering and the application of this knowledge to problem solving;
- To provide students with the ability to integrate knowledge from diverse sources, develop new knowledge, and apply that knowledge to environmental problem solving;
- To provide students with the ability to interact with others in the identification and solution of environmental problems;
- To provide students with a knowledge of the scientific, technological, economic, ethical, social and cultural contexts of environmental problems; and
- To provide students with the skills necessary to lead others in the resolution of environmental problems.

B.S. in Environmental Engineering

Degree Requirements: 201.5 credits

General education requirements
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
MATH 310 Introduction to Probability and Statistics 4.0
PHIL 315 Engineering Ethics 3.0
UNIV 101 The Drexel Experience 4.0
Liberal studies electives 9.0

Engineering core courses
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 201 Energy I 3.0
TDEC 202 Energy II 3.0
TDEC 211 Materials I 3.0
TDEC 212 Materials II 3.0
TDEC 221 Systems I 3.0
TDEC 222 Systems II 3.0
TDEC 231 Evaluation/Presentation of Experimental Data I 4.0
TDEC 232 Evaluation/Presentation of Experimental Data II 4.0

Environmental engineering requirements
BIO 221 Microbiology 5.0
CHE 201 Process Material Balances 3.0
CHE 311 Fluid Flow and Transport 3.0
CHEM 230 Quantitative Analysis 3.0
CHEM 231 WI Quantitative Analysis Laboratory 2.0
CHEM 241 Organic Chemistry I 4.0
CHEM 242 Organic Chemistry II 4.0
CIVE 240 Engineering Economic Analysis 3.0
CIVE 330 Hydraulics I 3.5
CIVE 430 Hydrology 3.0
CIVE 431 Ground Hydrology 3.0
EGEO 220 Engineering Geology 4.0
ENVE 152 Environmental Measurement 3.0
ENVE 300 Introduction to Environmental Engineering 3.0
ENVE 302 Environmental Transport and Kinetics 3.0
ENVE 410 Solid and Hazardous Waste 3.0
ENVE 421 Water and Waste Treatment II 3.0
ENVE 422 Water and Waste Treatment Design 3.0
ENVR 451 Atmospheric Environment 3.0
or
ENVE 435 Groundwater Remediation
ENVE 460 Fundamentals of Air Pollution Control 3.0
ENVE 485 Professional Environmental Engineering Practice 1.0
ENVE 486 Environmental Engineering Processing Lab I 2.0
ENVE 487 Environmental Engineering Processing Lab II 2.0
ENVE 491 Senior Project Design I 3.0
ENVE 492 Senior Project Design II 3.0
ENVE 493 Senior Project Design III 3.0
ENVR 260 Environmental Science and Society I 3.0
ENVR 284 WI Ecology I: Physiological and Population 5.0
or
ENVR 286 WI Ecology II: Communities and Ecosystems 5.0
ENVR 401 Chemistry of the Environment 3.0
Technical electives 12.0

Materials Engineering

Materials engineering is concerned with the production, properties, and utilization of metals, ceramics, polymers, composites, and electronic materials. Materials engineers play a vital role in our increasingly complex technological society by extending the limited supply of materials, improving existing materials, and developing new and superior materials and processes with an awareness of cost, reliability, safety, and social/environmental implications.

Students majoring in materials engineering get a thorough grounding in the basic sciences and engineering of all materials. All students are required to take course sequences that include materials processing, thermodynamics and kinetics of materials, and their physical and mechanical behavior, plus laboratories designed to familiarize them with the instruments and techniques for characterizing materials and evaluating their performance. In addition, several required senior courses emphasize the role of materials in design.

A required senior design project, a wide variety of technical elective courses, and co-op experiences allow students in-depth exploration of selected areas.

Mission Statement
Our mission is to produce graduates who can excel in leadership positions in industry and academia at the national and international levels.

Program Objectives

- Educate our students so that they possess the technical competencies required to interface with all engineering disciplines in the workplace
- Increase the number of materials engineering graduates who have the aptitude for postgraduate education at the nation's premier engineering institutions or professional schools, and who could become leaders in their chosen fields
- Enhance the skills of our undergraduates in experimental methods and modeling, with a focus on materials engineering
- Develop an ability in our students to successfully undertake lifelong learning in the discipline and practice of materials engineering or in any other profession
- Enhance the verbal and written communication skills of materials engineering students

Senior Design Projects
Throughout the senior year, majors in materials engineering work on a capstone senior design project with guidance from a faculty advisor. Students, working in small groups, synthesize information from their courses to arrive at solutions to real-world engineering problems.

B.S. in Materials Engineering

Degree Requirements: 192.0 credits

General education
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics I (Macro) 3.0
HIST 285 Technology in Historical Perspective 3.0
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
PHIL 315 Engineering Ethics 3.0
UNIV 101 The Drexel Experience 1.0
Technical electives 9.0
Liberal studies electives 9.0
Free electives 6.0

Foundation requirements
CHE 310 Transport Phenomena 4.0
CHEC 353 Physical Chemistry and Applications III 4.0
CHEM 241 Organic Chemistry I 4.0
PHYS 451 Quantum Structure of Materials 4.0
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 201 Energy I 3.0
TDEC 202 Energy II 3.0
TDEC 211 Materials I 3.0
TDEC 212 Materials II 3.0
TDEC 221 Systems I 3.0
TDEC 222 Systems II 3.0
TDEC 231 Evaluation/Presentation of Experimental Data I 4.0
TDEC 232 Evaluation/Presentation of Experimental Data II 4.0

Professional requirements
MATE 216 Polymers I 4.5
MATE 240 Thermodynamics and Kinetics of Materials I 4.0
MATE 245 Thermodynamics and Kinetics of Materials II 4.0
MATE 270 Advanced Materials Laboratory 4.0
MATE 315 Polymers II: Processing 4.5
MATE 340 Fundamentals of Ceramics 4.0
MATE 345 Ceramics II: Processing and Properties 4.0
MATE 360 Metals I 3.5
MATE 366 Metals II 4.5
MATE 370 Mechanical Properties I 3.0
MATE 400 Materials Engineering Design I 3.0
MATE 410 Materials Engineering Design II 3.0
MATE 460 Engineering Computational Laboratory 4.0
MATE 472 Mechanical Properties II 3.0
MATE 491 Senior Project Design I 2.0

MATE 492 Senior Project Design II 2.0
MATE 493 Senior Project Design III 4.0

Minor in Materials Engineering

In addition to the core engineering curriculum and the courses required for the major in chemical, civil, electrical, or mechanical engineering, students electing to pursue the minor in materials engineering must fulfill the following requirements.

Required course
MATE 130 Materials Laboratory* 3.0

At least 21.0 credits from the following:
MATE 216 Polymers I 4.5
MATE 240 Thermodynamics and Kinetics of Materials I 4.0
MATE 270 Advanced Materials Laboratory 4.0
MATE 340 Fundamentals of Ceramics 4.0
MATE 360 Metals I 3.5
MATE 370 Mechanical Properties I 3.0
PHYS 451 Quantum Structure of Materials 4.0
***Taken in the sophomore or pre-junior year.**

Substitution for these courses of equivalent courses offered by other departments and/or institutions may be made with the approval of the Department of Materials Engineering on a case-by-case basis. At least two-thirds of the content of a substitute course must be the same as that of the course in the cited list. Students pursuing the minor are encouraged to select a senior design topic that is relevant to materials.

Mechanical Engineering and Mechanics

The role of the mechanical engineer in today's society is rapidly changing. Advances in manufacturing, transportation, infrastructure systems, materials, communications, and high-performance computing have introduced new demands, opportunities, and challenges for mechanical engineers. What was once an individual endeavor has now become a team activity. Today's industries require that mechanical engineers possess diverse interdisciplinary skills, a global viewpoint, entrepreneurial and managerial abilities, and an understanding of the forces governing the marketplace.

Traditionally, mechanical engineers have been associated with industries like automotive, transportation, and power generation, and with activities involving the design, analysis, and manufacturing of products useful to society. While today such activities are still dominated by mechanical engineers, the spectrum of opportunities for these professionals has expanded tremendously. For example, mechanical engineers are involved in the design and analysis of biomedical instrumentation, electronic components, smart structures, and advanced materials; they are involved in sophisticated studies of human motion, control of satellites, and the development of more efficient energy-transfer techniques.

Drexel's Department of Mechanical Engineering and Mechanics prides itself on providing e its students with a comprehensive program of courses, laboratories, design projects, and co-op experiences. The MEM curriculum is designed to balance technical breadth (provided by a set of fundamental required core courses) with technical depth (provided by optional concentrations that emphasize particular fields within the profession). Thus, the MEM program not only prepares its graduates to become successful mechanical engineers needed in industry and government, but also provides an excellent springboard to pursue graduate studies in medical sciences, law, business, information technology, and any other disciplines where technological and analytical skills play an important role.

Mission Statement
The mission of the Department of Mechanical Engineering and Mechanics of Drexel University is to transfer and acquire knowledge through: (a) the education of engineers for leadership in industry, business, academia, and government; and (b) the establishment of internationally recognized research programs. This mission is accomplished by the delivery of an outstanding curriculum, by the participation of our students in one of the nation's most prestigious co-operative educational programs, and by the scholarly activities of the faculty.

Program Objectives

- Deliver a comprehensive mechanical engineering curriculum which emphasizes both the foundations and breadth of the mechanical engineering profession
- Provide an education that equips students with the tools necessary to become successful mechanical engineers based on their co-op experience, strong communication skills, and awareness of the need for continuous professional development
- Provide an education that will allow mechanical engineering students to understand the social, economic, environmental, political, and ethical importance of their future profession
- Provide mechanical engineering students with a thorough understanding of the impact of mechanical engineers and the mechanical engineering profession in the development, implementation and creation of future technology.

B. S. in Mechanical Engineering and Mechanics

Degree Requirements: 195.0 credits

Mathematics requirements
MATH 290 Math Modeling for Engineers 4.0
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 221 Systems I 3.0
TDEC 222 Systems II 3.0

Physics requirements
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 201 Energy I 3.0
TDEC 202 Energy II 3.0

Chemistry/biology requirements
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0

Design/laboratory requirements
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 231 Evaluation and Presentation of Experimental Data I 4.0
TDEC 232 Evaluation and Presentation of Experimental Data II 4.0

Engineering economics requirements
CIVE 240 Project Economics and Decisions 3.0

Liberal studies requirements

HIST 285 Technology in Historical Perspective 3.0
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
PHIL 315 Engineering Ethics 3.0
UNIV 101 The Drexel Experience 2.0

Materials requirements
TDEC 211 Materials I 3.0
TDEC 212 Materials II 3.0

Mechanical requirements
MEM 201 Fundamentals of Computer Aided Design 3.0
MEM 202 Engineering Mechanics: Statics 3.0
MEM 220 Basic Fluid Mechanics 4.0
MEM 230 Mechanics of Materials I 4.0
MEM 238 Engineering Mechanics: Dynamics 4.0
MEM 255 Introduction to Controls 4.0
MEM 311 Thermal Fluid Science Laboratory 2.0
MEM 331 Experimental Mechanics Laboratory 2.0
MEM 351 Dynamic Systems Laboratory 2.0
MEM 310 Thermodynamic Analysis I 4.0
MEM 345 Heat Transfer 4.0
MEM 355 Performance Enhancement of Dynamic Systems 4.0
MEM 361 Engineering Reliability 3.0
MEM 465 Introduction to CAD/CAM 4.0
MEM 491 Senior Design I 3.0
MEM 492 Senior Design II 3.0
MEM 493 Senior Design III 3.0

Elective courses
Liberal studies 12.0
MEM designated electives* 12.0
MEM undesignated electives* 6.0
MEM/CoE electives 6.0**
MEM/Science/technical electives* 6.0**
Free electives 6.0

*** All MEM students must complete a minimum of four of the advanced MEM fundamentals courses, plus any other two MEM courses 300 level or higher.**

**** Any MEM or College of Engineering course 300 level or higher.**

***** Any MEM or science/engineering course 300 level or higher.**

Advanced MEM Fundamental Courses
MEM 320 Fluid Dynamics I 3.0
MEM 330 Mechanics of Materials II 4.0
MEM 410 Thermodynamics Analysis II 3.0
MEM 423 Mechanics of Vibration 4.0
MEM 440 Thermal Systems Design 3.0
MEM 458 Microcomputer-Based Control Systems I 3.0
MEM 459 Microcomputer-Based Control Systems II 3.0

Minor in Mechanical Engineering

Any undergraduate student in good standing who has completed more than 30 credits at Drexel may apply for the minor in mechanical engineering. The minor must contain a minimum of 24 credits according to the following distribution: (a) 16 credits from any four of the 4-credit required courses; (b) at least eight credits from additional required courses or from the laboratory components and recommended electives.

Required courses
MEM 220 Basic Fluid Mechanics 4.0
MEM 230 Mechanics of Materials I 4.0
MEM 238 Engineering Mechanics: Dynamics 4.0
MEM 255 Introduction to Controls 4.0
MEM 310 Thermodynamic Analysis I 4.0
MEM 345 Heat Transfer 4.0
MEM 355 Performance Enhancement of Dynamic Systems 4.0
MEM 361 Engineering Reliability 3.0
MEM 465 Introduction to CAD/CAM 4.0

Laboratories
MEM 311 Thermal Fluid Science Laboratory 2.0
MEM 331 Experimental Mechanics Laboratory 2.0

MEM 351 Dynamic Systems Laboratory 2.0

Recommended electives
MEM 320 Fluid Dynamics I 3.0
MEM 330 Mechanics of Materials II 4.0
MEM 410 Thermodynamics Analysis II 3.0
MEM 420 Aerodynamics 3.0
MEM 423 Mechanics of Vibration 4.0
MEM 425 Aircraft Design/Performance 3.0
MEM 430 Advanced Stress Analysis 4.0
MEM 437 Manufacturing Process I 3.0
MEM 438 Manufacturing Process II 3.0
MEM 440 Thermal Systems Design 3.0
MEM 453 Aircraft Flight Dynamics and Control I 3.0
MEM 455 Introduction to Robotics 3.0
MEM 458 Microcomputer-Based Control Systems I 3.0
MEM 459 Microcomputer-Based Control Systems II 3.0
MEM 462 WI Introduction to Engineering Management 3.0

Software Engineering

Advances in information technology have captured the public imagination and had tremendous economic and social impact over the last 50 years. These advances offer great benefit, but have also created a great need for highly dependable systems developed at predictable cost. Unfortunately, it has become increasingly clear that our ability to produce the software for these systems in a way that meets cost and quality requirements is quite limited.

For example, studies conclude that cost and schedule overruns on commercial software projects commonly average at least 100%. Some studies report averages as high as 300 - 400%. Studies of large projects indicate that about 25% of them are abandoned and never completed. There is a growing list of incidents in which software failures have caused injury and death. Software engineering is an attempt to solve this problem. The notion can be traced to a conference sponsored by NATO in 1967. The conference was organized to discuss the problems in creating software systems reliably. In the years since, there has been some progress, but the problems that motivated the original conference are still very much in evidence. There is good reason to believe that creation of software will never be easy. But there is tremendous incentive to make the process as efficient and reliable as possible.

That is the goal in software engineering. In summary, software engineering can be defined as the application of processes, methods, and tools to the problem of building and maintaining computer software with a defined level of quality, at a predictable cost, on a predictable schedule.

The Bachelor of Science in Software Engineering degree is a multidisciplinary University degree sponsored by the College of Engineering and the College of Information Science and Technology. The program, drawing on the strengths of existing Drexel programs in computer science and information science and technology, provides a curriculum that encompasses behavioral, managerial and technical aspects of software engineering and attempts to synthesize disciplinary paradigms and themes.

B. S. in Software Engineering

Degree Requirements: 191.0 credits

Software engineering requirements
SE 101 Foundations of Software Engineering I 3.0
SE 102 Foundations of Software Engineering II 3.0
SE 103 Foundations of Software Engineering III 3.0
SE 210 Software Specification and Design I 3.0
SE 211 Software Specification and Design II 3.0
SE 310 Software Architecture I 3.0
SE 311 Software Architecture II 3.0
SE 320 Software Verification and Validation 3.0
SE 410 Software Evolution 3.0
SE 491 Design Project I 2.0
SE 492 Design Project II 2.0
SE 493 Design Project III 4.0

Computer science requirements
CS 260 Data Structures 3.0
CS 361 Concurrent Programming 3.0
CS 338 Graphical User Interfaces 3.0
CS 472 Computer Networks 3.0

Information systems requirements
ISYS 210 Database Management Systems 3.0
ISYS 310 Human Computer Interaction 3.0
ISYS 420 WI Software Project Management 3.0

Computer engineering requirements
ECEC 200 Fundamentals of Intelligent Systems 3.0

Computing electives
Additional IS courses (CS courses see advisor) 18.0

Mathematics/statistics requirements
CS 270 Mathematical Foundations of Computer Science 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
MATH 221 Discrete Mathematics 3.0
STAT 205 Statistical Inference I 4.0
STAT 206 Statistical Inference II 4.0

Basic Science requirements (Choose one of the following sequences)

BIO 114 Bioscience I: Growth of Organisms and Populations 5.5
BIO 115 Bioscience II: Organismal Physiology 5.5
BIO 117 Bioscience III: Molecular and Cellular Genetics 5.5

or
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
CHEM 103 General Chemistry III 5.0
or
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 211 Physics III 4.5
Additional science electives 4.5 - 8.5

Liberal studies requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
PHIL 105 Critical Reasoning 3.0
PHIL 311 Computer Ethics 3.0
COM 230 Techniques of Speaking 3.0
COM 310 WI Technical Communication 3.0
PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
Additional liberal studies electives 6.0

Business requirements
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
ACCT 111 Financial Accounting 3.0

University requirements
UNIV 101 The Drexel Experience 2.0
Free electives 24.0

The College of Information Science and Technology

The College of Information Science and Technology educates interdisciplinary professionals to provide information services and systems to meet a wide range of needs. The College complements its educational programs with research that increases the benefits of information science and technology for all sectors of society

General Information
The College offers the major in Information Systems both as a four and five-year program, and offers the Software Engineering major as a five-year program. The degree programs are open to freshmen and transfers from other departments at Drexel and other universities. Students have access to the College of Information Science and Technology's Computing Resource Center and the computing facilities available to all Drexel students.

Transfer admission occurs in the fall term only due to the sequence of required courses.

The College of Information Science and Technology offers graduate work leading to the degrees of Master of Science, Library and Information Science; Master of Science in Information Systems; Master of Science in Software Engineering; and Doctor of Philosophy. Full details of all graduate curricula are located in the graduate section of the catalog.

Co-operative education, academic eligibility requirements, acceptance of transfer students, and placement services are described in detail in other sections of this catalog.

About the Information Systems Curriculum
The required courses included in the information systems curriculum may be grouped into seven categories:

Information Systems
The 54 credits required in information systems include a 36-credit common core of courses.

Computer Science
The 12 credits required in computer science provide a working knowledge of programming and computation fundamentals for information systems personnel.

Behavioral Science
The strong emphasis on this area indicates the commitment of this program to developing information systems personnel who understand the needs of users and the effects of information systems on various social systems. This 24-credit grouping includes courses in psychology and sociology, and three electives.

Arts and Humanities
This 33-credit grouping includes courses in communications, language, logic, and computer ethics.

Mathematics/Natural Science
This 24-credit grouping includes a choice of basic sciences and mathematics.

B*usiness*
This 27-credit grouping includes courses in statistics, economics, management, and two electives.

Other Courses
Nine to twelve credits of free electives enable students to devote extra time to any of the areas listed above or to study areas outside the required curriculum. Students are also required to take two terms of university seminar.

Academic credit will not be given for technical certification work, even if it is embedded in academic curriculum. This policy covers both transfer credits and independent studies done at Drexel.

Advanced Coursework
All B.S. in Information Systems students pursue in-depth coursework in fundamental areas such as systems analysis and design and information systems development. All students in the program must also select a focus area as part of advanced coursework. Students receive one or more initial courses in these areas as part of the core requirements. They take at least two additional courses in the focus area during advanced coursework. The focus areas are:

Database Management Systems
Coursework in databases and systems analysis addresses database design and development, database administration, application of databases in information systems, and modeling of data and information requirements. This prepares students for careers in applied database technology, database development, and database administration.

Distributed Computing and Networking
Coursework in distributed information systems, applications of networking, and Internet computing. This prepares students for careers in network design and administration, network operations and support, and design and development of Internet information systems.

Human-Centered Computing
Coursework in human-computer interaction, computer-supported cooperative work, and systems analysis addresses the human and organizational aspects of information systems and how those elements affect successful system implementation. This prepares students for careers as interface designers and developers and administrators of messaging, work-flow, and collaborative systems.

Information Retrieval and Analysis
Coursework in information retrieval, use and evaluation of information resources, and managing information content in databases, information repositories, and on the Internet. This prepares students for careers in information services and information resource management.

Computer Science
Coursework in computer science topics beyond the introductory computer science and programming sequence. This focus area is for students combining significant computer science interests (typically a minor) with a major in information systems. Selection of this focus area requires approval of an undergraduate advisor. This prepares students for careers emphasizing software development, systems software, and applications in science and mathematics.

Information Systems

Drexel's College of Information Science and Technology offers a Bachelor of Science Degree in Information Systems to meet the growing demand for individuals skilled in the development and management of information systems. This forward-looking program for undergraduates offers a solid background in liberal arts and sciences as well as the skills and knowledge needed to design, create, manage, and effectively use modern information systems.

The Information Systems curriculum has no single application focus. It is directed to the art and science of managing information in all application environments. Students learn how to determine information needs, design appropriate information systems, manage those systems, and measure the systems' performance. The emphasis is on the users of computers, and on building professional-level information systems skills.

B.S. in Information Systems

Degree Requirements: 189.0 credits

Information systems requirements
ISYS 101 Introduction to Information Systems I 3.0
ISYS 102 Introduction to Information Systems II 3.0
ISYS 105 Information Evaluation, Organization, and Use 3.0
ISYS 110 Human-Computer Interaction I 3.0
ISYS 140 Information Systems Laboratory I 1.0
ISYS 141 Information Systems Laboratory II 1.0
ISYS 142 Information Systems Laboratory III 1.0
ISYS 200 Systems Analysis I 3.0
ISYS 210 Database Management Systems 3.0
ISYS 215 Social Aspects of Information Systems 3.0
ISYS 350 Distributed Computing and Networking 3.0
ISYS 355 Systems Analysis II 3.0
ISYS 420 WI Software Project Management 3.0
ISYS 425 WI Design Problem I 2.0
ISYS 426 WI Design Problem II 4.0
ISYS 480 Special Topics: Foundations of Software 3.0
Concentration courses 6.0
Electives 18.0

Behavioral science requirements

PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
SOC 101 Introduction to Sociology
or
ANTH 101 Cultural Diversity 3.0
SOC 250 Research Methods I 3.0
SOC 350 Research Methods II 3.0
Electives 9.0

Computer science requirements
CS 131 Computer Programming A 3.0
CS 132 Computer Programming B 3.0
CS 133 Computer Programming C 3.0

or
CS 171 Computer Programming I 3.0
CS 172 Computer Programming II 3.0
CS 260 Data Structures 3.0

Mathematics/natural science requirements
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
or
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0

MATH 180 Discrete Computational Structures 4.0
Natural science sequence 8.0-9.0
Elective 3.0-4.0

Arts/humanities requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
PHIL 105 Critical Reasoning 3.0
PHIL 111 Beginning Logic 3.0
COM 230 Techniques of Speaking 3.0
COM 310 WI Technical Communication 3.0
Electives 3.0

University and college requirements
UNIV 101 The Drexel Experience (for freshmen) 2.0
ISYS 480 Special Topics: IST Seminar (for freshmen) 1.0
ISYS 120 IST Seminar for Transfer Students 2.0
Free electives 12.0 - 13.0

Minor in Business
IST students who take all their courses at Drexel will qualify for the minor in business. Transfer students may or may not qualify for the minor depending on individual circumstances, but all BSIS students will have the credit equivalent of a minor.

Business minor requirements
ACCT 111 Financial Accounting 3.0
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
ORGB 300 Organizational Behavior 4.0
STAT 201 Statistics I 4.0
STAT 202 Statistics II 4.0

At least two of the following:
BLAW 201 Business Law I 4.0
FIN 311 Financial Management 3.0
MKTG 301 WI Introduction to Marketing Management 5.0
POM 300 WI Operations Management 4.0

Minor in Information Systems

The information systems minor is available to all University students in good standing, with the exception of information systems majors. A minimum of 24 credits is needed to complete the academic minor in information systems.

Required courses
ISYS 102 Introduction to Information Systems II 3.0
ISYS 110 Human-Computer Interaction I 3.0
ISYS 200 Systems Analysis I 3.0
ISYS 210 Database Management Systems 3.0
SOC 350 Distributed Computing and Networking 3.0
ISYS 355 Systems Analysis II 3.0

An additional 6 credits or more are to be chosen from other course offerings in information systems pertinent to the student's overall program of study. Guidance in selecting these electives will be provided by staff and faculty of the College of Information Science and Technology.

Software Engineering

Advances in information technology have captured the public imagination and had tremendous economic and social impact over the last 50 years. These advances offer great benefit, but have also created a great need for highly dependable systems developed at predictable cost. Unfortunately, it has become increasingly clear that our ability to produce the software for these systems in a way that meets cost and quality requirements is quite limited.

For example, studies conclude that cost and schedule overruns on commercial software projects commonly average at least 100%. Some studies report averages as high as 300 - 400%. Studies of large projects indicate that about 25% of them are abandoned and never completed. There is a growing list of incidents in which software failures have caused injury and death. Software engineering is an attempt to solve this problem. The notion can be traced to a conference sponsored by NATO in 1967. The conference was organized to discuss the problems in creating software systems reliably. In the years since, there has been some progress, but the problems that motivated the original conference are still very much in evidence. There is good reason to believe that creation of software will never be easy. But there is tremendous incentive to make the process as efficient and reliable as possible.

That is the goal in software engineering. In summary, software engineering can be defined as the application of processes, methods, and tools to the problem of building and maintaining computer software with a defined level of quality, at a predictable cost, on a predictable schedule.

The Bachelor of Science in Software Engineering degree is a multidisciplinary University degree sponsored by the College of Engineering and the College of Information Science and Technology. The program, drawing on the strengths of existing Drexel programs in computer science

and information science and technology, provides a curriculum that encompasses behavioral, managerial and technical aspects of software engineering and attempts to synthesize disciplinary paradigms and themes.

B. S. in Software Engineering

Degree Requirements: 191.0 credits

Software engineering requirements
SE 101 Foundations of Software Engineering I 3.0
SE 102 Foundations of Software Engineering II 3.0
SE 103 Foundations of Software Engineering III 3.0
SE 210 Software Specification and Design I 3.0
SE 211 Software Specification and Design II 3.0
SE 310 Software Architecture I 3.0
SE 311 Software Architecture II 3.0
SE 320 Software Verification and Validation 3.0
SE 410 Software Evolution 3.0
SE 491 Design Project I 2.0
SE 492 Design Project II 2.0
SE 493 Design Project III 4.0

Computer science requirements
CS 260 Data Structures 3.0
CS 361 Concurrent Programming 3.0
CS 338 Graphical User Interfaces 3.0
CS 472 Computer Networks 3.0

Information systems requirements
ISYS 210 Database Management Systems 3.0
ISYS 310 Human Computer Interaction 3.0
ISYS 420 WI Software Project Management 3.0

Computer engineering requirements
ECEC 200 Fundamentals of Intelligent Systems 3.0

Computing electives
Additional IS courses (CS courses see advisor) 18.0

Mathematics/statistics requirements
CS 270 Mathematical Foundations of Computer Science 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
MATH 221 Discrete Mathematics 3.0
STAT 205 Statistical Inference I 4.0
STAT 206 Statistical Inference II 4.0

Basic Science requirements (Choose one of the following sequences)

BIO 114 Bioscience I: Growth of Organisms and Populations 5.5
BIO 115 Bioscience II: Organismal Physiology 5.5
BIO 117 Bioscience III: Molecular and Cellular Genetics 5.5
or
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
CHEM 103 General Chemistry III 5.0
or
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 211 Physics III 4.5
Additional science electives 4.5 - 8.5

Liberal studies requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
PHIL 105 Critical Reasoning 3.0
PHIL 311 Computer Ethics 3.0
COM 230 Techniques of Speaking 3.0
COM 310 WI Technical Communication 3.0
PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
Additional liberal studies electives 6.0

Business requirements
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
ACCT 111 Financial Accounting 3.0

University requirements
UNIV 101 The Drexel Experience 2.0
Free electives 24.0

The College of Media Arts and Design

The College of Media Arts and Design is a center for studying both the process and the products of design in the human environment and on media. Curricula concentrate on design as a process that can be defined, understood, and applied to solve human problems. Students study conceptualization and implementation of ideas within a creative environment involving aesthetics, function, ethics, technology, and the realities of the marketplace. They focus on the use of artifacts of daily life and react to creations that reflect the human condition. Common to most of the college's undergraduate curricula is a visual core that provides a foundation of design knowledge.

The College of Media Arts and Design offers nine majors leading to the Bachelor of Science degree, as well as a major in Architecture leading to the Bachelor of Architecture degree. The purpose of each program is to encourage design and creation.

Consistent with Drexel's philosophy of co-operative education, periodic, full-time, paid employment is required of most students in the college. Students' specializations determine the timing of their co-op experiences.

The Drexel in London Program
The Drexel in London Program offers flexible schedules for study abroad, ranging from six-week summer sessions to two-term study and co-operative education programs in which students can earn up to 18 credits and a quarter of full-time co-operative education. The program's emphasis is on experiencing and understanding British culture and the visual media with a focus on the global implications of the merchandising and design industries. Students may select among the offered courses to create their own concentrations. Housing is provided in South Kensington, one of central London's most desirable residential sections. Drexel in London applications are administered by the Study Abroad office, 215-895-1704.

Accelerated Summer Courses
With departmental permission, students may enroll in Visual Studies accelerated courses over the summer. These typically include courses in accelerated Design I,II, III; Introductory Drawing; Figure Drawing I and II; Multimedia Space; Performance; Materials; Sculpture, Painting, and Silkscreen.

Primarily these courses are offered so that new undergraduate transfer students and pre-graduate students can complete their future programs in an economical time frame. Students with some experience in studio coursework may be eligible to take accelerated courses. A portfolio review is required to required to determine eligibility.

Enrichment Programs
The Department of Architecture runs Summer Study Tours Abroad to Rome and Paris as elective course offerings in History and Theory. These programs focus the travel portion into three-week periods to accommodate student work commitments.

Architecture

The practice of architecture calls for creative thinking and aesthetic sensitivity, technical and management skills, inventive and scientific knowledge, cultural understanding and social responsibility, and the ability to communicate with those in related disciplines. Therefore, the curriculum of the Department of Architecture is broad, including courses in the physical and social sciences and the humanities as well as professional courses in the field of architecture. This broad education allows for various career objectives, both in architecture and in related fields.

Advisement and Departmental Regulations
Please refer to the department's General Counseling Guidelines to the Curriculum for a complete description of all departmental regulations and procedures, and for advice in selecting, sequencing, and scheduling coursework. These guidelines are available at the Office of the Department of Architecture at 3201 Arch Street.

Accreditation
The Bachelor of Architecture degree program at Drexel is accredited by the National Architectural Accrediting Board (NAAB). Please note that the Two+Four Option and the Part-Time Evening Program are both integral parts of the accredited Bachelor of Architecture degree program.

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the preprofessional degree is not, by itself, recognized as an accredited degree.

Architecture vs Architectural Engineering
Because Drexel university offers two programs with "architecture" in their titles, it is useful to point out the significant differences between them:

Architects design buildings to meet people's spatial, organizational, and aesthetic needs; they also coordinate the building design process. After earning a Bachelor of Architecture Degree, graduates become registered architects by completing the required work experience and state licensing examinations.

Architectural engineers specialize in the design of engineering systems within buildings. Architectural engineers earn Bachelor of Science Degrees and become professional engineers with the required experience and state examinations. Students whose interests are focused on the technological and engineering aspects of buildings should review Drexel's major in Architectural Engineering offered by the College of Engineering.

Drexel offers two routes to attain a bachelor of architecture degree: a 2 + 4 option and a part-time evening option. In the 2 + 4 option, offered by the College of Media Arts and Design, students complete two years of full-time study, then continue studies on a part-time basis for four additional years while employed. The part-time evening option is offered through the Goodwin College

Bachelor of Architecture Degree (2+4) Option

Degree Requirements: 209.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0|
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
PHYS 103 General Physics I 4.0
PHYS 104 General Physics II 4.0
UNIV 101 The Drexel Experience 2.0
Humanities and social science electives 9.0
Free electives 12.0

Required studio design sequence (2+4 option)
ARCH 101 Studio 1-A 4.5
ARCH 102 Studio 1-B 4.5
ARCH 103 Studio 2-A 4.5
ARCH 104 Studio 2-B* 4.5
ARCH 105 Studio 3-A 4.5
ARCH 106 Studio 3-B 4.5
ARCH 241 Studio 4-1* 4.0
ARCH 242 Studio 4-2 4.0
ARCH 243 Studio 4-3 4.0
ARCH 351 Studio 5-1 4.0
ARCH 352 Studio 5-2 4.0
ARCH 353 Studio 5-3 4.0
ARCH 361 Studio 6-1* 4.0
ARCH 362 Studio 6-2 4.0
ARCH 363 Studio 6-3 4.0
ARCH 496 Thesis I 8.0
ARCH 497 Thesis II 8.0
ARCH 498 Thesis III 8.0
***Prior to taking this course student must meet the Department of Architecture's minimum studio advancement requirements. See the Department's Advising Guidelines web page for more details.**

Required professional courses (2+4 option)
ARCH 14I WI Architecture and Society I 3.0
ARCH 142 WI Architecture and Society II 3.0
ARCH 143 WI Architecture and Society III 3.0
ARCH 150 Introduction to CADD I 4.0
ARCH 151 Architectural Drawing I 3.0
ARCH 152 Architectural Drawing II 3.0
ARCH 153 Introduction to CADD II 4.0
ARCH 161 Architectural Construction 3.0
ARCH 261 Environmental Systems I 3.0
ARCH 262 Environmental Systems II 3.0
ARCH 263 Environmental Systems III 3.0
ARCH 321 WI General Lecture Series I 3.0
ARCH 322 WI General Lecture Series II 3.0
ARCH 323 WI General Lecture Series III 3.0
CIVE 261 Materials and Structural Behavior I 3.0
CIVE 262 Materials and Structural Behavior II 3.0
CIVE 263 Materials and Structural Behavior III 3.0

History and theory electives 12.0
Three or four of the following courses
ARCH 341 Theories of Architecture I 3.0
ARCH 342 Theories of Architecture II 3.0
ARCH 343 Theories of Architecture III 3.0
ARCH 344 History of the Modern Movement I 3.0
ARCH 345 History of the Modern Movement II 3.0
ARCH 346 History of Philadelphia Architecture 3.0
ARCH 347 Summer Study Abroad (6 credits) 6.0
ARCH 348 Studies in Vernacular Architecture 3.0
ARCH 441 Urban Design Seminar I 3.0
ARCH 442 Urban Design Seminar II 3.0
ARCH 499 Special Topics in Architecture 3.0

Professional electives 9.0
Any three of the following courses*
ARCH 157 Graphic Communication II 3.0
ARCH 421 WI Environmental Psychology and Design Theory 3.0
ARCH 431 Architectural Programming 3.0
ARCH 432 The Development Process 3.0
ARCH 435 Management Seminar I 3.0
ARCH 436 Management Seminar II 3.0
ARCH 451 Advanced Drawing 3.0
ARCH 455 Computer Applications in Architecture I 3.0
ARCH 456 Computer Applications in Architecture II 3.0
ARCH 461 Technology Seminar I 3.0
ARCH 462 Technology Seminar II 3.0
ARCH 465 Energy and Architecture 3.0
ARCH 499 Special Topics in Architecture 3.0
CIVE 400 Structural Design I 3.0
CIVE 401 Structural Design II 3.0
CIVE 402 Structural Design III 3.0
CIVE 464 Acoustics and Noise Control in Buildings I 3.0
CMGT 462 Construction Management I 3.0
CMGT 463 Value Engineering II 3.0
CMGT 363 Estimating I 3.0
PHTO 110 Photography 3.0
VSST 111 Figure Drawing I 3.0
VSST 202 Multimedia: Space 4.0
VSST 301 Painting I 4.0
VSST 311 Sculpture 4.0
Other approved engineering courses 3.0

*** History and theory electives can also be used to satisfy professional elective requirements.**

Minor in Architecture

A minor in architecture gives students majoring in other disciplines an opportunity to explore architecture through a coherent sequence of coursework. The minor in architecture can also be used for preparation towards professional graduate study in this field. Interested students should consult with the architecture advisor for course selection and scheduling.

The minor requires 27 credits divided among design studio courses, courses in architectural history, and architectural elective courses. No more than 9 credits from a student's major can be used to fulfill the minor requirements.

Required courses
ARCH 141 WI Architecture and Society I 3.0
ARCH 142 WI Architecture and Society II 3.0
ARCH 143 WI Architecture and Society III 3.0
Elective architecture courses* 9.0
*** Chosen from Department of Architecture history/theory electives and professional electives.**

Three of the following*
ARCH 191 Studio 1 3.0
or
ARCH 111 Studio 1-1 3.0
ARCH 192 Studio 2 3.0
or
ARCH 112 Studio 1-2 3.0
ARCH 113 Studio 1-3 3.0
ARCH 121 Studio 2-1 3.0
ARCH 122 Studio 2-2 3.0
ARCH 123 Studio 2-3 3.0

*** Students who have successfully completed INTR 233 should enter the studio sequence at the second-year level (ARCH 121). Students who have successfully completed ARCH 192 should start the studio sequence with ARCH 113.**

Design and Merchandising

The major in design and merchandising prepares students to make merchandising and marketing decisions based on a knowledge of visual/aesthetic and business considerations. Design and merchandising students develop an appreciation for style, product quality, and design; learn to communicate verbally and visually about design; and gain the business skills and knowledge required to promote and defend an aesthetically grounded point of view in the marketplace.

Design and merchandising majors typically focus study in the areas of fashion retail merchandising or product development. Elective credits may be used for a concentration in retail merchandising and management, product development and merchandise management, lifestyle product development and management, special events planning and promotion, computer imaging for design and merchandising, or marketing, and for providing an option to minor in business administration or another discipline or to pursue specific educational goals.

B.S. in Design and Merchandising

Degree Requirements 180.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 119 Mathematical Foundations for Design 4.0
PHYS 121 Physical Science for Design I 4.0
PHYS 122 Physical Science for Design II 4.0
UNIV 101 The Drexel Experience 2.0
Arts and humanities electives 9.0
Social science electives 9.0
Free electives 29.0

Visual studies requirements
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
PHTO 110 Photography 3.0
or
PHTO 115 Photographic Principles
VSST 101 Design I 4.0
VSST 102 Design II 4.0
VSST 103 Design III 4.0
VSST 110 Introductory Drawing 3.0
VSST 111 Figure Drawing I 3.0
VSST 201 Multimedia: Performance 4.0
VSST 202 Multimedia: Space 4.0
VSST 203 Multimedia: Materials 4.0
VSST 211 Textiles 3.0

Design and merchandising requirements
ACCT 115 Financial Accounting I 5.0
ARTH 300 WI History of Modern Design 3.0
DSMR 201 Analysis of Product 3.0
DSMR 210 Presentation Techniques Design Merchandising 3.0
DSMR 211 Computer Design for Design and Merchandising 3.0
DSMR 310 Computer Integrated Merchandise Management 3.0
DSMR 311 Visual Merchandising I 4.0
DSMR 431 Introduction to Retail Marketing 3.0
DSMR 432 Retail Buying and Merchandising 4.0
DSMR 433 Fashion Product Knowledge and Development 3.0
DSMR 477 WI Design and Merchandising Seminar 3.0
DSMR 496 WI Senior Problem in Design and Merchandising 3.0
ECON 201 Economics I 4.0
ECON 202 Economics II 4.0
FASH 201 Survey of the Fashion Industry 3.0
MKTG 301 WI Introduction to Marketing Management 5.0
VSCM 100 Computer Imaging I 3.0
Art history electives 6.0

Digital Media

The digital media program is a broad and robust course of study covering traditional design techniques and cutting-edge new technologies taught in the framework of a university education. Students take a range of courses including timeline design, 3D animation, gaming, multimedia authoring, and advanced interactivity for the Internet.

Students also take courses in the humanities, social sciences, mathematics, and natural sciences. Graduates

are prepared for innovative careers in a variety of environments, including boutique media companies, corporate production houses, visual effects studios and gaming companies.

The two digital media minors provide foundations in the production and management of digital assets, the design and creation of 2D and 3D computer graphics, animation, and multimedia. Additional study is done in media arts.

Students select one of the two minors. To qualify for a minor a student must have completed a minimum of 30 credits, have a declared major, and have a minimum GPA of 2.7.

B.S. in Digital Media

Degree Requirements: 185.0 credits

General education requirements

ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 119 Mathematical Foundations for Design 4.0
PHYS 121 Physical Science for Design I 4.0
PHYS 122 Physical Science for Design II 4.0
UNIV 101 The Drexel Experience 2.0
COM 230 Techniques of Speaking 3.0
Arts and humanities electives 6.0
History elective 3.0
Literature elective 3.0
Philosophy elective 3.0
Social science electives 9.0
Unrestricted electives 23.0-24.0

Visual studies requirements
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
ARTH 300 WI History of Modern Design 3.0
VSST 101 Design I 4.0
VSST 102 Design II 4.0
VSST 110 Introductory Drawing 3.0
VSCM 100 Computer Imaging I 3.0
One of the following courses
VSST 103 Design III 4.0
VSST 111 Figure Drawing I 3.0
VSST 201 Multimedia: Performance 4.0
VSST 202 Multimedia: Space 4.0
VSST 301 Painting I 4.0

Media foundation requirements
CS 171 Computer Programming I 3.0
CS 172 Computer Programming II 3.0
FMVD 105 Fundamentals of Video Production 3.0
FMVD 150 American Classic Cinema 3.0
or
FMVD 270 Scriptwriting I
ISYS 110 Human-Computer Interaction 3.0
VSCM 230 Visual Communication I 4.0
VSCM 240 Typography I 3.0

Digital media requirements
DIGM 115 3-D Modeling/Design 3.0
DIGM 150 Overview of Digital Media 3.0
DIGM 203 Multimedia Timeline Design 3.0
DIGM 211 Computer Animation I 3.0
DIGM 212 Computer Animation II 3.0
DIGM 220 Digital Still Imaging I 3.0
DIGM 221 Digital Still Imaging II 3.0
DIGM 240 Introduction to Interactivity 3.0
DIGM 241 Multimedia Authoring 3.0
DIGM 242 Advanced Interactivity for the Internet 3.0
DIGM 250 Professional Practices 3.0
DIGM 302 Art and Techniques of Digital Compositing 3.0
DIGM 321 Digital Audio 3.0
DIGM 475 Seminar: The Future of Digital Media 3.0
DIGM 492 Senior Project in Digital Media I 3.0
DIGM 493 Senior Project in Digital Media II 3.0

Five of the following:
DIGM 314 Character Animation I 3.0
DIGM 315 Character Animation II 3.0
DIGM 350 WI Digital Storytelling and Cultural Production 3.0
DIGM 411 Advanced Animation and Visual Effects 3.0
DIGM 440 Interactive Game Development 3.0
DIGM 445 Advanced Hybrid Interactivity 3.0
DIGM 451 WI Explorations in New Media 3.0

Minor in 3D Modeling/Animation

Required courses
DIGM 115 3D Modeling/Design 3.0
DIGM 203 Multimedia Timeline Design 3.0
DIGM 211 Computer Animation I 3.0
FMVD 105 Fundamentals of Video Production 3.0
VSCM 100 Computer Imaging I 3.0
VSST 110 Introductory Drawing 3.0

Three of the following courses 9.0
DIGM 150 Overview of Digital Media 3.0
DIGM 314 Character Animation I 3.0
DIGM 315 Character Animation II 3.0
DIGM 350 WI Digital Storytelling and Cultural Production 3.0
DIGM 411 Advanced Animation and Visual Effects 3.0

Minor in Interactivity

Required courses
DIGM 203 Multimedia Timeline Design 3.0
DIGM 240 Introduction to Interactivity 3.0
DIGM 241 Multimedia Authoring 3.0
PHTO 110 Photography 3.0
or
DIGM 220 Digital Still Imaging I
VSCM 100 Computer Imaging I 3.0
Computer programming courses 6.0

Two of the following courses
DIGM 150 Overview of Digital Media 3.0
DIGM 242 Advanced Interactivity for the Internet 3.0

DIGM 350 WI Digital Storytelling and Cultural Production 3.0
DIGM 445 Advanced Hybrid Interactivity 3.0

Dramatic Writing

Students in the dramatic writing program begin the lifelong process of accumulating a writer's capital: the ideas, understandings, facts, and methods of perception, as well as the technical knowledge, needed to write compellingly for the stage or screen. Students learn to create scripts that meet current industry standards for feature film and television production and acquire hands-on experience in the techniques of film and video production. Graduates of this program will be prepared to pursue careers in any of numerous fields that require dramatic writing or to enter one of the highly competitive graduate programs in dramatic writing.

B.S. in Dramatic Writing

Degree Requirements: 182.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 119 Mathematical Foundations for Design 4.0
PHYS 121 Physical Science for Design I 4.0
PHYS 122 Physical Science for Design II 4.0
UNIV 101 The Drexel Experience 2.0
Arts and humanities electives (excluding ENGL courses) 9.0
Social science electives 9.0
Electives 34.0

Visual studies requirements
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
MUSC 130 Introduction to Music 3.0
PHTO 115 Photography 3.0
or
PHTO 115 Photographic Principles
VSST 101 Design I 4.0
VSST 102 Design II 4.0

Literature requirements
ENGL 203 WI Post-Colonial Literature I
or
ENGL 204 Post-Colonial Literature II 3.0
ENGL 315 WI Shakespeare 3.0
Literature electives 6.0

One of the following:
ENGL 200 WI Classical to Medieval Literature
ENGL 201 Renaissance to the Enlightenment
ENGL 202 WI Romanticism to Modernism

Cinema studies/theatre studies requirements
ENGL 216 WI Readings in Drama 3.0
FMVD 150 American Classic Cinema 3.0
FMVD 350 World Cinema 3.0
THTR 115 Theatrical Experience 3.0
THTR 121 Dramatic Analysis 3.0
Theatre choice elective (any advanced acting, directing or production course) 3.0
FMVD Cinema studies elective 3.0

Methods requirements
FMVD 105 Fundamentals of Video Production 3.0
FMVD 215 Dramatic Video Production 3.0
FMVD 230 Basic Filmmaking 3.0
THTR 210 Acting I 3.0
THTR 240 Theatre Production I 3.0
THTR 320 Play Direction I 3.0

Writing requirements
DRWT 220 Playwriting I 3.0
DRWT 225 Playwriting II 3.0
DRWT 495 Senior Project in Dramatic Writing I 3.0
DRWT 496 Senior Project in Dramatic Writing II 3.0
FMVD 270 Scriptwriting I 3.0
FMVD 275 Scriptwriting II 3.0
FMVD 285 Writing for Nonfiction Film and Video 3.0
WRIT 225 WI Creative Writing 3.0

One of the following course sequences:
DRWT 382 Playwriting Workshop I
DRWT 383 Playwriting Workshop II
or
FMVD 270 Screenwriting Workshop I
FMVD 275 Screenwriting Workshop II

One of the following:
COM 260 WI Fundamentals of Journalism
COM 280 Public Relations
FMVD 280 Copywriting
PRFA 310 Performing Arts Evaluation and Criticism
WRIT 220 WI Creative Nonfiction Writing

Fashion Design

Fashion design encompasses the planning, design, production, and marketing of clothing. The fashion designer's final products answer physical, aesthetic, psychological, and social needs and employ traditional and advanced technological tools.

The fashion design major prepares students for professional employment in the apparel industry as fashion designers, stylists, or technical designers. Graduates are also prepared to work in positions that demand creative design ability in display, computer-aided design, advertising, and merchandising. Students exhibit their collections competitively in the annual fashion show.

B.S. in Fashion Design

Degree Requirements: 182.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 119 Mathematical Foundations for Design 4.0
PHYS 121 Physical Science for Design I 4.0
PHYS 122 Physical Science for Design II 4.0
UNIV 101 The Drexel Experience 2.0
Arts and humanities electives 9.0
Social science electives 9.0
Free electives 24.0

Visual studies requirements
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
PHTO 110 Photography 3.0
or
PHTO 115 Photographic Principles
VSST 101 Design I 4.0
VSST 102 Design II 4.0
VSST 103 Design III 4.0
VSST 110 Introductory Drawing 3.0
VSST 111 Figure Drawing I 3.0
VSST 204 Materials Exploration 4.0
VSST 211 Textiles 3.0
VSST 301 Painting I 4.0

One of the following:
VSST 201 Multimedia: Performance 4.0
VSST 202 Multimedia: Space 4.0
VSST 203 Multimedia: Materials 4.0

Fashion design requirements
ARTH 335 History of Costume I: Preclassical to Directoire 3.0
ARTH 336 History of Costume II: Directoire to World War I 3.0
FASH 201 Survey of the Fashion Industry 3.0
FASH 210 Presentation Techniques in Fashion Design 3.0
FASH 211 Fashion Drawing I 3.0
FASH 212 Fashion Drawing II 3.0
FASH 220 Textile Design 3.0
FASH 241 Construction Skills 4.0
FASH 251 Fashion Design I 4.0
FASH 252 Fashion Design II 4.0
FASH 313 Fashion Drawing for Industry 3.0
FASH 314 Fashion Presentation Drawing 3.0
FASH 315 CAD Patternmaking 3.0
or
FASH 316 CAD for Fashion Design 3.0
FASH 341 Flat Pattern Design 4.0
FASH 342 Draping Design 4.0
FASH 343 Tailoring and Design 4.0
FASH 351 Fashion Design III 4.0
FASH 352 Fashion Design IV 4.0
FASH 491 Senior Problem in Fashion Design: Phase I 4.0
FASH 492 Senior Problem in Fashion Design: Phase II 3.0
VSST 112 Figure Drawing II

Film and Video

The film and video major enables students to acquire a broad education in the liberal arts and the foundations of design as well as solid preparation for a professional career in film and video. In the core program, students develop talent and expertise as film and video makers. The program emphasizes production but includes substantial work in screenwriting and cinema studies.

B.S. in Film and Video

Degree Requirements: 182.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 119 Mathematical Foundations for Design 4.0
PHYS 121 Physical Science for Design I 4.0
PHYS 122 Physical Science for Design II 4.0
UNIV 101 The Drexel Experience 2.0
History electives 6.0
Literature electives 6.0
Philosophy electives 6.0
Social science electives 9.0
Electives 42.0

Visual studies requirements
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
or
VSST 110 Introductory Drawing 3.0
DIGM 220 Digital Still Imaging I 3.0
VSCM 100 Computer Imaging I 3.0
VSST 101 Design I 4.0
VSST 102 Design II 4.0
VSST 201 Multimedia: Performance 4.0

Film and video requirements
FMVD 105 Fundamentals of Video Production 3.0
FMVD 125 Basic Television Studio 3.0
FMVD 150 American Classic Cinema 3.0
FMVD 205 Professions in Film and Video 3.0
FMVD 210 Documentary Video Production 3.0
FMVD 215 Dramatic Video Production 3.0
FMVD 225 Advanced Television Studio
or
FMVD 330 Advanced Filmmaking 3.0
FMVD 230 Basic Filmmaking 3.0
FMVD 235 Lighting for Film and Video 3.0
FMVD 250 The Documentary Tradition 3.0
FMVD 255 Hitchcock 3.0
FMVD 270 Scriptwriting I 3.0
FMVD 275 Scriptwriting II 3.0
FMVD 350 World Cinema 3.0
FMVD 365 Special Topics in Production 3.0
FMVD 495 Senior Project in Film and Video 6.0

One of the following two-course sequences
FMVD 322 Production Workshop I 3.0
FMVD 323 Production Workshop II 3.0
or
FMVD 382 Screenwriting Workshop I 3.0
FMVD 383 Screenwriting Workshop II 3.0

Two of the following courses
FMVD 240 Film/Video Management 3.0
FMVD 260 The Western 3.0
FMVD 262 Film Comedy 3.0
FMVD 265 Special Topics in Cinema Studies 3.0
FMVD 285 Writing for Nonfiction Film and Video 3.0
FMVD 355 Contemporary Cinema 3.0
FMVD 360 Television Aesthetics 3.0

Minor in Cinema Studies

The minor requires eight courses, for a total of 24 credits.

Required courses
FMVD 105 Fundamentals of Video Production 3.0
FMVD 150 American Classic Cinema 3.0
FMVD 255 Hitchcock 3.0
FMVD 270 Scriptwriting I 3.0

Four of the following:
FMVD 250 The Documentary Tradition 3.0
FMVD 260 The Western 3.0
FMVD 262 Film Comedy 3.0
FMVD 265 Special Topics in Cinema Studies 3.0
FMVD 350 World Cinema 3,0
FMVD 355 Contemporary Cinema 3.0
FMVD 360 Television Aesthetics 3.0

Minor in Video Production

The minor requires eight courses, for a total of 24 credits.

Required courses
FMVD 105 Fundamentals of Video Production 3.0
FMVD 150 American Classic Cinema 3.0
FMVD 270 Scriptwriting I 3.0
FMVD 125 Basic Television Studio 3.0
FMVD 210 Documentary Video Production
or
FMVD 215 Dramatic Video Production 3.0
FMVD 322 Production Workshop I 3.0
FMVD 323 Production Workshop II 3.0

One of the following courses
FMVD 225 Advanced Television Studio 3.0
FMVD 230 Basic Filmmaking 3.0
FMVD 235 Lighting for Film and Video 3.0
FMVD 365 Special Topics in Production 3.0

Minor in Writing for the Media

The minor requires eight courses, for a total of 24 credits.

Required courses
FMVD 105 Fundamentals of Video Production 3.0
FMVD 150 American Classic Cinema 3.0
FMVD 270 Scriptwriting I 3.0
FMVD 275 Scriptwriting II 3.0
WRIT 225 Creative Writing 3.0
FMVD 285 Writing for Non-Fiction 3.0
FMVD 382 Screenwriting Workshop I 3.0
FMVD 383 Screenwriting Workshop II 3.0

Graphic Design

The Bachelor of Science curriculum in graphic design provides a balance of traditional and technical artistic studies enhanced by general education coursework in humanities and social sciences. Students develop a sophisticated approach to creative problem solving and develop skills in typography, image generation, corporate identity, information graphics, three dimensional design, and motion graphics. Students experience a broad range of two and three dimensional projects and remain current on electronic applications and emerging technologies. Graduates are employed by advertising agencies, design studios, corporate design departments and publishers.

B.S. in Graphic Design

Degree Requirements: 180.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 119 Mathematical Foundations for Design 4.0
PHYS 121 Physical Science for Design I 4.0
PHYS 122 Physical Science for Design II 4.0
UNIV 101 The Drexel Experience 2.0
Arts and humanities electives 9.0
Social science electives 9.0
Unrestricted electives 29.0
Co-operative education (two terms) 0.0

Visual studies requirements
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
PHTO 110 Photography 3.0
VSST 101 Design I 4.0
VSST 102 Design II 4.0
VSST 103 Design III 4.0
VSST 110 Introductory Drawing 3.0
VSST 111 Figure Drawing I 3.0
VSST 301 Painting I 4.0
VSST 302 Painting II 4.0

Two of the following:
VSST 201 Multimedia: Performance 4.0
VSST 202 Multimedia: Space 4.0
VSST 203 Multimedia: Materials 4.0
VSST 311 Sculpture I 4.0

Graphic design requirements
ARTH 300 WI History of Modern Design 3.0
PHTO 210 Intermediate Photography 3.0
VSCM 100 Computer Imaging I 3.0
VSCM 200 Computer Imaging II 3.0

VSCM 230 Visual Communication I 4.0
VSCM 231 Visual Communication II 4.0
VSCM 232 Visual Communication III 4.0
VSCM 240 Typography I 3.0
VSCM 241 Production 3.0
VSCM 242 Typography II 3.0
VSCM 330 Visual Communication IV 4.0
VSCM 331 Visual Communication V 4.0
VSCM 340 Typography III 3.0
VSCM 350 Graphic Design: 20th Century and Beyond 3.0
VSCM 430 Visual Communication VI 4.0
VSCM 440 Book Design 3.0
VSCM 460 Professional Practice
or
VSCM 477 Graphic Design Seminar 3.0
VSCM 496 Senior Thesis in Graphic Design 3.0
VSCM 321 Silkscreen 4.0

Interior Design

The interior design major educates students to design spaces aesthetically and functionally. The program is rooted in design and is supported by a visual studies foundation that provides a broad base of knowledge in design and the fine arts and by a broad spectrum of general education courses. Scientific and quantitative knowledge, historical and cultural understanding, social and behavioral forces, and the ability to communicate are addressed through the general education requirements.

The mission of the interior design program is to educate the student as a developing professional through academic coursework and entry-level co-operative employment and to instill an aspiration for lifelong learning. The curriculum prepares students for employment with interior firms and architectural offices and in facilities design and management. The program is accredited by the Foundation for Interior Design Education Research (FIDER).

B.S. in Interior Design

Degree Requirements: 183.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 119 Mathematical Foundations for Design 4.0
PHYS 121 Physical Science for Design I 4.0
PHYS 122 Physical Science for Design II 4.0
UNIV 101 The Drexel Experience 2.0
Arts and humanities electives 9.0
Social science electives 9.0
Free electives 23.0

Visual studies requirements
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
VSCM 100 Computer Imaging I 3.0
VSST 101 Design I 4.0
VSST 102 Design II 4.0
VSST 103 Design III 4.0
VSST 110 Introductory Drawing 3.0
VSST 201 Multimedia: Performance 4.0
or
VSST 202 Multimedia: Space
VSST 203 Multimedia: Materials 4.0
VSST 211 Textiles 3.0
VSST 301 Painting I 4.0
VSST 311 Sculpture I 3.0
CoMad studio electives 6.0

Interior design requirements
INTR 150 Issues of the Interior Environment 3.0
INTR 200 History of Modern Architecture 3.0
INTR 220 Orthographic Drawing 3.0
INTR 231 Structure 4.0
INTR 232 Interior Studio I 4.0
INTR 233 Interior Studio II 4.0
INTR 240 Perspective Drawing I 3.0
INTR 241 Perspective II 3.0
INTR 245 CAD for Interior Design 3.0
INTR 250 Interior Materials 3.0
INTR 251 Interior Systems 3.0
INTR 305 WI History of Furniture 3.0
INTR 331 Residential Design Studio 4.0
INTR 332 Hospitality Design Studio 4.0
INTR 340 Interior Lighting 3.0
IINTR 351 Interior Detailing 3.0
INTR 430 Commercial Design Studio 4.0
INTR 435 Topical Issues Studio 4.0
INTR 445 Contract Documentation for Interior Design 3.0
INTR 450 WI Codes Professional Practice for Interior Design 3.0

Music Industry

The music industry curriculum is divided into three areas, which are combined with co-operative experience: general education, music core, and music industry. By working in various aspects of the industry in two three-month periods of full-time career-related employment, students gain valuable insights into how the entertainment industry works.

In an industry where the process of building a career often begins with a few key contacts, the co-operative education program gives Drexel students the chance to begin meeting people and networking. The program prepares students for employment in the music industry in such diverse positions as recording engineer, sound engineer, sound designer, music lawyer, business manager, personal manager, and music publisher.

The major offers a distinctive range of specializations and areas of concentration. Each student chooses from among these options to build an individual program of study that can be focused toward a specific career goal.

Coursework

The curriculum combines four distinct features: First, the continued study of music; second, liberal studies courses that include mathematics, science, the arts, humanities, and social sciences; third, completion of a specialization; and fourth, a concentration which adds a specific, career-oriented focus to the program. The following provides an overview of these features.

Concentrations
Each student focuses the specialization by choosing a concentration appropriate to individual career goals. While general guidelines have been developed for such concentrations as artists/arts management, composition/arranging/audio technology, music marketing and merchandising, music-video production, and musical acoustics and sound reinforcement, a student may also design an individualized concentration.

Special Admissions Considerations
Students wishing to be admitted to the music program must meet or exceed the general requirements for admission to the University and the College of Design Arts, and must also fulfill the following special requirements:

- Successful completion of a performance audition in the applicant's applied performance area (piano, voice, trumpet, etc.)
- Completion of the equivalent of four years of high school English and at least two units of high school credit in the fine and/or performing arts
- Evidence of dedicated involvement in community or school activities related to the arts
- Students electing the science and technology specialization must have successfully completed high school mathematics through second-year algebra and trigonometry, and at least two laboratory sciences (physics and chemistry are recommended).

B.S. in Music Industry

Degree Requirements: 184.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
PHYS 121 Physical Science for Design I 4.0
PHYS 122 Physical Science for Design II 4.0
COM 230 Techniques of Speaking 3.0
UNIV 101 The Drexel Experience 2.0
Arts and humanities electives 9.0
Social science electives 9.0
Free electives 23.0

Music core requirements
Music theory, ear training, and creation
MUSC 121 Music Theory I 3.0
MUSC 122 Music Theory II 3.0
MUSC 123 Music Theory III 3.0
MUSC 125 Ear Training I 1.0
MUSC 126 Ear Training II 1.0
MUSC 127 Ear Training III 1.0
MUSC 229 Arranging and Orchestration 3.0
MUSC 231 WI Music History I 3.0
MUSC 232 Music History II 3.0
MUSC 323 Songwriting 3.0
MUSC 331 World Musics 3.0
MUSC 338 WI American Popular Music 3.0

Applied music, ensemble, and electives
MUSC 141 Applied Major I 4.0
MUSC 142 Applied Major II 4.0
MUSC 143 Applied Major III 4.0
MUSC 190 Class Piano 2.0
MUSC 290 Advanced Class Piano I 2.0
Music ensembles 6.0
Music electives 6.0

Music industry requirements
ACCT 111 Financial Accounting* 3.0
BLAW 211 Legal Options* 3.0
ECON 211 Principles of Economics I* 3.0
FIN 311 Financial Management* 3.0
MKTG 311 Introduction to Marketing Management* 3.0
MUSC 135 Acoustics 3.0
MUSC 137 Sound Reinforcement and Enhancement 3.0
MUSC 133 Computer Applications in Music 3.0
MUSC 138 Digital Audio Production 3.0
MUSC 227 Listening Techniques for Music Production 1.0
MUSC 279 Music Recording I 3.0
MUSC 261 Music Business I 3.0
MUSC 379 Music Recording II 3.0
MUSC 479 Recording Session 3.0
MUSC 361 Music Business II 3.0
MUSC 455 Audio for Video 3.0
MUSC 461 Music Business III 3.0
MUSC 491 Senior Project in Music Industry 3.0
STAT 261 Statistics I 3.0

*** These courses may count toward an MBA.**

Music Ensembles

Drexel University Choirs
Dr. Steven Powell, Director
Chamber Singers (MUSC 102/501)
A select group of 16 singers chosen by audition from the University Chorus. They perform secular music from the Renaissance period (Madrigals).

University Chorus (MUSC 101/501)
Traditional concert choir literature, a capella and with instrumental accompaniment.

Vocal Jazz Ensemble (MUSC 107/502)
A select group of 14 singers chosen by audition from the University Chorus. They perform "anything that swings," doing a variety of pieces from the 20's to the 90's with a three-piece back-up band.

Concert and Pep Bands
Mr. Bruce Kaminsky, Director

Concert Band (MUSC 105/501)
Students who are proficient on woodwind, brass, or percussion instruments may become members of this large instrumental ensemble by auditioning for the director. Membership is based on the student's ability and the instrumental needs of the ensemble.

The Basketball Pep Band (MUSC 105/001)
This band is made up of brass players, saxophone players, and trap drummers drawn from the membership of the Concert and Symphonic Bands.

Instrumental Jazz Ensembles
Dr. George Starks, Director

Jazz Orchestra (MUSC 107/501)
Performs music which is associated with and/or inspired by acknowledged masters of the jazz tradition such as Duke Ellington, Count Basie, Charlie Parker, Dizzy Gillespie, Miles Davis, Charles Mingus, Thad Jones, and others.

The Jazztet (MUSC 107/001)
This ensemble performs small group masterpieces such as literature associated with Art Blakey, Horace Silver, Clifford Brown, John Coltrane, and others.

Drexel University Gospel Choir (MUSC 115/501)
Mr. Greg Ross, Director
The Gospel Choir is a group of around 60 singers that is open to all Drexel Students. This ensemble performs contemporary gospel music with its own backup band.

Fusion Band and Percussion Ensemble
Ms. Lynne Riley and Mr. Bruce Kaminsky, Directors

The Fusion Band (MUSC 111/501)
A select group of musicians who perform fusion jazz music every term on campus for various student and university special events.

The Percussion Ensemble (MUSC 111/002)
Students in this group will have the opportunity to play, improve and perform on many instruments of the percussion family including: snare drum, bass drum, xylophone, marimba, timpani- and even hands and feet.

Drexel University Guitar and String Ensembles
Mr. Luke Abruzzo and Mr. Ron Lipscomb, Directors

Guitar Ensemble I and II (MUSC 111/001, MUSC 111/003)
The guitar ensemble is made up of twenty guitar enthusiasts. In this group students have the opportunity to develop their musicianship as part of a larger ensemble that includes acoustic guitars, acoustic bass guitars, electric guitars and electric bass guitars.

String Ensemble (MUSC 109/501)
The Drexel University String Ensemble is a chamber group composed of violins, violas, cellos, contrabasses, and piano. The ensemble is made up of about 10 to 20 players who are interested in continuing the musical skills they have already developed. The String Ensemble performs standard works by composers like Pachelbel, Bach and Mozart and has commissioned new works by American composers.

Drexel University Dance Program
Mrs. Miriam Giguere, Director

Dance Ensemble (DANC 131/501)
Elegant, exciting, sophisticated, sleek are all words commonly used to describe the Drexel Dance Ensemble. Performing ballet, jazz, tap and modern dance, the Drexel Dancers are both versatile and original.

Drexel University Theatre Program
Ms. Adelle Rubin, Director of Theatre Programs
Mr. Bill Pollock, Director of Theatre Academics

Main Stage Performance (THTR 131/001)
Studio Performance (THTR 131/002)
Main Stage Production (THTR 132/001)
Studio Production (THTR 132/002)

Students participate in all aspects of theatre performance and production, including; acting, directing, design, costumes, lighting, sets, sound, publicity, and box office.

Performing Arts Minors

Minor in Dance

Total credits: 24.0 credits

Required courses
DANC 150 Modern Dance Technique 3.0
DANC 325 20th-Century Dance 3.0
DANC 355 Rhythmic Study for Dance 3.0
DANC 450 Choreography—Solo Composition 3.0
or
DANC 380 Composition
MUSC 130 Introduction to Music 3.0
THTR 240 Dance Production 3.0

Electives in Dance (DANC 201-DANC 495) 6.0
Dance practicum (6 terms from DANC 131-DANC 133) 0.0

Minor in Music

Total credits: 26.0

Required courses
MUSC 121 Music Theory I 3.0
MUSC 125 Ear Training I* 1.0
MUSC 126 Ear Training II* 1.0
MUSC 130 Introduction to Music 3.0
MUSC 331 World Musics* 3.0
Applied music 6.0
Music ensemble (6 terms from MUSC 101 to MUSC 115) 0.0
Music electives* 9.0

***These requirements must be completed at Drexel.**

Minor in Performing Arts

Total credits: 25.0

Required courses
DANC 210 Introduction to Dance 3.0
MUSC 130 Introduction to Music 3.0
Applied music (one of MUSC 180–MUSC 182) 3.0
THTR 120 Introduction to Theatre 3.0
Theatre elective 3.0
Dance elective 3.0
Performing arts electives 7.0
Performing arts practicum (6 terms from MUSC 101-MUSC 115, THTR 131-THTR 133, and/or DANC 131-DANC 133) 0.0

Minor in Theatre

Total credits: 24.0

Required courses
THTR 121 Dramatic Analysis 3.0
THTR 221 Theatre History I 3.0
THTR 222 Theatre History II 3.0

Three credits in either or both of the following courses:
THTR 131 Performance Practicum 3.0
THTR 132 Production Practicum 3.0

Theatre electives from the following courses* 12.0 Credits
THTR 110 Voice and Articulation 3.0
THTR 115 Theatrical Experience 3.0
THTR 131 Performance Practicum 3.0**
THTR 132 Production Practicum 3.0**
THTR 210 Acting I 3.0
THTR 211 Acting II 3.0
THTR 240 Theatre Production I 3.0
THTR 241 Theatre Production II 3.0
THTR 260 Production Design 3.0
THTR 320 Play Direction 3.0
THTR 360 Lighting Design 3.0
THTR 380 Special Topics in Theatre 6.0
THTR 495 Directed Studies in Theatre
*** The Theatre Practicum courses may be repeated for credit, not to exceed 6.0 credits total toward the minor electives. The 0 credit option is for students on co-op participating in theatre productions who wish to have their participation documented on their transcripts, or for students carrying a 20.0 credit course load during a given term.**

**** With the approval of the Director of Theatre Academics, a student may propose alternative courses towards the completion of the minor electives based on his or her special area of interest.**

Photography

The photography major provides students with a unified fine arts/professional curriculum offering a wide range of studio, real-world, and academic experiences— intermixed with ongoing critiques and evaluation—including the studio, the darkroom, and the computer. The major prepares students to understand photography as a system of visual communication with its foundation in an ever-changing technology. Graduates may be employed in a variety of photo-related businesses, initiate their own photographic enterprises, or choose to go on to advanced studies.

B.S. in Photography

Degree Requirements: 180.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 119 Mathematical Foundations for Design 4.0
PHYS 121 Physical Science for Design I 4.0
PHYS 122 Physical Science for Design II 4.0
UNIV 101 The Drexel Experience 2.0
Arts and humanities electives 9.0
Social science electives 9.0
Unrestricted electives 35.0
Co-operative education (two terms) 0.0

Visual studies requirements
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
PHTO 110 Photography 3.0
VSST 101 Design I 4.0
VSST 102 Design II 4.0
VSST 103 Design III 4.0
VSST 110 Introductory Drawing 3.0
VSST 111 Figure Drawing 3.0
VSST 301 Painting I 4.0

Two of the following:
VSST 201 Multimedia: Performance 4.0
VSST 202 Multimedia: Space 4.0
VSST 203 Multimedia: Materials 4.0

Photography requirements
FMVD 105 Fundamentals of Video Production 3.0
PHTO 130 Photography I 1.0
PHTO 210 Intermediate Photography 3.0
PHTO 230 Photography II 1.0

PHTO 231 Color Photography 4.0
PHTO 233 Large-Format Photography 4.0
PHTO 234 Studio Photography 4.0
PHTO 236 Photojournalism 4.0
PHTO 240 Digital Photography 4.0
PHTO 253 Fine Black-and-White Printing 3.0
PHTO 275 WI History of Photography I 3.0
PHTO 276 History of Photography II 3.0
PHTO 350 WI Photography and Culture 3.0
PHTO 361 Advanced Photography 4.0
PHTO 392 Junior Project in Photography 3.0
PHTO 451 Photography and Business 3.0
PHTO 492 Senior Project in Photography I 3.0
VSCM 100 Computer Imaging I 3.0
PHTO 465 Special Topics in Photography 6.0

Studies in Media Arts and Design

A small number of students in the College of Media Arts and Design decide that their goals lie at the periphery of the major or the intersection between several majors and would be served by more latitude than offered in the highly specified courses in their major. For these students, the studies in media arts and design major broadens future career goals and allows exploration combined with a focused exposure to a second field. It acknowledges the specialization that is characteristic of the majors in the College and the expectations of the professional fields for which our students are being prepared. Simultaneously, it recognizes the breadth and rapidly changing nature of many disciplines and permits a student who has acquired a basic working knowledge of a specific aspect of media arts and design to investigate a clearly defined alternative.

Admission to the program is limited to currently matriculated College of Media Arts and Design students who have completed the major-intensive sophomore year and experienced a co-op placement or completed their junior-year courses. The following items are required as part of the application:

- A student-generated, individualized plan of study, developed with and signed by a member of the Studies in Media Arts and Design Advisors Committee
- A statement in writing of the student's goals in applying to the major and the rationale of how the proposed plan of study addresses those goals
- A definition of appropriate co-operative education placement if the student has not completed a six-month employment in the field of his or her major
- A letter from the student's current program director
- Approval by the Studies in Media Arts and Design Advisors Committee is required for admission to the major; it is not automatic upon request. The committee must be convinced by the validity of the applicant's reasons for applying, the proposed study plan, and accompanying documentation. Details about the application procedure may be obtained from the director of Studies in Media Arts and Design

B.S. in Studies in Media Arts and Design

Degree Requirements: 180.0 credits

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
UNIV 101 The Drexel Experience* 2.0
Arts and humanities electives 9.0
Mathematics and natural science electives 12.0**
Social science electives 9.0

***Students taking the Architecture Part-Time Evening program do not have this requirement.**

****At least one course in mathematics and one course in natural science are required.**

*****Not required if prior major did not require co-operative education experience.**

Unrestricted electives (max of 75.0)
Professional requirements* (min of 51.0)
Concentration or minor (min of 24.0)**

***All professional and visual studies courses required in prior major through winter term of junior year must be successfully completed.**

**** Up to 9 credits of general education and professional requirements may be included in this minimum.**

The College of Nursing and Health Professions

The College of Nursing and Health Professions contains a wealth of opportunity for prospective students to train in many health care fields. Managed care, universal access to health care, an aging population and the emergence of sophisticated direct care and communication technologies are revolutionizing health care delivery.

The College of Nursing offers the following undergraduate programs:

Behavioral and Addictions Counseling Sciences
Biomedical Sciences
Cardiovascular Perfusion Technology
Emergency Medical Services
Health Education and Related Training (HEART)
Health Sciences Degree-Completion Programs
Health-Services Administration
Nursing
Radiologic Technology
Nursing

The College's faculty and staff are committed to educating nurses to think critically, make evidenced-based decisions and practice competently and compassionately in rapidly changing practice environments. To this end, the College supports faculty and staff in developing strong education, practice and research programs that demonstrate the efficacy, quality and cost effectiveness of nursing interventions in promoting health, preventing disease and caring for the ill.

All nursing efforts in the College are designed to build nursing knowledge, enhance nursing practice, foster professional integrity, and ultimately improve the health outcomes of patients, families and communities across the continuum of care.

The College continuously reviews and redesigns programs, courses and educational products for depth and quality with the learner's experience and background always in the foreground. A significant percentage of full time faculty practice as part of their academic workload and serve as excellent role models for developing clinicians. In addition, a growing number of full time faculty are engaged in research activities.

The College examines changing market forces, the progression of nursing knowledge and best practices in health care and education to redesign educational programs and products. There is a strong commitment to population focused practice in diverse, urban communities.

In consideration of the demanding, fast-paced lives of students and nurse consumers, the College offers educational programs in convenient and contemporary formats including access to academic and continuing education web-based courses.

Behavioral and Addictions Counseling Sciences

The Behavioral and Addictions Counseling Sciences program consists of a comprehensive, clinically applied curriculum divided into two concentrations that prepare students with essential competencies for them to immediately begin making substantial contributions as professionals within today's evolving and demanding behavioral health care field: Behavioral Counseling Sciences and Addictions Counseling Sciences. Students may enter these concentrations as two-year transfer students or through the four-year Bachelor of Science Degree option.

Behavioral health care professions work in a variety of community agencies, outpatient treatment services, and inpatient and residential treatment settings, serving children, adolescents, and the elderly who suffer as a result of disabling mental illnesses and/or substance use disorders. Graduates who choose to enter the behavioral health care workforce find immediate employment in such functions as psychiatric rehabilitation, family and child support services, addictions counseling, case management, individual and group counseling, and crisis intervention. Graduates are also exceptionally well prepared to pursue advanced degrees in counseling, social work, psychology and related professions.

The curriculum design allows students engaged in either concentration options in selecting courses that reflect individual interests and meet a variety of pre-professional development needs. Students may also combine certain course sequences to earn Certificates of Advanced Study in one or more clinical practice specializations. Curriculum options available to students are selected after close consultation with a faculty advisor chosen by the student or by the department head.

About the Concentrations

Behavioral Counseling Sciences Concentration
The Behavioral Counseling Sciences Concentration enables full-time students transferring from two-year colleges to complete their Bachelor of Science (B.S.) degree in two years. The first year provides foundational learning through competency-based courses for professional practice in behavioral health care settings. The second year integrates a twenty-hour per week clinical training experience with courses that continue guiding students toward increased competencies as behavioral health counselors.

Addictions Counseling Sciences
The primary focus of the Addictions Counseling Sciences curriculum is to build professional workforce competencies in the following eight nationally recognized clinical practice dimensions: clinical evaluation; treatment planning; referral; service coordination; counseling; client, family, and

community education; documentation; and professional and ethical responsibilities. Emphasis is on comprehensive counselor education within the classroom setting, with only a brief senior year practicum requirement.

About the Curriculum
The curriculum is divided into five sections:

College and General Two-Year Transfer Requirements
Entering freshmen begin with these general education courses. Transfer students from other colleges nearing the end of their sophomore year should have completed most, if not all, of the credits within these course categories prior to applying. It is not necessary to have completed an associate's degree before completing a transfer application.

Foundation Requirements for Both Concentrations
These courses are common to both concentrations and may be taken by four-year students along with general education requirements during their sophomore year. Transfer students who have already completed the equivalent of one or more foundation courses with a grade of "B" or better during the five years prior to application to this program, may substitute electives from other areas in the program to complete the total credits required for the Bachelor of Science degree.

Behavioral Counseling Sciences Core
These courses are generally reserved for junior/senior year standing students. Students in this concentration are generally full-time students.

Addictions Counseling Sciences Core
These courses are also generally reserved for junior/senior year standing. Additionally, these courses are offered weekdays between 4:00 PM and 6:50 PM and on Saturdays, between 9:00 AM and 11:50 AM and 1:00 PM and 3:50 PM. This concentration is ideal for both full- and part-time students.

General Electives
Electives can be chosen from the list of electives or from core courses in either concentration.

Requirements
Freshmen applying to either concentration will complete the general education requirements listed below in the College of Nursing and Health Professions during their first two years of study before advancing to the core courses in either of this program's concentrations. Transfer students seeking junior-year entry are expected to have already completed most or all of these general education requirements

B.S. in Behavioral and Addictions Counseling

Degree Requirements: 120.0 (semester) credits

College Requirements/General Two-Year Transfer Requirements
ENGL 101 Composition and Literature I 3.0
ENGL 102 Composition and Literature II 3.0
CMPS 125 Computer Studies or Communications elective 3.0
or
SPCH 213
MATH 102 College Mathematics (or higher) 3.0
or
STAT 344 Statistics for Behavioral Science
BIOL 201 General Biology I 3.0-4.0
or
CHEM 201 General Chemistry I
or
Natural Science elective
Humanities and Social Science electives 21.0
General electives 24.0

Foundation Requirements for Both Concentrations
BCS 367 Foundations of Behavioral Health Care 3.0
or
ADCS 342 Foundations of Behavioral Health Care
BCS 352 Life-Span Human Development 3.0
or
ADCS 364 Life-Span Human Development
BCS 360 Behavioral Disorders 3.0
or
ADCS 360 Behavioral Disorders
BCS 336 Theory and Practice of Counseling 3.0
or
ADCS 322 Theory and Practice of Counseling
BCS 344 Multicultural Counseling Perspectives 3.0
or
ADCS 344 Multicultural Counseling Perspectives
Behavioral Counseling Sciences Core
BCS 301 Psychiatric Rehabilitation Principles 3.0
BCS 337 Family-Focused Interventions 3.0
BCS 351 Cognitive-Behavioral Counseling 3.0
BCS 368 Group Counseling 3.0
BCS 363 Crisis and Brief-Interventions Counseling 3.0
BCS 371 Ethics and Professional Responsibility 3.0
BCS 395 Clinical Training I 9.0
BCS 355 Clinical Case Seminar I 2.0
BCS 396 Clinical Training II 9.0
BCS 356 Clinical Case Seminar II 2.0

Behavioral Counseling Concentration Electives
Choose one or both concentration electives (or any courses from the general electives listed below or from the Addictions Counseling Sciences concentration core)

BCS 400 Psychiatric Rehabilitation Competencies
BCS 392 Child and Adolescent Support Services
Addictions Counseling Sciences Core
ADCS 312 Introduction to Addictive Disorders 3.0
ADCS 332 Psychopharmacology for Counselors 3.0
ADCS 362 Ethics and Professional Responsibility 3.0
ADCS 365 Assessment and Treatment Planning 3.0
ADCS 402 Cognitive-Behavioral Counseling I 3.0
ADCS 404 Cognitive-Behavioral Counseling II 3.0
ADCS 410 Group Counseling I 3.0
ADCS 411 Group Counseling II 3.0
ADCS 408 Recovery and Relapse Prevention Methods 3.0

ADCS 412 Case Management Methods 3.0
ADCS 440 Senior Practicum 3.0

Addictions Counseling
Choose any four courses from the General Electives listed below (or from Behavioral Counseling Sciences concentration core and electives)

General Electives
BCS 391 Child Psychopathology 3.0
BCS 390 Independent Study 3.0
ADCS 401 Forensic Mental Health Services 3.0
ADCS 367 Addictions Counseling Interventions 3.0
ADCS 368 Addictions Counseling with Special Populations 3.0
ADCS 414 Co-occurring Disorders 3.0
ADCS 406 Senior Case Seminar 3.0

Cardiovascular Perfusion Technology

The cardiovascular perfusion technology program provides students with the theoretical knowledge and clinical experience to be able to operate and provide extracorporeal circulation for patients.

Perfusionists apply their knowledge of the cardiopulmonary system and complex technology to the task of maintaining life during cardiac surgery. They prepare and operate the heart-lung machine and other equipment that replaces normal heart and lung functions during surgery.

In addition to becoming knowledgeable about this equipment, students in the cardiovascular perfusion technology program learn to interpret patients' medical histories and lab results, develop plans to conduct perfusion, implement the selection and interpretation of appropriate diagnostic tests, and learn to administer blood products and pharmacological agents. The perfusionist's role during cardiovascular bypass for elective heart surgery is highlighted, as are responsibilities in other clinical areas, including neurosurgery, organ and limb preservation, blood salvage and recovery, and transplantation.

Curriculum

The 21-month curriculum is designed for students who have already completed two or more years of college. Upon graduation, students are awarded the Bachelor of Science (B.S.) degree. The first semester is spent primarily in classroom instruction, while the remainder of the program focuses on clinical experience. Clinical rotation sites perform more than 2,000 cardiac surgeries annually, giving students the opportunity for a high volume of clinical work. More than half of the required semester hours are in clinical practica. The program is accredited by the Commission on Accreditation of Allied Health Education Programs (CAAHEP).

B.S. in Cardiovascular Perfusion Technology

Bachelor of Science Degree: 132.0 (Semester) credits

Prerequisites
Students with a minimum of 60 credits may enter this program, based on their completion of the following core prerequisites:
Core Prerequisites
English (one semester must be composition) 6.0
Mathematics (college-level algebra or higher) 3.0
Physics (preferably for health sciences) 3.0
General Biology 8.0
General Chemistry 8.0
Anatomy and Physiology 8.0
Social Science (history, political science, economics, psychology, sociology, anthropology) 12.0
Humanities* (languages, philosophy, non-dogmatic theology and theory courses in fine arts and music) 3.0
Computer Science 3.0
Medical Ethics 3.0
Free elective 3.0
Total 60.0
*** Note: Studio courses in art and music do not satisfy the humanities requirement.**

Additional Requirements

The program is an extremely intense 21-month course that requires personal and financial sacrifices and demands a high degree of integrity, self-sufficiency, motivation, discipline and highly developed study skills. Enrolled students will be expected to live in the metropolitan Philadelphia area and may need to be available nights, weekends and holidays, based on the rigors of the surgical schedule.

21-month Curriculum

First Semester
CVPT 101 Perfusion Technology I 4.0
CVPT 289 Cardiac Anatomy and Physiology 4.0
CVPT 293 Basic Surgery and Monitoring 2.0
CVPT 320 Physiologic Management of the Bypass 3.0

Second Semester
CVPT 295 Clinical Practicum I 8.0
CVPT 310 Perfusion Technology II 4.0
CVPT 330 Cardiovascular Pathology 4.0
CVPT 340 Cardiovascular Pharmacology 3.0

Third Semester
CVPT 300 Clinical Practicum II 12.0
CVPT 305 Pediatric Clinical Practicum 2.0
CVPT 307 Clinical Practicum III 12.0

Fourth Semester
CVPT 350 Clinical Practicum IV 12.0

Fifth Semester
CVPT 360 Cardiac Surgical Practicum 2.0

In addition, an independent research paper pertaining to cardiothoracic surgery is required. Examples of two recent projects are the management of diabetic patients undergoing

open-heart surgery and experimental animal research with mechanical heart-assist devices.

Emergency Medical Services

The undergraduate Emergency Medical Services (EMS) program provides two educational tiers, giving students the option of following an associate or a bachelor's degree track. Throughout the program, students learn to provide competent clinical prehospital care to the ill or injured, to master skills and concepts essential to the coordination and management of EMS systems, and to interact effectively with other health care professionals and patients.

While laying the foundation for graduate-level endeavors, the program also prepares students to analyze important public-policy issues that confront both prehospital emergency medical services and the emerging network of EMS systems and to combine theoretical and practical experience and knowledge of health care as it applies to EMS.

Accredited by the Pennsylvania Department of Health, Drexel University's program complies with the Commonwealth of Pennsylvania's EMS guidelines. The paramedic curriculum exceeds the National Standard Curriculum as accepted by the National Highway Traffic Safety Administration in 1998. Two degrees are available: the Associate in Science Degree and the Bachelor of Science Degree

About the Curriculum

Each degree track offers a traditional option, in which EMTs complete all necessary paramedic certification and degree coursework at Drexel University, and a completion option, in which certified EMT-Ps and recognized prehospital RNs can challenge for clinical credits and complete remaining degree coursework at Drexel University. Many online courses are being developed to allow off-site completion of the program.

Each degree track offers both a full-time and part-time option. The part-time program is designed for the person who wants to obtain their associate's or bachelor's degree as well as their paramedic certification but cannot attend a traditional program because of lifestyle and scheduling conflicts.

The flexible part-time option allows students to take courses that combine distance education and live classroom interaction. Via computer, the student will access daily didactic information such as lectures, videos, and reading assignments; hold online discussions; and take quizzes. Courses with a clinical lab component will require the student to attend a weekend of intensive skill learning, practice, and testing once a month. Clinical and field rotations are conveniently scheduled throughout the program. It should be noted that certain courses are sequenced to enhance the learning experience of the student.

A.S. in Emergency Medical Services

Degree Requirements: 72.0 (semester) credits

The traditional associate in science degree program prepares students to take the EMT-P certification examination. Clinical education is combined with investigation of specific EMS and health care management issues as well as a broad base of science and liberal arts courses. Five semesters of work are required to complete this degree. Clinical and field rotations are included throughout the two years. Although most students complete the clinical program on a full-time basis, a part-time process is being developed.

First semester
ANAT 130 Anatomy and Physiology I 4.0
EMS 104 Disease Processes I 2.0
EMS 108 Prehospital Field Techniques I 1.0
EMS 112 Professional Issues in EMS 1.0
EMS 210 EMS Management I 3.0
(EMS 100) Principles of Emergency Care (If the student is not already a certified EMT) (4.0)
Social Science or Humanties elective 3.0
College Mathematics 3.0

Second semester
ANAT 131 Anatomy and Physiology II 4.0
EMS 103 Advanced Assessment 3.0
EMS 107 Disease Processes II 2.0
EMS 109 Prehospital Field Techniques II 2.0
EMS 301 EMS Management II 4.0
Social Science or Humanities elective 3.0

Third semester
EMS 201 Emergency Care Analysis/Intervention I 5.0
EMS 202 Emergency Care Analysis/Intervention Lab I 4.0
EMS 115 Pharmacology 3.0
ENGL 101 Composition and Literature I 3.0

Fourth Semester
EMS 125 Field Practicum I 3.0
EMS 203 Emergency Care Analysis/Intervention II 5.0
EMS 206 Emergency Care Analysis and Intervention Lab II 5.0
ENGL 102 Composition and Literature II 3.0

Fifth Semester
EMS 226 Field Practicum II 6.0

Completion Program: Emergency Medical Services Associate in Science Degree

The completion program for the associate degree allows paramedics, who have state or National Registry certification, and recognized prehospital RNs to show

evidence of equivalent clinical coursework in order to receive credit for their previous clinical certifications by way of an Advanced Life Support competency examination. These students then complete the remaining courses to receive the associate degree. The EMS core courses are specific to Drexel University and must be completed here. Transfer of the other courses is acceptable with a grade of C or higher.

B.S. in Emergency Medical Services

Degree Requirements: 132.0 (semester) credits

Building on the first five semesters, the upper years concentrate on additional management, research, and administration knowledge with applied practica to enhance students' abilities. A required full-semester internship allows students to concentrate on an area of interest and specialization. Students can complete the B.S. degree as a continuous four-year sequence or on a part-time schedule for years three and four.

Internship examples include various regional EMS councils, flight programs, the Federal Emergency Management Agency, OSHA, EMS operational systems, Delaware State Police, and hospital emergency departments.

A nonclinical option is available for those interested in EMS education, management, and administration. This option is directed toward those who have had previous experience in other aspects of EMS and want additional education specific to health care management. EMT certification is a prerequisite.

First semester
ANAT 130 Anatomy and Physiology I 4.0
EMS 104 Disease Processes I 2.0
EMS 108 Prehospital Field Techniques I 1.0
EMS 112 Professional Issues in EMS 1.0
EMS 210 EMS Management I 3.0
(EMS 100) Principles of Emergency Care (If the student is not already a certified EMT) (4.0)
Social Science or Humanties elective 3.0
College Mathematics 3.0

Second semester
ANAT 131 Anatomy and Physiology II 4.0
EMS 103 Advanced Assessment 3.0
EMS 107 Disease Processes II 2.0
EMS 109 Prehospital Field Techniques II 2.0
EMS 301 EMS Management II 4.0
Social Science or Humanities elective 3.0

Third semester
EMS 201 Emergency Care Analysis/Intervention I 5.0
EMS 202 Emergency Care Analysis/Intervention Lab I 4.0
EMS 115 Pharmacology 3.0
ENGL 101 Composition and Literature I 3.0

Fourth semester
EMS 125 Field Practicum I 3.0
EMS 203 Emergency Care Analysis and Intervention II 5.0
EMS 206 Emergency Care Analysis and Intervention Lab II 5.0
ENGL 102 Composition and Literature II 3.0

Fifth semester
EMS 226 Field Practicum II 6.0

Sixth semester
CMPS 305 Management Applications of Computers 3.0
EMS 205 Instructional Issues Emergency Health Services 3.0
EMS 305 Utilization/ Preparation of Instructional Materials 3.0
EMS 306 Concepts of Injury Prevention 3.0
STAT 343 Statistics for Physical Sciences 3.0

Seventh semester
ECON 210 Economics 3.0
EMS 360 Local, State, and Federal Legislation 3.0
EMS 368 Practical Safety Services Applications 3.0
MGMT 310 Issues and Problems in Health Care Delivery 3.0
MGMT 315 Accounting/Budgeting for Health Professionals 3.0

Eight semester
EMS 307 Critical Incident and Stress Management 3.0
EMS 315 Special Topics in EMS 3.0
EMS 365 Planning and Fiscal Approaches 3.0
RSCH 349 Research and Experimental Design 3.0
Social Science or Humanities elective 3.0

Ninth semester
EMS 355 Internship 15.0

Completion Program: B.S. in Emergency Medical Services

The completion program allows certified paramedics or recognized prehospital RNs to show evidence of clinical competence through their current Advanced Life Support practice status and complete a competency examination to receive clinical course credits. Previous college credits are transferred as appropriate and required by each campus. Students then complete the EMS and required courses to meet University requirements. To complete the clinical courses, the challenge process will be used to obtain 30 credits when clinical competency is demonstrated.

Part-Time Option
The part-time option for the bachelor's degree completion program allows certified paramedics and prehospital RNs to obtain their degree either through traditional classroom interaction or distance learning. Students will receive up to 30 credits for their clinical experience through a challenge exam. These credits will be used to cover the clinical courses in the first two years. Previously earned college credits with a grade of C or higher that equate to courses at the college of Nursing and Health Professions will be considered for transfer. Due to the uniqueness of the EMS core courses, students should plan on completing them at Drexel.

EMS Core Courses Offered:

EMS Management I
EMS Management II
Instructional Issues in Emergency Health Services
Concepts of Injury Prevention
Utilization and Preparation of Instructional Materials
Local, State, and Federal Legislation
Issues and Problems in Health Care Delivery
Practical Safety Services
Special Topics in EMS
Critical Incident and Stress Management
Planning and Fiscal Approaches
Research and Experimental Design
Internship

Prehospital RN Program
The Prehospital RN program is available for RNs interested in expanding their experience to the prehospital area. This two-semester program is conducted from January to August each year and follows Pennsylvania Department of Health guidelines. Clinical and field rotations are required. Prerequisites include a current Pennsylvania RN license and a current CPR card.

Admission Requirements
High school-level mathematics, English, and basic sciences will provide a foundation for college-level work. Weakness in any of these areas should be evaluated by the applicant and additional coursework completed if necessary. The curriculum is demanding so a solid start is essential. Applicants must forward to the Admissions Office:

- Official high school transcript(s) or GED records
- Previous college transcript(s) if applicable
- SAT or ACT scores unless they have earned 30 semester hours of college work with a grade of C or higher at the time of application
- Current CPR course completion by the beginning of the first semester

EMT certification provides a foundation for the development of more advanced EMS skills and knowledge. When applicants are not already certified EMTs, they must complete the EMT course in the first semester and complete the state certification process in order to continue in the EMS program.

Applicants for the clinical paramedic program must meet all Pennsylvania Department of Health requirements for criminal history clearance, age, and ability to complete the functional job description. The ability to sit for the state certification examination rests on successful course completion, validation by the program medical director of the student's knowledge and skills abilities, and clearance from the Office of EMS regarding the above factors.

The program may interview applicants as admissions files become complete. Admissions are on a continuous review basis; it is recommended that clinical students begin in the fall semester for appropriate course sequencing.

Health Education And Related Training (HEART) Certificate Program

HEART is the two-year certificate degree program for students whose academic skills need strengthening. Students who successfully complete the preparatory HEART curriculum may proceed a prescribed degree program.

The HEART curriculum introduces students to the health professions; provides courses in English, math, computers and the sciences; provides academic and tutorial assistance throughout the courses; and prepares students for further education as health-care practitioners. The program includes the Step Ahead Program, a weeklong pre-college summer experience.

Health Education and Related Training (HEART) Program Sample Plan of Study

First semester
BIOL 092* Fundamentals of Biology 4.0
EDUC 095* Life Skills 1.0
EDUC 096* SAT Preparation 1.0
ENGL 097 * Fundamentals of English 3.0
ENGL 098 * Fundamentals of Reading 3.0
or
NURS 093* Home Health Care Clinical 3.0
GENH 099* Introduction to Health Sciences 4.0
or
NURS 092* Home Health Care Basics 3.0
MATH 094 * Fundamentals of Mathematics 3.0

Second semester
CHEM 093 * Fundamentals of Chemistry 4.0
CMPS 125 Computer Applications 3.0
ENGL 101 Composition and Literature I 3.0
HUMN 125 Medical Terminology 3.0
or
SPCH 213 Public Speaking 3.0
MATH 102 College Mathematics 3.0

Third semester
BIOL 201 General Biology I 3.0
BIOL 210 General Biology I Lab 1.0
ENGL 102 Composition and Literature II 3.0
PHIL 107 Ethics and Medicine 3.0
MGMT 101 Management 3.0
PSYC 101 Introduction to Psychology 3.0

Fourth Semester
BIOL 202 General Biology II 3.0
BIOL 211 General Biology II Lab 1.0
PSYC 319 Life-Span Human Development 3.0
PSYC 319 Introduction to Sociology 3.0
HUMN 125 Medical Terminology 3.0
or
SPCH 213 Public Speaking 3.0
or
PHIL 311 Values and Health Profession 3.0
or
HUMN 314 Medicine and the Arts 3.0
PSYC 200 Behavioral Disorders 3.0

*** Basic courses: credits are applicable for financial aid, but not for graduation.**

Health and Society Degree-Completion Program

A.S. in Health and Society (Degree-Completion Program)

Degree Requirements: 60.0 (semester) credits

The Health and Society Degree-Completion Program, which consists of 60 semester credits, is designed for the individual who has already earned at least 15 semester credits, a certificate, or a diploma in an approved health-sciences discipline and who wishes to complete a broad-based Associate in Science degree on a full-time or part-time basis. (Individuals with fewer than 15 transferable semester credits in health sciences may consider this program if these individuals plan to complete the 15 credits by taking any of the medical billing and coding courses currently offered in the program.)

Students enrolled in the program choose from a wide array of interdisciplinary daytime and evening courses, including online courses. Depending on the number of transfer credits, students can elect to complete the program entirely online. A maximum of 45 semester credits can be transferred, including block credits from approved hospital-based certificate and diploma programs.

Requirements
ENGL 101 Composition and Literature I 3.0
ENGL 102 Composition and Literature II 3.0
Humanities/social sciences electives 6.0
Natural-sciences elective 3.0
Health-sciences electives (must be completed prior to admission, with the exception of the Program's billing and coding courses) 15.0
General electives 30.0

Humanities electives include approved courses in communications, ethics, fine arts, folklore, languages, literature, music, mythology, philosophy, religion, speech, theater, and theology, as well as other approved humanities courses. (Courses used to fulfill the Composition and Literature I and II requirements will not count as humanities electives.)

Social-sciences electives include approved courses in addictions counseling, anthropology, archeology, behavioral counseling, economics (introductory), environmental studies, geography, history, management (introductory), mental-health sciences, political science, psychology, and sociology, as well as other approved social-sciences courses.

Natural-sciences electives include approved courses in anatomy, astronomy, biochemistry, biology, botany, cell and molecular biology, chemistry, genetics, geology, meteorology, microbiology, neurobiology, oceanography, pathophysiology, physics, physiology, and zoology, as well as other approved natural-sciences courses.

Health-sciences electives include approved courses in cardiovascular perfusion technology, clinical laboratory sciences, medical billing/coding/records, nursing, physician-assistant studies, radiologic technology, and respiratory therapy, as well as other approved health-sciences disciplines.

B.S. in Health and Society (Degree-Completion Program)

Degree Requirements: 120.0 (semester) credits

This program, which consists of 120 semester credits, is designed for the individual who already holds a certificate, diploma, or associate degree in an approved health-sciences discipline and who wishes to complete a broad-based interdisciplinary-studies Bachelor of Science degree on a full-time or part-time basis for career enhancement or employment. (Individuals who have already earned at least 30 semester credits in health sciences, yet not holding certificates, diplomas, or associate degrees in health sciences, may also apply. Individuals who have previously earned at least 12 credits in health sciences may apply only if these individuals plan to complete the 30 credits of health sciences electives by taking any of the medical billing and coding courses offered in the program.)

Students enrolled in the program choose from a wide array of interdisciplinary daytime and evening courses, including online courses. Depending on the number of transfer credits, students can elect to complete the program entirely online. A maximum of 90 semester credits can be transferred, including block credits from approved hospital-based certificate and diploma programs. (Internal transfer students must take a minimum of 15 credits in the program.)

Requirements

ENGL 101 Composition and Literature I 3.0
ENGL 102 Composition and Literature II 3.0
Computer studies or communication elective 3.0
College Mathematics (or higher) or statistics 3.0
Humanities/social sciences electives 18.0
Natural-sciences electives 6.0
Health-sciences electives (must be completed prior to admission with the exception of the Program's billing and coding courses) 30.0
General electives 54.0

Humanities electives include approved courses in communications, ethics, fine arts, folklore, languages, literature, music, mythology, philosophy, religion, speech, theater, and theology, as well as other approved humanities courses. (Courses used to fulfill the Composition and Literature I and II requirements will not count as humanities electives.)

Social-sciences electives include approved courses in addictions counseling, anthropology, archeology, behavioral counseling, economics (introductory), environmental studies, geography, history, management (introductory), mental-health sciences, political science, psychology, and sociology, as well as other approved social-sciences courses.

Natural-sciences electives include approved courses in anatomy, astronomy, biochemistry, biology, botany, cell and molecular biology, chemistry, genetics, geology, meteorology, microbiology, neurobiology, oceanography, pathophysiology, physics, physiology, and zoology, as well as other approved natural-sciences courses.

Health-sciences electives include approved courses in cardiovascular perfusion technology, clinical laboratory sciences, medical billing/coding/records, nursing, physician-assistant studies, radiologic technology, and respiratory therapy, as well as other approved health-sciences disciplines.

Health Sciences

The Health Sciences programs (formerly known as Biomedical Science programs) offer science-based curricula for pre-med, other health professions (dentistry, physical therapy, physician assistant) and careers in the natural sciences.

Although the programs emphasize the biomedical sciences, they seek to integrate scientific knowledge with the perspectives of the humanities and social sciences to provide students with a comprehensive background necessary for responding to the rapidly changing demands of today's health care delivery system.

An honors program has been designed for qualified individuals with strong backgrounds in the natural sciences and mathematics and with interests in careers in medicine, optometry, podiatry, dentistry, pharmacy, or physical therapy.

A.S. in Health Sciences

Degree Requirements: 60 (semester) credits.

The associate degree program, which requires the completion of 60 approved semester credits, is designed for the following individuals:

- Those interested in the natural sciences, yet undecided about their career goals.
- Those needing science-based associate degrees for employment purposes primarily in health-sciences or health-care settings.
- Those needing preparation for entrance into their desired undergraduate health-professions programs.

Requirements
Composition and literature 6.0
Computer studies 3.0
College mathematics or higher 3.0
(May include statistics)
Natural science electives 20.0
Humanities electives 9.0
Social science electives 9.0
Open electives 10.0

Electives
Humanities electives include approved courses in ethics, fine arts, folklore, languages, literature, music, mythology, philosophy, religion, speech, and theater. (Courses used to fulfill the composition and literature requirement will not count as humanities electives.)

Natural science and health science electives include approved courses in biology, chemistry, and physics and advanced anatomy, biochemistry, cell and molecular biology, cross-sectional anatomy, developmental anatomy, genetics, human physiology, medical microbiology, neurobiology, pathophysiology, and physiology.

Social science electives include approved courses in anthropology, archaeology, environmental studies, geography, history, political science, psychology, and sociology. With the approval of the program director, three semester hours of accounting, administration, business, economics, finance, law, management, or marketing may be used in place of a three-semester-hour social science elective for the bachelor's degree program.

Pre-Physician's Assistant Requirements

Pre-PA students must take Biology I and II, General Chemistry I, General Chemistry II or Medical Microbiology (with lab), and Anatomy & Physiology I and II as natural science electives, Critical Thinking and Ethics & Medicine as Humanities electives and Introductory Psychology (including Developmental Psychology or Human Growth & Development) and Abnormal Psychology as social science electives. Pre-PT students must take six semester hours of psychology as social science or open electives.

Recommended Plan of Study: Four-Year Curriculum

First semester
ENGL 101 Composition and Literature I 3.0
BIOL 201 General Biology I 4.0
CHEM 201 General Chemistry I 4.0
MATH 102 College Mathematics 3.0

Second semester
ENGL 102 Composition and Literature II 3.0
BIOL 202 General Biology II 4.0
MCRB 208 Medical Microbiology 4.0
PHIL 107 Ethics and Medicine 3.0
SPCH 213 Public Speaking 3.0

Third semester
ANAT 130 Anatomy and Physiology I 4.0
BIOL 314 Developmental Biology 4.0
HUMN 314 Medicine and the Arts 3.0
PHIL 325 Critical Thinking 3.0
PSYC 101 Introduction to Psychology 3.0

Fourth semester
ANAT 131 Anatomy and Physiology II 4.0
ANAT 202 Cross-Sectional Anatomy 2.0
CMPS 125 Computer Applications 3.0
PSYC 200 Abnormal Psychology 3.0

B.S. in Health Sciences

Degree Requirements: 120.0 (semester) credits

The bachelor's degree program requires the completion of 120 approved semester credits and provides flexible curricula designed for the following individuals:

- Those wishing to become physicians, physician assistants, optometrists, podiatrists, dentists, pharmacists, or physical therapists.
- Those wishing to enter graduate school in various natural-sciences disciplines.
- Those needing science-based bachelor’s degrees for employment purposes

Requirements
Composition and literature 6.0
Computer studies 3.0
College mathematics or higher 6.0
(May include statistics)
Natural science electives 40.0
Humanities electives 18.0
Social science electives 18.0
Open electives 29.0

Electives

Humanities electives include approved courses in ethics, fine arts, folklore, languages, literature, music, mythology, philosophy, religion, speech, and theater. (Courses used to fulfill the composition and literature requirement will not count as humanities electives.)

Natural science and Health science electives include approved courses in biology, chemistry, and physics and advanced anatomy, biochemistry, cell and molecular biology, cross-sectional anatomy, developmental anatomy, genetics, human physiology, medical microbiology, neurobiology, pathophysiology, and physiology.

Social science electives include approved courses in anthropology, archaeology, environmental studies, geography, history, political science, psychology, and sociology. With the approval of the program director, three semester hours of accounting, administration, business, economics, finance, law, management, or marketing may be used in place of a three-semester-hour social science elective for the bachelor’s degree program.

Pre-Physician's Assistant Requirements

Pre-PA students must take Biology I and II, General Chemistry I, General Chemistry II or Medical Microbiology (with lab), and Anatomy & Physiology I and II as natural science electives, Critical Thinking and Ethics & Medicine as Humanities electives and Introductory Psychology (including Developmental Psychology or Human Growth & Development) and Abnormal Psychology as social science electives. Pre-PT students must take six semester hours of psychology as social science or open electives.

Recommended Plan of Study: Four-Year Curriculum

First semester
ENGL 101 Composition and Literature I 3.0
BIOL 201 General Biology I 4.0
CHEM 201 General Chemistry I 4.0
MATH 102 College Mathematics 3.0

Second semester
ENGL 102 Composition and Literature II 3.0
BIOL 202 General Biology II 4.0
CHEM 203 General Chemistry II 4.0
PHIL 107 Ethics and Medicine 3.0

Third semester
ANAT 130 Anatomy and Physiology I 4.0
CHEM 315 Organic Chemistry I 5.0
PHSC 325 General Physics I 5.0
PSYC 101 Introduction to Psychology 3.0

Fourth semester
ANAT 131 Anatomy and Physiology II 4.0
CHEM 316 Organic Chemistry II 5.0
PHSC 326 General Physics II 5.0
PSYC 200 Abnormal Psychology 3.0

Fifth semester
BIOC 334 Biochemistry 4.0
PHYS 325 Physiology 3.0
CMPS 125 Computer Applications 3.0
MATH 112 Algebra and Trigonometry 3.0
PHIL 325 Critical Thinking 3.0

Sixth semester
ANAT 202 Cross-Sectional Anatomy 2.0
BIOL 314 Developmental Biology 4.0
HUMN 314 Medicine and the Arts 3.0
PHYS 382 Pathophysiology 3.0
PSYC 319 Human Growth and Development 3.0

Seventh semester
ANAT 420 Advanced Anatomy 4.0
BIOL 324 Cell and Molecular Biology 4.0
ENGL 206 Drama 3.0
PHIL 311 Values and Health Professions 3.0

Eight semester
BIOL 325 Genetics 4.0
SOC 115 Introduction to Sociology 3.0
ENGL 325 Literature and Psychology 3.0
ECON 310 Economics 3.0
SPCH 213 Public Speaking 3.0

Health Sciences Honors Program

The Health Sciences Honors program is a bachelor of science (B.S.) degree designed for individuals with strong backgrounds in the natural sciences and mathematics and with interests in extensive exposure to the biomedical sciences for entrance into professional schools and graduate programs for careers in medicine, dentistry, optometry, podiatry, pharmacy and physical therapy.

Requirements
Composition and literature 6.0
Computer studies 3.0
Mathematics 11.0
Precalculus
Calculus I
Statistics for Physical Sciences
Natural sciences 44.0
General Biology I and II (plus labs)
General Chemistry I and II (plus labs)
Anatomy and Physiology I and II
Organic Chemistry I and II (plus labs)
General Physics I and II
Health science electives 16.0
Humanities electives 18.0
Critical Thinking
Ethics and Medicine
Social science electives 18.0
Open electives 16.0

Electives

Humanities electives include approved courses in ethics, fine arts, folklore, languages, literature, music, mythology, philosophy, religion, speech, and theater. (Courses used to fulfill the composition and literature requirement will not count as humanities electives.)

Natural science and Health science electives include approved courses in biology, chemistry, and physics and advanced anatomy, biochemistry, cell and molecular biology, cross-sectional anatomy, developmental anatomy, genetics, human physiology, medical microbiology, neurobiology, pathophysiology, and physiology.

Social science electives include approved courses in anthropology, archaeology, environmental studies, geography, history, political science, psychology, and sociology. With the approval of the program director, three semester hours of accounting, administration, business, economics, finance, law, management, or marketing may be used in place of a three-semester-hour social science elective for the bachelor's degree program.

Pre-Physician's Assistant Requirements
Pre-PA students must take Biology I and II, General Chemistry I, General Chemistry II or Medical Microbiology (with lab), and Anatomy & Physiology I and II as natural science electives, Critical Thinking and Ethics & Medicine as Humanities electives and Introductory Psychology (including Developmental Psychology or Human Growth & Development) and Abnormal Psychology as social science electives. Pre-PT students must take six semester hours of psychology as social science or open electives.

Health-Services Administration

The Health-Services Administration program provides students with a foundation in general management and economic principles related to health care, as well as an understanding of the administrative structure, operations, and policies of the health-care industry.

A.S. in Health-Services Administration

Degree Requirements: 60.0 (semester) credits.
This program, which consists of 60 semester credits, is designed as a full-time or part-time course of study for the individual seeking a broad-based Associate in Science degree for career enhancement or employment in a health-administration setting, especially the individual having prior college credits and wishing to transfer to this program to complete an associate-degree in health-services administration.

The program provides students with a foundation in general management and economic principles related to health care, as well as a basic understanding of the

administrative structure and operations of the health-care industry. Additionally, students may choose from a wide array of daytime and evening interdisciplinary studies toward completing the associate degree.

Online courses are also available, and depending on the number of transfer credits, students can elect to complete the program entirely online. A maximum of 45 approved semester credits can be transferred, including block credits from approved hospital-based certificate and diploma programs.

Requirements
ENGL 101 Composition and Literature I 3.0
ENGL 102 Composition and Literature II 3.0
Humanities*/social sciences electives 6.0
Natural-sciences elective 3.0
Health-services administration electives 15.0
General electives 30.0

Humanities electives include approved courses in communications, ethics, fine arts, folklore, languages, literature, music, mythology, philosophy, religion, speech, theater, and theology, as well as other approved humanities courses. (Courses used to fulfill the Composition and Literature I and II requirements will not count as humanities electives.)

Social-sciences electives include approved courses in addictions counseling, anthropology, archeology, behavioral counseling, economics (introductory), environmental studies, geography, history, management (introductory), mental-health sciences, political science, psychology, and sociology, as well as other approved social-sciences courses.

Natural-sciences electives include approved courses in anatomy, astronomy, biochemistry, biology, botany, cell and molecular biology, chemistry, genetics, geology, meteorology, microbiology, neurobiology, oceanography, pathophysiology, physics, physiology, and zoology, as well as other approved natural-sciences courses.

Courses offered in health-services administration include the following: Accounting and Budgeting for Health-Care Professionals; Economics; Financial Management for Health-Care Professionals; Health-Care Law; Health-Care Marketing; Health-Care Policy; Health-Systems Administration, Issues in the Health-Care Delivery System; Leadership and Management in Health Care; Managed Health Care; Management; and Readings in Health Systems Administration.

B.S. in Health-Services Administration

Degree Requirements: 120.0 (semester) credits

This program, which consists of 120 semester credits, is designed as a full-time or part-time course of study for the individual seeking a broad-based Bachelor of Science degree for career enhancement or employment in a health-administrative capacity. Individuals currently holding a certificate, diploma, or degree in health-sciences disciplines, yet seeking to move into health-services-administration positions, may especially wish to complete the bachelor's degree in health-care administration by transferring to this program.

The curriculum has been developed to enable students to qualify for positions in hospitals, managed-care companies, insurance companies, and health-marketing firms by exposing students to the quantitative and qualitative aspects of the health-care industry by means of health-administration courses related to policy, law, economics, management, and marketing, as well as interdisciplinary courses dealing with religious, ethical, psychosocial, political, and historical perspectives on health-care practices.

In addition, the curriculum can prepare students wishing to pursue graduate studies in health-services administration.

Courses are available daytime and evenings, as well as online. Depending on the number of transfer credits, students can elect to complete the program entirely online. A maximum of 90 semester credits can be transferred, including block credits from approved hospital-based certificate and diploma programs.

Requirements
ENGL 101 Composition and Literature I 3.0
ENGL 102 Composition and Literature II 3.0
Computer studies or communication elective 3.0
College Mathematics (or higher) or statistics 3.0
Humanities*/social sciences electives 18.0
Natural-sciences electives 6.0
Health-services administration electives 30.0
General electives 54.0

Humanities electives include approved courses in communications, ethics, fine arts, folklore, languages, literature, music, mythology, philosophy, religion, speech, theater, and theology, as well as other approved humanities courses. (Courses used to fulfill the Composition and Literature I and II requirements will not count as humanities electives.)

Social-sciences electives include approved courses in addictions counseling, anthropology, archeology, behavioral counseling, economics (introductory), environmental studies, geography, history, management (introductory), mental-health sciences, political science, psychology, and sociology, as well as other approved social-sciences courses.

Natural-sciences electives include approved courses in anatomy, astronomy, biochemistry, biology, botany, cell and molecular biology, chemistry, genetics, geology,

meteorology, microbiology, neurobiology, oceanography, pathophysiology, physics, physiology, and zoology, as well as other approved natural-sciences courses.

Courses offered in health-services administration include the following: Accounting and Budgeting for Health-Care Professionals; Economics; Financial Management for Health-Care Professionals; Health-Care Law; Health-Care Marketing; Health-Care Policy; Health-Systems Administration, Issues in the Health-Care Delivery System; Leadership and Management in Health Care; Managed Health Care; Management; and Readings in Health Systems Administration.

For the bachelor's degree, the following interdisciplinary courses may also be used toward fulfilling health-services-administration electives upon approval of the program director: Advanced Computer Applications for Health-Care Professionals; Ethics and Medicine; Health, Disease, and Healing from a Cross-Cultural Perspective; Medical Billing, Coding, and Reimbursement; Medical Coding (Hospital Based and Physician Based); Religious Perspectives on Health-Care Practices; Social History of Health Care in America; Sociology of Aging; Statistics for the Health Sciences; and Values and the Health Professions.

Nursing

The College of Nursing and Health Profession's faculty and staff are committed to educating nurses to think critically, make evidenced-based decisions and practice competently and compassionately in rapidly changing practice environments.

The College offers a variety of educational programs that prepare nurses to function both as generalists and specialists at all levels, from primary care in community-based centers to tertiary care in medical centers and specialty hospitals.

All undergraduate nursing programs are accredited by the:

- Pennsylvania State Board of Nursing
- National League for Nursing Accreditation Commission, 61 Broadway, New York, NY 10006; 212-363-5555
- American Association of Colleges of Nursing, One Dupont Circle, NW, Suite 530, Washington, DC 20036.

B.S. in Nursing (B.S.N.)

Degree Requirements: 181.0 credits

Drexel's nursing curriculum is built to respond to the rapidly changing health care system, as well as to your needs. Graduates of the baccalaureate program will be prepared to:

- Use the growing compendium of current knowledge and information sources from nursing and other disciplines to learn, to teach, to heal the sick, and to preserve health
- Contribute to the profession by sharing knowledge and skills with clients, peers, and other professionals in a variety of methods
- Use multiple technologies to access and manage information to guide professional practice
- Participate in culturally sensitive health promotion activities that contribute to the health and wellness of the community
- Participate in ongoing educational activities related to personal growth, professional practice, and community service
- Apply knowledge and skills appropriate to the selected area of career clinical practice
- Develop personal potential for leadership in a changing health care environment
- Integrate ethical concepts and principles, the Nurses Code of Ethics, and professional standards into practice within professional, academic, and community settings
- Use critical thinking skills to improve the health outcomes of patients, families, and communities across the continuum of care

A B.S.N. is awarded at the completion of the program.

B.S.N. Co-op Program

Co-operative education was designed to provide students with real-world experience in a variety of professional settings before graduation. Co-op integrates full-time work experience in your field of study throughout the academic program. The College of Nursing and Health Professions co-op program is one of only two of its kind in the nation.

The nursing co-op provides you with 18 months of co-operative education in addition to the traditional clinical educational experiences.

Through co-op you'll get the opportunity to learn the role of the nurse and unlicensed assistive personnel as well as other daily professional, political, and social issues in a work environment. Both before and during your co-op experience you will receive instruction on career management and professional development skills, such as résumé writing, job searches, interviewing skills, maintaining a career portfolio, negotiating salary, and professional. The clinical background you gain from your

co-op experience, coupled with a knowledge of career management, makes the Drexel option a value-added model of nursing education.

B.S.N. Co-op Curriculum: 181.0 Credits

Term 1
CHEM 101 General Chemistry I 4.0
ENGL 101 Expository Writing and Reading 3.0
NURS 100 WI Nursing in Society 3.0
PSY 101 General Psychology 3.0
UNIV 101 The Drexel Experience 1.0

Term 2
ANAT 101 Anatomy & Physiology I 5.0
CHEM 102 General Chemistry II 4.0
CS 161 Introduction to Computing 3.0
ENGL 102 Readings and Research 3.0
UNIV 101 The Drexel Experience 1.0

Term 3
ANAT 102 Anatomy & Physiology II 5.0
BIO 221 Microbiology 5.0
ENGL 103 Analytical Writing and Reading 3.0
NURS 102 Health Promotion, Teaching and Self Care 4.0

Co-op I Nursing in the Global Health Network (24 co-op units)

Term 4
ANAT 103 Anatomy & Physiology III 5.0
NFS 200 WI Nutrition I: Principles of Nutrition 4.0
NURS 200 Principles of Nursing Practice 4.0
NURS 201 Health Assessment Across the Life Span 4.0
Term 5
NURS 300 Comprehensive Adult Nursing I 6.0
NURS 301 Pharmacology for Nursing I 3.0
NURS 404 Nursing Informatics 3.0
NFS 203 Nutrition II: Nutrition in the Life Cycle 4.0

Co-op II Acute and Chronic Adult Health and Illness (24 co-op units)

Term 6
NURS 303 Women's Health Nursing 6.0
NURS 308 Mental Health Nursing 3.0
PSY 120 Developmental Psychology 3.0

Term 7
NURS 304 Nursing of Children 6.0
NURS 305 Comprehensive Adult Nursing II 6.0
NURS 306 Pharmacology for Nursing II 3.0

Co-op III Specialty Nursing Concentration (24 co-op units)

Term 8
NURS 403 Community Public Health Nursing 6.0
STAT 201 Statistics I 4.0
PHIL 251 Ethics 3.0
or
PHIL 321 Biomedical Ethics
Elective 3.0

Term 9
NURS 400 WI Leadership, Management, and Entrepreneurship in Nursing 4.0
SOC 101 Introduction to Sociology 3.0
Social Science elective 3.0
Elective 3.0

Term 10
NURS 330 WI Research Basis of Nursing 4.0
NURS 401 Comprehensive Adult Nursing III 6.0
ECON Health Economics 3.0
SOC 125 Sociology of Aging 3.0

Term 11
NURS 450 Contemporary Gerontological Nursing 6.0
NURS 490 WI Senior Project in Nursing I 3.0
Humanities Elective 3.0

Term 12
NURS 491 WI Senior Project in Nursing II 3.0
NURS 492 Senior Seminar in Nursing 3.0
NURS 337 Genetics in Nursing and Health 3.0

B.S.N./M.S.N. Dual Degree Co-op Program

The B.S.N./M.S.N. degree program lets academically qualified students earn both a B.S.N. and an M.S.N. in five years the time it usually takes to earn the bachelor's degree alone.

The B.S.N. curriculum responds to the rapidly changing health care system, as well as to student's needs. Once students complete their undergraduate coursework, they are awarded the B.S.N. and are eligible to sit for the R.N. licensure examination.

The M.S.N. prepares leaders for advanced practice roles. Courses from nursing and other disciplines provide advanced theoretical knowledge, assessment skills, role and leadership development, advanced practice in a selected specialization, and the opportunity to critique and apply nursing theory and research as a scientific base for nursing practice.

This B.S.N./M.S.N. accelerated degree program combines the practical work experience of Drexel undergraduate co-operative education with the credentials of a graduate degree. With both an undergraduate and a graduate degree and practical work experience, students enter the workforce with specialized knowledge and training, giving them a much wider range of career opportunities.

New students may submit applications program as incoming freshmen. Students already enrolled in Drexel's B.S.N. Co-op program may apply for the dual degree option at the end of the sophomore year or the beginning of the pre-junior year. Students must consult with an academic advisor.

Students enrolled in the dual degree program will take four master's-level courses in lieu of the senior project and the

three free electives to complete the B.S.N. Students choosing to continue will then complete a fifth year consisting of all graduate-level study to receive their M.S.N.

Accelerated Career Entry (ACE) B.S.N. Option

Drexel University offers the Accelerated Career Entry Option, a one-year intensive nursing program for students who already have bachelor's or graduate degrees. The program is ideal for working adults or college graduates who want to change careers and earn a new degree in one year. This innovative program is geared to students who will benefit from intense education in nursing science rather than the traditional program, which takes three or four years.

Accelerated Career Entry (ACE) B.S.N. Option Requirements
Bachelor of Science in Nursing Degree 86.0 credits

First Quarter
NURS 100 WI Nursing in Society 3.0
NURS 102 Health Promotion, Teaching and Self Care 4.0
NURS 200 Principles of Nursing Practice 4.0
NURS 201 Health Assessment Across the Life Span 4.0
NURS 337 Genetics in Nursing and Health 3.0
NURS 404 Nursing Informatics 3.0

Second Quarter

NURS 300 Comprehensive Adult Nursing I 6.0
NURS 301 Pharmacology for Nursing I 3.0
NURS 303 Women's Health Nursing 6.0
NURS 308 Mental Health Nursing 3.0

Third Quarter
NURS 304 Nursing of Children 6.0
NURS 305 Comprehensive Adult Nursing II 6.0
NURS 306 Pharmacology for Nursing II 3.0
NURS 403 Community Public Health Nursing 6.0

Fourth Quarter
NURS 330 WI Research Basis of Nursing 4.0
NURS 400 Leadership/Management in Nursing 4.0
NURS 401 Comprehensive Adult Nursing III 6.0
NURS 450 Contemporary Gerontological Nursing 6.0
NURS 492 Senior Seminar in Nursing 3.0

R.N./B.S.N. Completion Program

The Bachelor of Science in Nursing program continues the education of registered nurses to prepare them for the rapidly changing health care environment. Core courses prepare the graduate for population-based cases and the managed care environment. Support courses, electives, and study in an area of the student's choosing build on foundational educational experiences to facilitate the examination of critical issues from a variety of perspectives.

A B.S.N. is awarded at the completion of the program. Qualified students are encouraged to submatriculate in the M.S.N. program (R.N./B.S.N./M.S.N. option) while enrolled in the B.S.N. program. Students may take 3 to 15 M.S.N. credits in lieu of the nursing concentration and/or up to three electives.

R.N./B.S.N. Completion Program

First Tier
ANAT 130 Anatomy and Physiology I 4.0
ANAT 131 Anatomy and Physiology II 4.0
ENGL 101 Composition and Literature I 3.0
ENGL 102 Composition and Literature II 3.0
HUMN 050 Humanities 3.0
MCRO 208 Microbiology 4.0
MCRO 209 Microbiology 4.0
NURS 050 Nursing (by transfer validation) 30.0
PSYC 101 General Psychology 3.0
PSYC 319 Growth and Development 3.0
SOC 115 Introduction to Sociology 3.0

Second Tier
ECON 310 Economics 3.0
PHIL 311 Values and the Health Profession 3.0
STAT 343 Statistics for Physical Sciences 3.0
Communications elective* (Computer Science Applications, Public Speaking) 3.0
Social science elective 3.0
Science elective 3.0
Advanced Physiology, Pharmacology, or Pathophysiology 3.0
Electives 9.0

***Students with limited computer experience are strongly encouraged to complete an introductory computer course.**

Upper-Division Courses
NURS 302 Health Promotion and Disease Prevention 4.0
NURS 322 Health Assessment 4.0
NURS 330 Research Basis of Nursing 3.0
NURS 334 Nursing in Environments of Change 4.0
NURS 337 Genetics in Nursing and Health 3.0
NURS 402 Public Health Nursing 6.0
NURS 44X Nursing Concentration 7.0

Accelerated R.N./B.S.N./M.S.N. Program

The R.N./B.S.N./M.S.N. program is an accelerated program designed for graduates of associate-degree and diploma nursing programs who are committed to earning the Master of Science in Nursing degree. New students should complete the application process for the R.N./B.S.N. completion program. After completing a minimum of three baccalaureate nursing courses, students may apply to the M.S.N. program of their choice via an internal process. (Note: This completion option is not available in the women's care practitioner track.)

Currently enrolled students may apply to the program after completing three nursing courses. Although the graduate application form must be completed, the application fee is

waived. Admission requirements are the same as for the M.S.N. program (see graduate programs). The GRE or MAT requirement is waived for students accepted to all graduate nursing programs with the exception of nurse anesthesia.

After being accepted, students complete the remaining baccalaureate-level nursing and non-nursing courses. Accepted students may choose to substitute graduate nursing courses for 3 to 15 credits of their undergraduate courses. These substitutions may be made for the Nursing Concentration (NURS 44x) and/or up to three open electives.

If, after completing two or more M.S.N. courses, a student decides not to finish the program, the University awards the B.S.N., provided that the student has completed the required 121 credits. All students who have applied to and entered the R.N./B.S.N./M.S.N. program work closely with the academic advisor to ensure proper progression.

Radiologic Technology

Radiology is the branch of medicine that uses various forms of radiation, such as X-rays, to provide information for the prevention, diagnosis, and treatment of disease. Radiologic technologists aid physicians by performing radiologic examinations necessary to diagnose conditions and treat patients.

Mission Statement
The mission of the Radiologic Technology Program is to provide:

- a progressive academic and clinical educational environment for qualified students to prepare them as competent and compassionate radiologic health care providers;
- the knowledge and skills needed to meet and/or exceed minimum entry level requirements to perform radiologic technology.

The program is accredited by The Joint Review Committee on Education in Radiologic Technology (JRCERT), 20 North Wacker Drive, Suite 900, Chicago, IL. 60606, (312) 704-5300.

Options for Study
The program features an integrated plan of classroom and closely supervised clinical practicum. Students have clinical experiences in CT, Magnetic Resonance Imaging, Angiography, Radiation Therapy and Nuclear Medicine. Graduates are familiar with all areas of diagnostic radiologic technology and the most modern, sophisticated equipment.

Certificate Program
The certificate program is a two-year program (summers included) that features an integrated plan of classroom work and closely supervised clinical practica. In addition to becoming familiar with all areas of diagnostic radiologic technology and the most modern, sophisticated equipment, students have clinical experiences in CT, magnetic resonance imaging, angiography, radiation therapy, and nuclear medicine.

On successfully completing the program, graduates are eligible to take the certification examination offered by the American Registry of Radiologic Technologists.

Radiologic Technology Certificate Program

Certificate Requirements: 91.0 credits

Sample Plan of Study
First term
ANAT 130 Anatomy and Physiology I 4.0
MATH 102 College Mathematics 3.0
RADI 100 Introduction to Radiologic Technology 2.0
RADI 150 Principles of Radiographic Exposure I 2.0
RADI 164 Radiographic Procedures I 3.0
RADI 194 Methods of Patient Care 2.0
RADI 195 Clinical Practicum I 3.0

Second term
ANAT 131 Anatomy and Physiology II 4.0
ANAT 202 Cross-Sectional Anatomy 2.0
RADI 132 Radiologic Physics I 2.0
RADI 153 Principles of Radiographic Exposure II 3.0
RADI 165 Radiographic Procedures II 3.0
RADI 196 Clinical Practicum II 3.0

Third term
RADI 133 Radiologic Physics II 2.0
RADI 141 Radiographic Processing Technique 1.0
RADI 197 Clinical Practicum II 12.0

Fourth term
RADI 166 Radiographic Procedures III 3.0
RADI 201 Medical Imaging 2.0
RADI 222 Pathology 2.0
RADI 254 Principles of Radiographic Exposure III 1.0
RADI 291 Clinical Practicum IV 6.0

Fifth term
CMPS 125 Computer Applications 3.0
RADI 204 Principles of Radiation Protection 2.0
RADI 210 Radiographic Procedures IV 2.0
RADI 215 Radiation Biology 2.0
RADI 221 Quality Assurance 2.0
RADI 292 Clinical Practicum V 6.0

Sixth term
RADI 293 Clinical Practicum VI 12.0

A.S. in Radiologic Technology

Degree requirements: 15.0 credits

Associate Degree Option

Student can pursue an Associate of Science degree while they are enrolled in the certificate program. They take five additional courses, totaling 15 credits:

Additional Requirements
ENGL 101 Composition and Literature I 3.0
ENGL 102 Composition and Literature II 3.0
Humanities elective 3.0
Social science electives 6.0

Post-Certificate A. S. in Radiologic Technology

Requirements: 15.0 credits

Post-Certificate Associate Degree

Graduate technologists can pursue an Associate of Science degree. Continuing education is required for technologists who plan to move upward in the field of diagnostic imaging. Students may attend the program on a full-time or part-time basis and must complete 15 semester hours at Drexel University. They take five additional courses, totaling 15 credits:

Additional Requirements
ENGL 101 Composition and Literature I 3.0
ENGL 102 Composition and Literature II 3.0
Humanities elective 3.0
Social science electives 6.0

The School of Biomedical Engineering, Science and Health Systems

The School of Biomedical Engineering, Science, and Health Systems (formerly the Biomedical Engineering and Science Institute, founded in 1961) is a nationally recognized center for research in biomedical engineering and science offering multidisciplinary instruction on a full- and part-time basis at the graduate and undergraduate levels.

The School of Biomedical Engineering, Science, and Health Systems offers two undergraduate Bachelor of Science degree programs: Biomedical Engineering and Health Systems and Technology. Because of the interdisciplinary nature of both programs, personalized faculty advising is stressed. In both programs, students work closely with faculty advisors to select core and elective courses offered by the School of Biomedical Engineering, Science, and Health Systems as well as other academic units of the University.

The School is the beneficiary of a major endowment that sponsors chair professorships and assistantships. Areas of strength in research and education include biosensors, biomedical ultrasound, biomedical imaging, biomedical systems and signal processing, biomechanics, biomaterials, tissue and cellular engineering, neuroengineering, human performance, and cardiovascular systems. New academic initiatives focus on biomedical optics and bioinformatics and computational biomedicine.

The faculty includes individuals with specialties in engineering, physics, mathematics, biostatistics, life science, medicine, and clinical work. Of the 93 associated full-time Drexel faculty members, 20 are core faculty members and 73 have joint appointments. Some 52 adjunct faculty members from regional institutions and industry participate in research and academic programs of the School.

Metropolitan Philadelphia has one of the highest concentrations of medical institutions and pharmaceutical, biotechnology, and medical devices and systems industries in the nation. In 2002, Drexel University merged with MCP Hahnemann University, which includes the MCP Hahnemann School of Medicine—one of the nation's largest medical schools. The School has also formed an academic alliance with Thomas Jefferson University, another prominent medical university, and has entered into a joint initiative in bioinformatics with the Coriell Institute for Medical Research and the Windber Research Institute. These initiatives ensure that students will have ample opportunities in basic research and clinical experience as well as innovative new academic programs.

Program Description

Biomedical engineering is concerned with the application of engineering and science methodologies to the analysis and solution of biological and physiological problems and to the delivery of health care. The biomedical engineer requires the analytical tools and broad physical and mathematical knowledge of modern engineering and science, a fundamental understanding of the biological or physiological system, and familiarity with recent technological breakthroughs. The biomedical engineer connects traditional engineering disciplines with living systems and may work in either direction, applying the patterns of living organisms to engineering design or engineering new approaches to human health. Thus on the one hand, the biomedical engineer may use his or her knowledge of physiological systems to develop artificial tissues or neural networks. On the other hand, he or she may use engineering know-how to create new equipment or environments for such purposes as maximizing human performance, accelerating wound healing, or providing noninvasive diagnostic tools.

The School of Biomedical Engineering, Science, and Health Systems, in collaboration with the College of Engineering, offers a unique B.S. degree program in biomedical engineering. This program differentiates itself from those offered at other institutions in several ways, including an emphasis on a fundamental and comprehensive education in the principles and methods of engineering, case-study and interdisciplinary courses, professional electives, a capstone design project, and several terms of employment in industry, in clinics or medical research laboratories (co-op program).

About the Curriculum
The Bachelor of Science degree in biomedical engineering was inaugurated in the 1998–99 academic year. A minimum of 194 credits of academic work is required to complete the degree. Engineering students must maintain an overall grade point average of 2.0 in all required professional courses in their major.

At least four terms of co-operative education (work experience in industrial/engineering/ clinical/ academic settings) are necessary to earn a co-op engineering degree accredited by the Accreditation Board for Engineering and Technology (ABET). At Drexel, this is accomplished through a five-year degree program involving six terms (18 months) of co-op assignments. In addition, there is the option of a four-year degree program involving two terms of co-op (or a six-month internship), but this is not a co-op engineering degree. The School has undergone its ABET accreditation review. When accreditation is granted, it will apply retroactively to students who have graduated from the program. Currently, all of the University's undergraduate engineering programs are ABET accredited.

Curricular Organization
The first two years of the undergraduate biomedical engineering program takes place in the College of Engineering and is based on the Drexel Engineering Curriculum (tDEC). The curriculum evolved from the Enhanced Educational Experience for Engineering Students Project, the National Science Foundation (NSF)–funded initiative to re-engineer undergraduate engineering education. Since its institutionalization in 1994, the curriculum has served as a national model for an integrated lower-division engineering curriculum and has established Drexel as a leader in engineering education innovation. Its success culminated in the evolution of the upper-division engineering curriculum developed under the auspices of the Gateway Engineering Education Coalition, funded again by NSF and composed of 10 major universities led by Drexel University. Reaching beyond curricular innovation to the human dimension of learning, educational methods, and assessment tools, the Gateway project has set in motion an academic culture change that has provided a framework for curricular integration and exciting interdisciplinary programs.

Biomedical engineering majors study the same subjects as students in the College of Engineering during the three terms of the first year. During the two terms of the sophomore year, there is a high degree of similarity. Students can transfer from one engineering major to another without significant loss of time until the end of the second year. These first five terms are devoted to subjects that form the foundation of the engineering curriculum. Courses in the biomedical engineering core curriculum provide an integrated view of the basic life and physical sciences and an introduction to the art of engineering through group projects and case studies. The first-level professional courses, also referred to as "core courses,? are completed by the junior year under individualized faculty advising. The senior year is mainly focused on professional electives in biomedical engineering to help students concentrate in a specialization area of biomedical engineering, including biomechanics and human performance, biomaterials and tissue engineering, biomedical systems and imaging, neuroengineering, human performance, and bioinformatics.

Liberal Studies Program
The Liberal Studies Program is designed to give engineering students a foundation in the following areas: English, history of the engineering profession and its impact on modern society, ethical standards required for the practice of the profession, and an in-depth study in a specific discipline in liberal studies.

All engineering majors must take 10 courses. Five of the 10 courses are designated as follows and must be completed by all engineering majors:

Designated liberal studies course requirements
BMES 338 Biomedical Ethics and Law
HIST 285 Technology in Historical Perspective
HUM 106 Humanities and Communications I
HUM 107 Humanities and Communications II
HUM 108 Humanities and Communications III

The five remaining liberal studies course requirements are undesignated and can be chosen from the disciplines listed below. Any course selected from the categories below meets this requirement, except language courses below 200 level and survey, performance, studio, or skills courses. Two of the five courses must comprise a sequence and therefore must be in the same discipline.

Anthropology
Architectural/Social History

Art History
Communications
Dance
History
Language (200 level and above)
Literature
Music
Philosophy
Political Science
Psychology
Sociology
Theater

Electives
In addition to the electives in the Liberal Studies Program, there are two types of elective sequences in the engineering curricula: technical electives and free electives.

Technical electives are courses in engineering, science, management, or entrepreneurship that build on the required professional courses and lead to a specific technical specialization. Possible elective sequences should be discussed with and approved by advisors before the end of the junior year.

Free electives are any courses for which students are eligible and that are not remedial in nature for engineering students.

Writing-Intensive Course Requirements
In order to graduate, all students beginning with the entering class of 2002/01 (Fall 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid “clustering” these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term.

About Co-op
Co-operative education and career opportunities available to students include employment in the medical device, equipment, and systems industry; the biomaterial and implant industry; the pharmaceutical industry; the biotechnology and agricultural industry; the telemedicine and tele-health industry; health care; medical and clinical information and management systems; and biomedical technology transfer. Preprofessional options available in the academic programs of the School prepare students for admission to schools of medicine, dentistry, and veterinary medicine. Students may also choose to continue their education at the graduate level to prepare for careers in research and development in biomedical engineering and science.

Biomedical Engineering

Biomedical engineering is an innovative Bachelor of Science degree program developed and delivered in collaboration with the College of Engineering. It prepares students to conceive, design, and develop devices and systems that improve human health and quality of life. Biomedical engineering is the convergence of life sciences with engineering. Biomedical engineers combine the strengths of both fields. From child car seats and football helmets to drug-delivery systems, minimally invasive surgery, and noninvasive imaging technology, the work of the biomedical engineer makes a difference in everyone’s life.

The undergraduate biomedical engineering curriculum is designed to strike a balance between academic breadth in biomedical engineering and concentration in biomechanics, biomaterials and tissue engineering, biomedical systems and imaging, neuroengineering, human performance, and bioinformatics. Following the Drexel Engineering Curriculum/Gateway model, the program provides innovative experiences in hands-on experimentation, engineering design, and opportunities for personal growth, as well as the development of leadership, entrepreneurship, and communication skills. Drexel's co-operative education alternates classroom study with periods of paid professional employment to prepare students for the workforce and enable them to adapt to rapid changes occurring in society.

Working with a faculty advisor, students select their core courses from a list of electives offered by the School of Biomedical Engineering, Science, and Health Systems and the Departments of Bioscience and Biotechnology, Chemistry, Physics, Chemical Engineering, Mechanical Engineering, Materials Engineering, Electrical and Computer Engineering, and Mathematics and Computer Science, and the College of Information Science and Technology.

B.S. in Biomedical Engineering

Degree Requirements: 194.0 credits

General education requirements
HIST 285 Technology in Historical Perspective 3.0
HUM 106 Humanities and Communications I 3.0
HUM 107 Humanities and Communications II 3.0
HUM 108 Humanities and Communications III 3.0
PHIL 315 Engineering Ethics 3.0
UNIV 101 The Drexel Experience 2.0
Liberal studies electives 15.0
Free electives 6.0

Engineering core courses
TDEC 110 Mathematical Foundations of Engineering I 3.0
TDEC 111 Physical Foundations of Engineering I 3.0
TDEC 112 Mathematical Foundations of Engineering II 3.0
TDEC 113 Physical Foundations of Engineering II 3.0
TDEC 114 Mathematical Foundations of Engineering III 3.0
TDEC 115 Physical Foundations of Engineering III 3.0
TDEC 120 Chemical Biological Foundations of Engineering I 3.0
TDEC 121 Chemical Biological Foundations of Engineering II 3.0
TDEC 122 Chemical Biological Foundations of Engineering III 3.0
TDEC 130 Engineering Design and Laboratory I 4.0
TDEC 131 Engineering Design and Laboratory II 4.0
TDEC 132 Engineering Design and Laboratory III 4.0
TDEC 201 Energy I 3.0
TDEC 202 Energy II 3.0
TDEC 211 Materials I 3.0
TDEC 212 Materials II 3.0
TDEC 221 Systems I 3.0
TDEC 222 Systems II 3.0
TDEC 231 Evaluation/Presentation of Experimental Data I 4.0
TDEC 232 Evaluation/Presentation of Experimental Data II 4.0

Biomedical engineering requirements
BIO 201 Human Physiology I 4.0
BIO 203 Human Physiology II 4.0
BMES 321 The Living Engine 4.0
BMES 322 WI The Body Synthetic 4.0
BMES 401 Biosensors I 4.0
BMES 402 Biosensors II 4.0
BME laboratories (4) 8.0
BME professional electives (2) 6.0
Interdisciplinary courses (4) 16.0
BME core electives (7) 30.0
Senior project design (3) 8.0

Working with a faculty advisor, biomedical engineering majors can satisfy their biomedical engineering core and professional course requirements by selecting from the following list of courses or sequences once they have completed the necessary prerequisites: Biomaterials, Biomechanics, Transport Phenomena in Living Systems, Biomedical Signals and Systems, Biomedical Imaging, Biomedical Informatics, and Chronoengineering.

Biomedical engineering majors can select the interdisciplinary courses from the list available for all engineering students. Recommended courses include Bioinformatics, Biomedical Informatics, Biomedical Instrumentation, Modeling Methods in Biology, Biometry, Introduction to Biophysics, and Engineering Mathematics.

Minor in Biomedical Engineering

The minor in biomedical engineering is designed for students who have taken the necessary TDEC courses in engineering or have obtained the equivalent background.

Requirements
BIO 201 Human Physiology I 4.0
BIO 203 Human Physiology II 4.0
BMES 321 The Living Engine 4.0
BMES 322 WI The Body Synthetic 4.0
BMES 401 Biosensors I* 4.0
BMES 402 Biosensors II* 4.0
Biomedical Engineering Laboratories 4.0
*** Or equivalent as determined by the School.**
Biomedical engineering students can also minor in another engineering or science discipline.

Health Systems and Technology

The Health Systems and technology program is primarily designed to be an off-campus degree-completion program. This bachelor of science degree program is specifically tailored for the working health care professional seeking career advancement and educational flexibility.

The Health Systems and Technology program is managed jointly by the School of Biomedical Engineering, Science, and Health Systems and the Richard C. Goodwin College of Professional Studies. In most cases, associate degree programs provide incoming students with the basic Drexel University requirements of two quarters of a laboratory science, two quarters of mathematics, and three quarters of humanities. If these requirements are not met, students take the appropriate courses as well as 12 credits of free electives.

Curriculum

The modular design of this program reflects the need for flexibility for part-time and working students. Although the program leads to the B.S., some students may want or need educational enhancement only in certain areas. Therefore, two levels of certification are offered in addition to the B.S. The first is obtained by completing six of the flagship courses. The second involves completing all the coursework in a given learning area module. This approach provides students with three options for their educational advancement, each level of which provides the necessary education and credits for the next level. The flagship courses serve as prerequisites for the modules, and certain modules can be added together to fulfill the requirements for the B.S.

B.S. in Health Systems and Technology

Degree Requirements: 180.0 credits

Primary Certificate
BMES 331 Computers in Health Systems I 3.0
BMES 332 Computers in Health Systems II 3.0
BMES 335 Biomedical Informatics I 3.0
BMES 336 Biomedical Informatics II 3.0
BMES 480 Health Care Administration 3.0
BMES 338 Biomedical Ethics and Law 3.0

Learning Area Modules:
Administration (Fiscal and Personnel Management)
Core requirements
ACCT 115 Financial Accounting Foundations 5.0
ACCT 116 Managerial Accounting Foundations 5.0
ACCT 331 Managerial Accounting II 4.0
BMES 338 Biomedical Ethics and Law 3.0
BMES 480 Health Care Administration 3.0
HRMT 321 Staffing in Organizations 4.0
HRMT 323 Principles of Human Resource Administration 3.0
HRMT 362 Personnel Administration 3.0
MKTG 351 Marketing for Nonprofit Organizations 4.0
ORGB 300 Organizational Behavior 4.0

Computer and Information Systems
Core requirements
BMES 331 Computers in Health Systems I 3.0
BMES 332 Computers in Health Systems II 3.0
BMES 335 Biomedical Informatics I 3.0
BMES 336 Biomedical Informatics II 3.0
ISYS 101 Introduction to Information Systems I 3.0
ISYS 102 Introduction to Information Systems II 3.0
ISYS 105 Information Evaluation, Organization, and Use 3.0
ISYS 110 Human-Computer Interaction I 3.0
ISYS 200 Systems Analysis I 3.0
ISYS 210 Database Management Systems 3.0
ISYS 350 Distributed Computing and Networking 3.0

Presentation and Communication
Core requirements
COM 210 Theory and Models of Communication 3.0
COM 230 Techniques of Speaking 3.0
COM 270 WI Writing for Business 3.0
COM 310 WI Technical Communication 3.0
COM 330 Professional Presentations 3.0
COM 370 WI Advanced Business Writing 3.0

Instrumentation and Analysis
Core requirements
BMES 391 Biomedical Instrumentation I 3.0
BMES 392 Biomedical Instrumentation II 3.0
ENVR 431 Epidemiology 3.0
ENGL 102 Persuasive Writing and Reading 3.0
STAT 261 Statistics I 3.0
STAT 262 Statistics II 3.0
STAT 263 Statistics III 3.0

Health and Safety
Core requirements
ENVR 321 Environmental Health 3.0
ENVR 331 Industrial Hygiene I 3.0
ENVR 332 Industrial Hygiene II 3.0
ENVR 333 Industrial Hygiene Laboratory 3.0
ENVR 335 Industrial Safety 3.0

One of the following sets of courses
ENVR 436 Toxicology and Human Physiology 3.0
ENVR 551 Radiological Health 3.0
or
NFS 265 Industrial Hygiene Laboratory 3.0
NFS 270 Microbial Food Safety and Sanitation 3.0

Psychology and Ethics
Core requirements
BMES 338 Biomedical Ethics and Law 3.0
PSY 250 Industrial Psychology 3.0
PSY 252 Death and Dying 3.0
SOC 115 Industrial Sociology 3.0
SOC 210 Race and Ethnic Relations 3.0
SOC 235 Sociology of Health 3.0

The School of Education

The School of Education offers Pennsylvania Department of Education-approved programs to certify students who to be teachers in elementary education (with an emphasis on mathematics, science, and technology) and secondary education (in biology, chemistry, earth and space science, environmental education, general science, mathematics, and physics).

The School of Education is the umbrella for:

- Teacher education and its undergraduate and graduate programs, which lead to B.S. and M.S. degrees and Pennsylvania State Teacher Certification for grades kindergarten through grade 12, and graduate Instructional Technology Specialist and school principal certification programs.
- The Drexel Center for the Prevention of School Violence, which is committed to reducing violence in schools by assisting schools in designing, implementing, and evaluating a creative school violence prevention model of pedagogy based on current research in creativity as opposed to the prevalent punitive focus on discipline.
- Ph.D. degree program in Educational Leadership Development and Learning Technologies, and School Superintendant certification.

Title II Reporting

In compliance with Title II, Section 207, of the Higher Education Act of 1998 and General Standards for the Institutional Preparation of Professional Educators (Chapter 354), pass rates on the Praxis Series Exam for students prepared as teachers by Drexel University are available at the School of Education.

About the Teacher Education Curriculum
Certification for classroom instruction is available in:

Elementary education (emphasis on mathematics, science, and technology)
Secondary education (grades 7-12)
Biology
Chemistry
Earth and Space Science
General Science
Mathematics
Physics
Secondary education (grades K-12)
Environmental Education

Students may acquire certification in more than one subject area.

Teacher education uses University-wide resources to prepare fully qualified mathematics and science teachers at both the elementary and secondary levels. It applies the microcomputer in teaching and learning, and it is the only such program in the country to incorporate a six-month paid internship in industry related to the student's area of certification (for example, a prospective chemistry teacher might co-op at a chemical company).

Because the program requires that students have a B average in content courses needed for certification, the student's content coursework is evaluated at the end of the sophomore year for formal admittance into the Teacher Preparation program. All students are expected to meet the B average requirement in content coursework before beginning pre-student field teaching experience. Students who fail to meet this requirement must take additional content coursework until the B average is met.

Students participate in two periods of direct teaching experience. The first period, in the junior year, consists of a ten-week field experience (EDUC 320 WI) through which students participate in limited teaching; on-campus coursework accompanies the field experience (EDUC 325 and EDUC 326 WI). In the senior year, students complete the 12-week student-teaching experience (EDUC 412 WI) required for certification. Students must receive a grade of at least B in student teaching and in all pedagogy coursework to be recommended for certification.

Students pursuing the appropriate majors in the College of Arts and Sciences may also complete the requirements for certification within their area of study. For more information, contact the Program Coordinator for the School of Education at 215-895-6770.

Writing-Intensive Course Requirements
In order to graduate, all students beginning with the entering class of 2002/01 (Fall 2002) must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in a student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid "clustering" these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term.

Co-operative Education
Drexel University has long been known for its co-operative education program, through which students combine periods of fulltime, career-related employment with their studies. Internship employment is a requirement for all teacher education majors.

The degree is completed in four years, and it includes one six-month or three-month internship period of full-time employment. The goal of the co-op program in teacher education is to provide real-world experiences for future teachers to use in their future classrooms.

Students pursue varied positions geared directly to their area(s) of certification. For example, a student working toward certification in chemistry might seek employment in a corporate laboratory, just as a chemistry major would do. Some students, especially elementary certification majors, intern in liberal arts areas or such educationally oriented museums as Philadelphia's Please Touch Museum and the Franklin Institute Science Museum.

B.S. Teacher Education: Elementary Education Certification

Degree Requirements: 182.0 credits

A liberal arts-based program of study in mathematics, science, technology, humanities, and social sciences. Students are encouraged to choose professional electives from among the offerings of Drexel's departments of Bioscience and Biotechnology, Chemistry, Instructional Technology, and Physics.

General education requirements
ECON 201 Economics I 4.0
HIST 280 History of Science I 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
UNIV 101 The Drexel Experience 2.0
English course between 200-329 3.0
Art or music elective 3.0
Science, technology, and human affairs electives 6.0
Professional or free electives 36.0

One of the following:
HIST 201 U.S. History to 1815
HIST 202 U.S. History 1815 -1900
HIST 203 The United States Since 1900

Science requirements
BIO 102 Bioscience I 4.0
BIO 104 Bioscience II 4.0
CHEM 111 General Chemistry I
or
PHYS 103 General Physics I 4.0
CHEM 112 General Chemistry II
or
PHYS 104 General Physics II 4.0
ENVR 260 Environmental Issues 3.0
PHYS 131 WI Survey of the Universe 3.0
NFS 101 Introduction to Nutrition and Foods 3.0

Education requirements
EDUC 105 Freshman Seminar 3.0
EDUC 112 Integrative Instruction 3.0
EDUC 114 Science Teaching Methods 3.0
EDUC 205 Sophomore Seminar 1.0
EDUC 216 Diversity and Today's Teacher 3.0
EDUC 218 Math: Methods and Content 3.0
EDUC 301 Introduction to Personalized System of Instruction 3.0
EDUC 305 Junior Seminar 1.0
EDUC 310 Computer Applications in Teaching 3.0
EDUC 320 WI Professional Studies in Instruction 9.0
EDUC 322 Evaluation of Instruction 4.0
EDUC 323 WI Diagnostic Teaching 4.0
EDUC 324 Current Research in Curriculum and Instruction 3.0
EDUC 325 Multimedia in Instructional Design 3.0
EDUC 326 WI Language Arts Processes 3.0
EDUC 327 Learning Disabilities 3.0
EDUC 405 Senior Seminar 1.0

Student teaching experience
EDUC 412 WI Student Teaching 12.0

Suggested Professional Electives
Bioscience
BIO 201 Human Physiology I 4.0
BIO 203 Human Physiology II 4.0
BIO 221 Microbiology 5.0
BIO 244 Genetics I 3.0
BIO 254 Invertebrate Morphology and Physiology 5.0
BIO 256 Vertebrate Morphology and Physiology 5.0
BIO 260 Morphology and Physiology of Lower Animals 4.5
BIO 262 Morphology and Physiology of Higher Animals 4.5
BIO 235 Terrestrial Ecology 5.0
Chemistry
CHEM 103 General Chemistry III 5.0
CHEM 230 Quantitative Analysis 3.0
CHEM 231 WI Quantitative Analysis Laboratory 2.0
CHEM 241 Organic Chemistry I 4.0
CHEM 242 Organic Chemistry II 4.0
Nutrition and foods
NFS 200 WI Nutrition I: Principles of Nutrition 4.0
Physics
PHEV 141 WI Atmospheric Science I 3.0
PHEV 143 Atmospheric Science II: Weather and Forecasting 3.0
PHYS 106 WI The Physics of High Fidelity 3.0

B.S. Teacher Education: Biology Certification

Degree Requirements: 182.5 credits

The certification area emphasizes coursework in the biological sciences, including genetics, morphology and physiology, biochemistry, microbiology, and ecology. Students may also choose to pursue a second certification in chemistry and/or environmental education. Certification is for grades 7 – 12.

General education requirements
HIST 280 History of Science I 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
PHIL 251 Ethics 3.0
PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
UNIV 101 The Drexel Experience 2.0

Science requirements
BIO 114 Bioscience I: Growth of Organisms and Populations 5.5
BIO 115 Bioscience II: Organismal Physiology 5.5
BIO 117 Bioscience III: Molecular Cell Biology 5.5
BIO 204 Bioscience IV: Metabolic Molecular Cell Biology 5.5
BIO 206 WI Bioscience V: Gene Expression and Function 5.5
BIO 268 Vertebrate Developmental Biology 4.5
BIO 303 Biochemistry I 3.5
BIO 305 Biochemistry I Laboratory 2.0
BIO 460 Evolution 3.0
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
CHEM 241 Organic Chemistry I 4.0

CHEM 242 Organic Chemistry II 4.0
CHEM 244 Organic Chemistry I Laboratory 3.0
CHEM 245 Organic Chemistry Laboratory II 3.0
ENVR 284 WI Ecology I: Physiological and Population 5.0
PHYS 152 Physics for Life Sciences I 4.5
PHYS 153 Physics for Life Sciences II 4.5

Education requirements
EDUC 105 Freshman Seminar 3.0
EDUC 112 Integrative Instruction 3.0
EDUC 114 Science Teaching Methods 3.0
EDUC 205 Sophomore Seminar 1.0
EDUC 216 Diversity and Today's Teacher 3.0
EDUC 218 Math: Methods and Content 3.0
EDUC 301 Introduction to Personalized System of Instruction 3.0
EDUC 305 Junior Seminar 1.0
EDUC 310 Computer Applications in Teaching 3.0
EDUC 320 WI Professional Studies in Instruction 9.0
EDUC 322 Evaluation of Instruction 4.0
EDUC 323 WI Diagnostic Teaching 4.0
EDUC 324 Current Research in Curriculum and Instruction 3.0
EDUC 325 Multimedia in Instructional Design 3.0
EDUC 326 WI Language Arts Processes 3.0
EDUC 327 Learning Disabilities 3.0
EDUC 405 Senior Seminar 1.0

Student teaching experience
EDUC 412 WI Student Teaching 12.0

B.S. Teacher Education: Chemistry Certification

Degree Requirements: 190.5 credits

The certification area emphasizes coursework in such areas as organic chemistry, physical chemistry, biochemistry, analytical chemistry, and inorganic chemistry. Students may also choose to pursue a second certification in biology. Certification is for grades 7 – 12.

General education requirements
HIST 280 History of Science I 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
MATH 200 Calculus IV 4.0
MATH 201 Linear Algebra 4.0
PHIL 251 Ethics 3.0
PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
UNIV 101 The Drexel Experience 2.0

Science requirements
BIO 102 Bioscience I 4.0
BIO 104 Bioscience II 4.0
BIO 301 Biochemistry I 5.0
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
CHEM 103 General Chemistry III 5.0
CHEM 230 Quantitative Analysis 4.0
CHEM 231 WI Quantitative Analysis Laboratory 2.0
CHEM 241 Organic Chemistry 4.0
CHEM 242 Organic Chemistry II 4.0
CHEM 243 Organic Chemistry III 3.0
CHEM 245 Organic Chemistry I Laboratory 3.0
CHEM 251 Physical Chemistry I 4.0
CHEM 352 Physical Chemistry and Applications II 4.0
CHEM 357 WI Physical Chemistry I Laboratory 2.5
CHEM 421 Inorganic Chemistry I 3.0
CHEM 430 Analytical Chemistry I 4.0
CHEM 110 Environmental Chemistry 2.0
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 131 WI Survey of the Universe
or
PHEV 141 WI Atmospheric Science I 3.0
CHEM 245 Organic Chemistry II Laboratory 3.0
CHEM 352 Physical Chemistry II 3.0

Education requirements
EDUC 105 Freshman Seminar 3.0
EDUC 112 Integrative Instruction 3.0
EDUC 114 Science Teaching Methods 3.0
EDUC 205 Sophomore Seminar 1.0
EDUC 216 Diversity and Today's Teacher 3.0
EDUC 218 Math: Methods and Content 3.0
EDUC 301 Introduction to Personalized System of Instruction 3.0
EDUC 305 Junior Seminar 1.0
EDUC 310 Computer Applications in Teaching 3.0
EDUC 320 WI Professional Studies in Instruction 9.0
EDUC 322 Evaluation of Instruction 4.0
EDUC 323 WI Diagnostic Teaching 4.0
EDUC 324 Current Research in Curriculum and Instruction 3.0
EDUC 325 Multimedia in Instructional Design 3.0
EDUC 326 WI Language Arts Processes 3.0
EDUC 327 Learning Disabilities 3.0
EDUC 405 Senior Seminar 1.0

Student teaching experience
EDUC 412 WI Student Teaching 12.0

B.S. Teacher Education: Earth and Space Science Certification

Degree Requirements: 191.0 credits

The certification area emphasizes interdisciplinary study, involving coursework in biology, chemistry, geology, physics and atmospheric science. Students may also choose to pursue a second certification in chemistry or physics. Certification is for grades 7 – 12.

General education requirements

ECON 201 Economics I 4.0
HIST 285 Technology in Historical Perspective 3.0
HIST 280 History of Science I 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 121 Calculus I 4.0

MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
PHIL 251 Ethics 3.0
PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
UNIV 101 The Drexel Experience 2.0
Elective 3.0

Science requirements
BIO 102 Bioscience I 4.0
BIO 104 Bioscience II 4.0
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
EGEO 200 Physical Geology 3.0
EGEO 230 Historical Geology 3.0
ENVR 169 Environmental Science 3.0
ENVR 260 Environmental Issues 3.0
ENVR 284 WIWI Ecology I: Physiological and Population 5.0
ENVR 286 WI Ecology II: Communities and Ecosystems 5.0
ENVR 300 Environmental Impacts 3.0
ENVR 330 Aquatic Ecology 3.0
ENVR 390 Marine Ecology 3.0
PHEV 141 WI Atmospheric Science I 3.0
PHEV 142 WI Atmospheric Science I Laboratory 1.0
PHEV 143 Atmospheric Science II 3.0
PHEV 144 WI Atmospheric Science II Laboratory 1.0
PHEV 441 Issues in Global Change I: Seminar 2.0
PHEV 442 Issues in Global Change II: Research 2.0
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 131 WI Survey of the Universe 3.0
PHYS 226 WI Instrumentation for Scientists I 3.0
PHYS 227 WI Instrumentation for Scientists II 3.0

Education requirements
EDUC 105 Freshman Seminar 3.0
EDUC 112 Integrative Instruction 3.0
EDUC 114 Science Teaching Methods 3.0
EDUC 205 Sophomore Seminar 1.0
EDUC 216 Diversity and Today's Teacher 3.0
EDUC 218 Math: Methods and Content 3.0
EDUC 301 Introduction to Personalized System of Instruction 3.0
EDUC 305 Junior Seminar 1.0
EDUC 310 Computer Applications in Teaching 3.0
EDUC 320 WI Professional Studies in Instruction 9.0
EDUC 322 Evaluation of Instruction 4.0
EDUC 323 WI Diagnostic Teaching 4.0
EDUC 324 Current Research in Curriculum and Instruction 3.0
EDUC 325 Multimedia in Instructional Design 3.0
EDUC 326 WI Language Arts Processes 3.0
EDUC 327 Learning Disabilities 3.0
EDUC 405 Senior Seminar 1.0

Student teaching experience
EDUC 412 WI Student Teaching 12.0

B.S. Teacher Education: Environmental Education Certification

Degree Requirements: 191.0 credits

The certification area emphasizes coursework in such areas of environmental issues as biology and chemistry. Students may also choose to pursue a second certification in biology. Certification is for grades K – 12.

General education requirements

ECON 201 Economics I 4.0
HIST 285 Technology in Historical Perspective 3.0
HIST 280 History of Science I 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
PHIL 251 Ethics 3.0
PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
UNIV 101 The Drexel Experience 2.0
Elective 3.0

Science requirements
BIO 102 Bioscience I 4.0
BIO 104 Bioscience II 4.0
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
EGEO 200 Physical Geology 3.0
EGEO 230 Historical Geology 3.0
ENVR 169 Environmental Science 3.0
ENVR 260 Environmental Issues 3.0
ENVR 284 WIWI Ecology I: Physiological and Population 5.0
ENVR 286 WI Ecology II: Communities and Ecosystems 5.0
ENVR 300 Environmental Impacts 3.0
ENVR 330 Aquatic Ecology 3.0
ENVR 390 Marine Ecology 3.0
PHEV 141 WI Atmospheric Science I 3.0
PHEV 142 WI Atmospheric Science I Laboratory 1.0
PHEV 143 Atmospheric Science II 3.0
PHEV 144 WI Atmospheric Science II Laboratory 1.0
PHEV 441 Issues in Global Change I: Seminar 2.0
PHEV 442 Issues in Global Change II: Research 2.0
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 131 WI Survey of the Universe 3.0
PHYS 226 WI Instrumentation for Scientists I 3.0
PHYS 227 WI Instrumentation for Scientists II 3.0

Education requirements
EDUC 105 Freshman Seminar 3.0
EDUC 112 Integrative Instruction 3.0
EDUC 114 Science Teaching Methods 3.0
EDUC 205 Sophomore Seminar 1.0
EDUC 216 Diversity and Today's Teacher 3.0
EDUC 218 Math: Methods and Content 3.0
EDUC 301 Introduction to Personalized System of Instruction 3.0
EDUC 305 Junior Seminar 1.0
EDUC 310 Computer Applications in Teaching 3.0
EDUC 320 WI Professional Studies in Instruction 9.0
EDUC 322 Evaluation of Instruction 4.0
EDUC 323 WI Diagnostic Teaching 4.0
EDUC 324 Current Research in Curriculum and Instruction 3.0
EDUC 325 Multimedia in Instructional Design 3.0
EDUC 326 WI Language Arts Processes 3.0

EDUC 327 Learning Disabilities 3.0
EDUC 405 Senior Seminar 1.0

Student teaching experience
EDUC 412 WI Student Teaching 12.0

B.S. Teacher Education: General Science Certification

Degree Requirements: 185.0 credits

The certification area is a well-rounded program incorporating biology, chemistry, mathematics, and physics. Students may also choose to pursue a second certification in any of the other certification areas. Certification is for grades 7 – 12.

General education requirements
HIST 280 History of Science I 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
PHIL 251 Ethics 3.0
PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
UNIV 101 The Drexel Experience 2.0
Electives 15.0
Science, Technology, Human Affairs electives 6.0

Science requirements
BIO 102 Bioscience I 4.0
BIO 104 Bioscience II 4.0
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
CHEM 103 General Chemistry III 5.0
EGEO 200 Physical Geology 3.0
EGEO 230 Historical Geology 3.0
ENVR 284 WI Ecology I: Physiological and Population 5.0
ENVR 286 WI Ecology II: Communities and Ecosystems 5.0
ENVR 390 Marine Ecology 3.0
PHEV 141 WI Atmospheric Science I 3.0
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 131 WI Survey of the Universe 3.0
PHYS 226 WI Instrumentation for Scientists I 4.0
PHYS 227 WI Instrumentation for Scientists II 3.0

Education requirements
EDUC 105 Freshman Seminar 3.0
EDUC 112 Integrative Instruction 3.0
EDUC 114 Science Teaching Methods 3.0
EDUC 205 Sophomore Seminar 1.0
EDUC 216 Diversity and Today's Teacher 3.0
EDUC 218 Math: Methods and Content 3.0
EDUC 301 Introduction to Personalized System of Instruction 3.0
EDUC 305 Junior Seminar 1.0
EDUC 310 Computer Applications in Teaching 3.0
EDUC 320 WI Professional Studies in Instruction 9.0
EDUC 322 Evaluation of Instruction 4.0
EDUC 323 WI Diagnostic Teaching 4.0
EDUC 324 Current Research in Curriculum and Instruction 3.0
EDUC 325 Multimedia in Instructional Design 3.0
EDUC 326 WI Language Arts Processes 3.0
EDUC 327 Learning Disabilities 3.0
EDUC 405 Senior Seminar 1.0

Student teaching experience
EDUC 412 WI Student Teaching 12.0

B.S. Teacher Education: Mathematics Certification

Degree Requirements: 184.0 credits

The certification area emphasizes coursework in such areas of mathematics as calculus, linear algebra, differential equations, probability and statistics, techniques of mathematical proof, and discrete mathematics. Students may also choose to pursue a second certification in physics or one of the other sciences. Certification is for grades 7 – 12.

General education requirements
CS 164 Introduction to Computer Science 3.0
CS 171 Computer Programming 3.0
ECON 211 Principles of Economics I (Micro) 4.0
HIST 280 History of Science I 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
PHIL 251 Ethics 3.0
PSY 101 General Psychology I 3.0
PSY 330 Cognitive Psychology 3.0
UNIV 101 The Drexel Experience 2.0
English elective 3.0
Electives 9.0

Mathematics requirements
EDUC 428 Cultural and Historical Significance of Math 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
MATH 200 Calculus IV 4.0
MATH 201 Linear Algebra 4.0
MATH 210 Differential Equations 4.0
MATH 220 Techniques of Mathematical Proof 3.0
MATH 221 Discrete Mathematics 3.0
MATH 311 Probability and Statistics I 4.0

Science requirements
BIO 102 Bioscience I 4.0
BIO 104 Bioscience II 4.0
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
ENVR 260 Environmental Issues 3.0
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5

Education requirements
EDUC 105 Freshman Seminar 3.0
EDUC 112 Integrative Instruction 3.0

EDUC 114 Science Teaching Methods 3.0
EDUC 205 Sophomore Seminar 1.0
EDUC 216 Diversity and Today's Teacher 3.0
EDUC 218 Math: Methods and Content 3.0
EDUC 301 Introduction to Personalized System of Instruction 3.0
EDUC 305 Junior Seminar 1.0
EDUC 310 Computer Applications in Teaching 3.0
EDUC 320 WI Professional Studies in Instruction 9.0
EDUC 322 Evaluation of Instruction 4.0
EDUC 323 WI Diagnostic Teaching 4.0
EDUC 324 Current Research in Curriculum and Instruction 3.0
EDUC 325 Multimedia in Instructional Design 3.0
EDUC 326 WI Language Arts Processes 3.0
EDUC 327 Learning Disabilities 3.0
EDUC 405 Senior Seminar 1.0

Student teaching experience
EDUC 412 WI Student Teaching 12.0

B.S. Teacher Education: Physics Certification

Degree Requirements: 186.5 credits

The certification area emphasizes coursework in physics and atmospheric science, including such topics as classical mechanics, electromagnetic fields, quantum mechanics, and physics of high fidelity, and survey of the universe. Students may also choose to pursue a second certification in mathematics. Certification is for grades 7 – 12.

General education requirements
HIST 280 History of Science I 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 121 Calculus I 4.0
MATH 122 Calculus II 4.0
MATH 123 Calculus III 4.0
MATH 200 Calculus IV 4.0
MATH 201 Linear Algebra 4.0
MATH 210 Differential Equations 4.0
PHIL 251 Ethics 3.0
PSY 101 General Psychology 3.0
PSY 330 Cognitive Psychology 3.0
UNIV 101 The Drexel Experience 2.0

Science requirements
BIO 102 Bioscience I 4.0
BIO 104 Bioscience II 4.0
CHEM 101 General Chemistry I 4.0
CHEM 102 General Chemistry II 4.0
ENVR 260 Environmental Issues 3.0
PHEV 141 WI Atmospheric Science I 3.0
PHYS 111 Physics I 4.5
PHYS 112 Physics II 4.5
PHYS 131 WI Survey of the Universe 3.0
PHYS 211 Physics III 4.5
PHYS 222 Modern Physics 4.0
PHYS 226 WI Instrumentation for Scientists I 4.0
PHYS 227 WI Instrumentation for Scientists II 3.0
PHYS 311 Classical Mechanics I 4.0
PHYS 312 Classical Mechanics II 4.0
PHYS 316 Thermodynamics 4.0
PHYS 321 Electromagnetic Fields I 4.0
PHYS 326 Quantum Mechanics I 4.0

Education requirements
EDUC 112 Integrative Instruction 3.0
EDUC 114 Science Teaching Methods 3.0
EDUC 205 Sophomore Seminar 1.0
EDUC 216 Diversity and Today's Teacher 3.0
EDUC 218 Math: Methods and Content 3.0
EDUC 301 Introduction to Personalized System of Instruction 3.0
EDUC 305 Junior Seminar 1.0
EDUC 310 Computer Applications in Teaching 3.0
EDUC 320 WI Professional Studies in Instruction 9.0
EDUC 322 Evaluation of Instruction 4.0
EDUC 323 WI Diagnostic Teaching 4.0
EDUC 324 Current Research in Curriculum and Instruction 3.0
EDUC 325 Multimedia in Instructional Design 3.0
EDUC 326 WI Language Arts Processes 3.0
EDUC 327 Learning Disabilities 3.0
EDUC 405 Senior Seminar 1.0

Student teaching experience
EDUC 412 WI Student Teaching 12.0

The Richard C. Goodwin College of Professional Studies

The mission of the Goodwin College of Professional Studies is to provide contemporary students with an academic foundation and practical education for their professional and personal advancement. The College is dedicated to scholarly activities and to educating students by means of programs delivered by committed faculty through creative and effective teaching/learning methods.

The Goodwin College (formerly known as the Evening College) has been recognized as a leading institution for adult and nontraditional learners since its inception. During its long history it has provided part-time students the opportunity to pursue baccalaureate degrees, by taking courses during the evening, in more than 20 different disciplines. In 1989 the Association of Continuing Higher Education honored the College for more than 50 years of outstanding achievement in the field of adult education.

Changing needs among adult and traditional students are driving new trends in higher education, and new societal needs have reshaped what was once the sole mission of the College. Today the College serves full-time and part-time students, traditional and non-traditional learners. Offering for-credit and non-credit courses and programs, it also serves corporations at their sites and students at remote locations through wireless technology.

The College also provides a range of continuing adult and professional education programs, certificates of proficiency, licensing and certification test preparation, customer contracted training, and workforce development programs. The College abides by the continuing education unit (CEU) criteria for quality education.

Students can pursue studies leading to a baccalaureate degree in the following nine majors:

Architecture
Applied Engineering Technology
Construction Management
Communications & Applied Technology
Culinary Arts
General Studies
Health Systems & Technology
Hospitality Management
Industrial Engineering

Degree Requirements
Requirements for Goodwin degrees are provided by individual programs according to the requirements for each major, which are set forth in subsequent pages. The minimum number of credits required for the degree of Bachelor of Science varies from one program to another. All graduating students, regardless of the program, must have earned a grade point average of 2.0 or higher for all coursework undertaken at Drexel University.

Writing-Intensive Course Requirements
In order to graduate, all students beginning with the entering class of Fall 2002 must pass three writing-intensive courses after their freshman year. Two writing-intensive courses must be in the student's major. The third can be in any discipline. Students are advised to take one writing-intensive class each year, beginning with the sophomore year, and to avoid “clustering” these courses near the end of their matriculation. Transfer students need to meet with an academic advisor to review the number of writing-intensive courses required to graduate.

A "WI" next to a course in this catalog indicates that this course can fulfill a writing-intensive requirement. Departments will designate specific sections of such courses as writing-intensive. Sections of writing-intensive courses are not indicated in this catalog. Students should check the section comments in Banner when registering. Students scheduling their courses in Banner can also conduct a search for courses with the attribute "WI" to bring up a list of all writing-intensive courses available that term..

Architecture

Part-time Evening Curriculum
The program, offered entirely in the evening, leads to a Bachelor of Architecture degree. The program is structured into three areas of study: the studio/thesis sequence (87 credits); required and elective architectural coursework (74 credits); and required university coursework (48 credits).

Calendar
The course of study usually takes seven years to complete, but students with transfer credits in studio design can accelerate their program. Students are expected to supplement their academic work through full-time employment in architectural offices. The studio courses and most required professional courses are offered in sequences during the fall, winter and spring quarters. Elective courses and required university courses are available during the summer quarter. |

Transfer Credits
It is possible to transfer into the architecture program at Drexel. Transfer credit for comparable courses completed at accredited institutions will be awarded if grades of C or higher have been earned. Placement and credit in studio design courses will depend on a portfolio review of the students’ academic design projects. In general advanced placement in design is awarded when students have successfully completed comparable studios in B.Arch. programs or in recognized pre-architecture transfer programs.

Advisement and Departmental Regulations
Please refer to the department's General Counseling Guidelines to the Curriculum for a complete description of all departmental regulations and procedures, and for advice in selecting, sequencing, and scheduling coursework. These guidelines are available at the Office of the Department of Architecture at 3201 Arch Street.

Accreditation
The Bachelor of Architecture degree program at Drexel is accredited by the National Architectural Accrediting Board (NAAB).

In the United States, most state registration boards require a degree from an accredited professional degree program as a prerequisite for licensure. The National Architectural Accrediting Board (NAAB), which is the sole agency authorized to accredit U.S. professional degree programs in architecture, recognizes two types of degrees: the Bachelor of Architecture and the Master of Architecture. A program may be granted a five-year, three-year, or two-year term of accreditation, depending on its degree of conformance with established educational standards.

Master's degree programs may consist of a preprofessional undergraduate degree and a professional graduate degree, which, when earned sequentially, comprise an accredited professional education. However, the preprofessional degree is not, by itself, recognized as an accredited degree.

Bachelor of Architecture: Part-Time Evening Program

Degree Requirements: 209.0 credits.

General education requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 181 Mathematical Analysis I 3.0
MATH 182 Mathematical Analysis II 3.0
MATH 183 Mathematical Analysis III 3.0
PHYS 182 Applied Physics I 3.0
PHYS 183 Applied Physics II 3.0
PHYS 184 Applied Physics III 3.0
Humanities and social science electives 9.0
Free electives 12.0

Departmental requirements
ARCH 111 Studio 1-1 3.0
ARCH 112 Studio 1-2 3.0
ARCH 113 Studio 1-3 3.0
ARCH 121 Studio 2-1 3.0
ARCH 122 Studio 2-2 3.0
ARCH 123 Studio 2-3 3.0
ARCH 231 Studio 3-1* 3.0
ARCH 232 Studio 3-2 3.0
ARCH 233 Studio 3-3 3.0
ARCH 241 Studio 4-1 4.0
ARCH 242 Studio 4-2 4.0
ARCH 243 Studio 4-3 4.0
ARCH 351 Studio 5-1 4.0
ARCH 352 Studio 5-2 4.0
ARCH 353 Studio 5-3 4.0
ARCH 361 Studio 6-1* 4.0
ARCH 362 Studio 6-2 4.0
ARCH 363 Studio 6-3 4.0
ARCH 496 Thesis I 8.0
ARCH 497 Thesis II 8.0
ARCH 498 Thesis III 8.0
***Prior to taking this course student must meet the Department of Architecture's minimum studio advancement requirements. See the Department's Advising Guidelines web page for more details.**

Required professional courses

ARCH 14I WI Architecture and Society I 3.0
ARCH 142 WI Architecture and Society II 3.0
ARCH 143 WI Architecture and Society III 3.0
ARCH 150 Introduction to CADD I 4.0
ARCH 153 Introduction to CADD II 4.0
ARCH 155 Basic Architectural Drawing 3.0
ARCH 156 Graphic Communication I 3.0
ARCH 161 Architectural Construction 3.0
ARCH 261 Environmental Systems I 3.0
ARCH 262 Environmental Systems II 3.0
ARCH 263 Environmental Systems III 3.0
ARCH 321 WI General Lecture Series I 3.0
ARCH 322 WI General Lecture Series II 3.0
ARCH 323 WI General Lecture Series III 3.0
CIVE 261 Materials and Structural Behavior I 3.0
CIVE 262 Materials and Structural Behavior II 3.0
CIVE 263 Materials and Structural Behavior III 3.0

History and theory electives 12.0
Three or four of the following courses
ARCH 341 Theories of Architecture I 3.0
ARCH 342 Theories of Architecture II 3.0
ARCH 343 Theories of Architecture III 3.0
ARCH 344 History of the Modern Movement I 3.0
ARCH 345 History of the Modern Movement II 3.0
ARCH 346 History of Philadelphia Architecture 3.0
ARCH 347 Summer Study Abroad (6 credits) 6.0
ARCH 348 Studies in Vernacular Architecture 3.0
ARCH 441 Urban Design Seminar I 3.0
ARCH 442 Urban Design Seminar II 3.0
ARCH 499 Special Topics in Architecture 3.0

Professional electives
Any three of the following courses*
ARCH 157 Graphic Communication II 3.0
ARCH 421 WI Environmental Psychology and Design Theory 3.0
ARCH 431 Architectural Programming 3.0
ARCH 432 The Development Process 3.0
ARCH 435 Management Seminar I 3.0
ARCH 436 Management Seminar II 3.0
ARCH 451 Advanced Drawing 3.0
ARCH 455 Computer Applications in Architecture I 3.0
ARCH 456 Computer Applications in Architecture II 3.0
ARCH 461 Technology Seminar I 3.0
ARCH 462 Technology Seminar II 3.0
ARCH 465 Energy and Architecture 3.0
ARCH 499 Special Topics in Architecture 3.0
CIVE 400 Structural Design I 3.0
CIVE 401 Structural Design II 3.0
CIVE 402 Structural Design III 3.0
CIVE 464 Acoustics and Noise Control in Buildings I 3.0
CMGT 462 Construction Management I 3.0
CMGT 463 Value Engineering II 3.0
CMGT 363 Estimating I 3.0
PHTO 110 Photography 3.0
VSST 111 Figure Drawing I 3.0
VSST 202 Multimedia: Space 4.0
VSST 301 Painting I 4.0
VSST 311 Sculpture 4.0
Other approved engineering courses 3.0

*** History and theory electives can also be used to satisfy professional elective requirements.**

Applied Engineering Technology

The Bachelor of Science (B.S.) degree in Applied Engineering Technology provides an integrated educational experience directed toward development of the

ability to apply fundamental knowledge to the solution of practical technological problems.

The B.S. in Applied Engineering Technology consists of 186 credits. All students enrolled in the program are required to take 86 credits of general education courses including mathematics, the sciences and liberal arts. During their sophomore year, students need to choose one of the three available concentrations, namely electrical, manufacturing, or mechanical engineering technology. These concentrations consist of core fundamental courses, technical electives, free electives and a three-term senior design project reflecting industrial practices.

The AET program distinguishes itself from traditional engineering programs by placing emphasis on the application of theory, by integrating most courses with laboratory experience, and by incorporating faculty with extensive industrial experience.

The AET program includes full-time and part-time enrollment options. Students pursuing the full-time option can opt for a four-year program with a six-month internship or a five-year program with an eighteen-month co-op period.

Students who have earned an Associate of Applied Science (AAS) in Automated Manufacturing, Robotics, Machine Tool Technology, Mechanical Technology, Electronics Technology or related areas from accredited community colleges, can usually complete their B.S. in two years.

Applied engineering technology graduates are uniquely qualified to serve in a variety of functions requiring traditional and nontraditional technological skills. The program also prepares students for graduate study in a variety of fields including engineering management, business administration, and health technology.

B.S. in Applied Engineering Technology: Manufacturing Engineering Technology Concentration

Degree Requirement: 186.0 credits

Humanities and social sciences requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
COM 111 Introduction to Corporate Communication 3.0
COM 230 Principles of Speech 3.0
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
HIST 285 Technology in Historical Perspective 3.0
PHIL 315 Engineering Ethics 3.0
Liberal studies electives 9.0

Basic Science requirements
CHEM 161 General Chemistry I 3.0
CHEM 162 General Chemistry II 3.0
CHEM 164 Chemistry Laboratory IA 3.0
PHYS 182 Applied Physics I 3.0
PHYS 186 Physics I-A 2.0
PHYS 183 Applied Physics II 3.0
PHYS 188 Physics II-A 2.0
PHYS 184 Applied Physics III 3.0
PHYS 282 Physics III-A 2.0

Mathematics requirements
MATH 279 Special Topics in Mathematics: Advanced Algebra 3.0
MATH 279 Special Topics in Mathematics: Trigonometry 3.0
MATH 110 Precalculus 3.0
MATH 184 Calculus and Analytic Geometry I 3.0
MATH 185 Calculus and Analytic Geometry II 3.0
STAT 261 Statistics I 3.0
STAT 262 Statistics 2 3.0

Capstone course requirements
AET 320A Project Design 1 3.0
AET 320B Project Design 2 3.0
AET 320C Project Design 3 3.0

Technical sciences requirements
EET 101 Circuit Analysis I 4.0
CS 390 Selected Computer Language 3.0
MET 101 Manufacturing Materials 4.0
MET 102 Industrial Electronics 4.0
MET 103 Applied Mechanics 4.0
MET 104 Fluid Power 4.0
MHT 201 Kinematics 3.0
MHT 205 Thermodynamics 1 3.0

Technical specialty requirements
MET 201 Introduction to Manufacturing Industries 3.0
MET 202 Computer Aided Drafting 4.0
MET 203 Machine Tool Processing 4.0
MET 204 Applied Quality Control 4.0
MET 205 Automation & Computer Assisted Machine Systems 4.0
MET 206 Automated Machines 4.0
MET 207 Manufacturing Processes 4.0
MET 208 Manufacturing Controls 4.0

Technical electives
MET 301 Advanced Technical Drawing 4.0
MET 302 Manufacturing Design with CAD 4.0
MET 303 Three Dimensional Modeling 4.0
MET 304 Digital Instrumentation 4.0
MET 305 Microprocessing and Computer Systems 4.0
MET 306 Zone Technologies 4.0
MET 307 Haz Mat for Manufacturing 4.0
MET 308 Maritime Construction 4.0
MET 370 Special Topics in Manufacturing 4.0

UGSD 180 College Success 2.0
Free electives 23.0 Credits

B.S. in Applied Engineering Technology: Electrical Engineering Technology Concentration

Degree Requirement: 186.0 credits

Humanities and social sciences requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
COM 111 Introduction to Corporate Communication 3.0
COM 230 Principles of Speech 3.0
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
HIST 285 Technology in Historical Perspective 3.0
PHIL 315 Engineering Ethics 3.0
Liberal studies electives 9.0

Basic Science requirements
CHEM 161 General Chemistry I 3.0
CHEM 162 General Chemistry II 3.0
CHEM 164 Chemistry Laboratory IA 3.0
PHYS 182 Applied Physics I 3.0
PHYS 186 Physics I-A 2.0
PHYS 183 Applied Physics II 3.0
PHYS 188 Physics II-A 2.0
PHYS 184 Applied Physics III 3.0
PHYS 282 Physics III-A 2.0

Mathematics requirements
MATH 279 Special Topics in Mathematics: Advanced Algebra 3.0
MATH 279 Special Topics in Mathematics: Trigonometry 3.0
MATH 110 Precalculus 3.0
MATH 184 Calculus and Analytic Geometry I 3.0
MATH 185 Calculus and Analytic Geometry II 3.0
STAT 261 Statistics I 3.0

Capstone course requirements 9.0 Credits
AET 320A Project Design 1 3.0
AET 320B Project Design 2 3.0
AET 320C Project Design 3 3.0

Technical sciences requirements
CS 390 Selected Computer Language 3.0
MET 101 Manufacturing Materials 4.0
MET 103 Applied Mechanics 4.0
MET 104 Fluid Power 4.0

Technical specialty requirements
EET 101 Circuit Analysis I 4.0
EET 102 Circuit Analysis 2 4.0
EET 103 Circuit Analysis 3 4.0
EET 104 Circuit Analysis 4 4.0
EET 105 Electronics I 3.0
EET 106 Electronics 2 4.0
EET 107 Electronics 3 3.0
EET 108 Advanced Electronics Laboratory I 3.0
EET 109 Advanced Electronics Laboratory 2 3.0
EET 110 Engineering Analysis 4.0
EET 112 Energy Conversion 4.0
EET 113 Pulse and Digital Circuits 1 3.0
EET 114 Distributed Systems 4.0
EET 115 Digital Computers 1 3.0
EET 116 Control Engineering 1 3.0

Technical electives
EET 301 Digital Computers 2 3.0
EET 302 Control Engineering 2 3.0
EET 303 Pulse and Digital Circuits 2 3.0
EET 304 Communications 1 3.0
EET 305 Communications 2 3.0
EET 306 Communications 3 3.0
EET 307 Power Systems 1 3.0
EET 308 Power Systems 2 3.0
EET 309 Optical System Design 3.0

UGSD 180 College Success 2.0
Free electives 18.0 Credits

B.S. in Applied Engineering Technology: Mechanical Engineering Technology Concentration

Degree Requirement: 186.0 credits

Humanities and social sciences requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
COM 111 Principles of Communication 3.0
COM 230 Principles of Speech 3.0
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
HIST 285 Technology in Historical Perspective 3.0
PHIL 315 Engineering Ethics 3.0
Liberal studies electives 9.0

Basic Science requirements
CHEM 161 General Chemistry I 3.0
CHEM 162 General Chemistry II 3.0
CHEM 164 Chemistry Laboratory IA 3.0
PHYS 182 Applied Physics I 3.0
PHYS 186 Physics I-A 2.0
PHYS 183 Applied Physics II 3.0
PHYS 188 Physics II-A 2.0
PHYS 184 Applied Physics III 3.0
PHYS 282 Physics III-A 2.0

Mathematics requirements
MATH 279 Special Topics in Mathematics: Advanced Algebra 3.0
MATH 279 Special Topics in Mathematics: Trigonometry 3.0
MATH 110 Precalculus 3.0
MATH 184 Calculus and Analytic Geometry I 3.0
MATH 185 Calculus and Analytic Geometry II 3.0
STAT 261 Statistics I 3.0

Capstone course requirements
AET 320A Project Design 1 3.0
AET 320B Project Design 2 3.0
AET 320C Project Design 3 3.0

Technical sciences requirements
EET 101 Circuit Analysis I 4.0
CS 390 Selected Computer Language 3.0
MET 101 Manufacturing Materials 4.0
MET 102 Industrial Electronics 4.0

EET 110 Engineering Analysis 4.0
MHT 101 Mechanics I 3.0
MHT 102 Mechanics 2 3.0
MHT 103 Mechanics 3 3.0

Technical specialty requirements
MET 202 Computer Aided Drafting 4.0
MHT 201 Kinematics 3.0
MHT 202 Stress Analysis 1 3.0
MHT 203 Stress Analysis 2 3.0
MHT 205 Thermodynamics 1 3.0
MHT 206 Thermodynamics 2 3.0
MHT 210 Fluid Mechanics 1 3.0
MHT 209 Mechanical Design 1 4.0
MHT 210 Mechanical Design 2 4.0
MHT 211 Machine Shop 4.0
MHT 213 Measurement & Analysis Laboratory 3.0
MHT 215 Technology Laboratory 2 2.0
MHT 216 Technology Laboratory 3 3.0

Technical electives
MHT 208 Fluid Mechanics 2 3.0
MHT 302 Vibrations 3.0
MHT 303 Power Generation 3.0
MHT 304 Advanced Materials 3.0
MHT 305 Applied Metallurgy 3.0
MHT 306 Refrigeration & Air Conditioning 3.0

UGSD 180 College Success 2.0
Free electives 16.0 Credits

Construction Management

Construction management is a dynamic profession that is a combination of art and science. While an understanding of the technical aspects of construction is extremely important, it is also essential that construction professionals have knowledge of the business and management aspects of the profession. While construction has traditionally been a very conservative industry, the increasing rate of technological development and competition in the industry serves to accelerate the development of new construction methods, equipment, materials, and management techniques. As a result of these forces, there is an increasing need for innovative and professionally competent construction professionals. Students in this program receive broad academic, technical, business, and construction management courses that are designed to produce these well-rounded construction professionals.

The Construction Management major prepares students for all phases of operation and management of the construction organization including cost estimating, project scheduling, and planning. Students are able to choose from a wide range of subjects in the social sciences and humanities to satisfy electives in the liberal arts and free elective requirements. Pursuing part-time, degree completion on average takes six years.

B.S. in Construction Management

Degree Requirements: 180.0 credits

English requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0

Mathematics requirements
CS 161 Introduction to Computing 3.0
MATH 181 Math Analysis I 3.0
MATH 182 Math Analysis II 3.0
MATH 183 Math Analysis III 3.0

Science requirements
CHEM 161 General Chemistry I 3.0
CHEM 162 General Chemistry II 3.0
CHEM 163 General Chemistry III 3.0
PHYS 182 Applied Physics I 3.0
PHYS 183 Applied Physics II 3.0
PHYS 184 Applied Physics III 3.0

Business requirements
ACCT 115 Financial Accounting 5.0
ECON 211 Principles of Economics I (Micro) 3.0
ECON 212 Principles of Economics II (Macro) 3.0
FIN 361 Financial Management I 3.0
HRMT 363 Collective Bargaining 3.0
STAT 261 Statistics I 3.0
STAT 262 Statistics II 3.0
STAT 263 Statistics III 3.0

Humanities and social science electives 15.0 Credits

Professional core requirements
ARCH 261 Environmental Systems I 3.0
ARCH 262 Environmental Systems II 3.0
ARCH 263 Environmental Systems III 3.0
CIVE 240 Engineering Economics 3.0
CIVE 251 Engineering Surveying 3.0
CIVE 261 Materials and Structural Behavior I 3.0
CIVE 262 Materials and Structural Behavior II 3.0
CIVE 263 Materials and Structural Behavior III 3.0
CIVE 464 Acoustics and Noise Control in Buildings I 3.0
CMGT 161 Building Materials Construction Management I 3.0
CMGT 162 Building Materials Construction Management II 3.0
CMGT 261 Construction Safety 3.0
CMGT 262 Building Codes 3.0
CMGT 263 Understanding Construction Drawing 3.0
CMGT 264 Construction Management of Field Operations 3.0
CMGT 361 Contracts & Specifications I 3.0
CMGT 362 Contracts & Specifications II 3.0
CMGT 363 Estimating I 3.0
CMGT 364 Estimating II 3.0
CMGT 380 Real Estate 3.0
CMGT 461 Construction Management I 3.0
CMGT 462 Construction Management II 3.0
CMGT 463 Value Engineering I 3.0
CMGT 465 Marketing Construction Services 3.0
CMGT 467 Techniques of Project Control 3.0

Professional electives 12.0 Credits

CMGT 380: Special Topics in Construction Management: Supv. Tools is a recommended professional elective.
Free electives 13.0 Credits

Certificate Program in Construction Management

The Certificate Program was started at the request of two contractors' associations: the General Building Contractors Association and the Contractors Association of Eastern Pennsylvania. It is designed for people who have undergraduate degrees in other fields and are employed or wish to be employed in the construction industry. It is also used as a credential for people who are already working in the construction industry, but do not wish to pursue an undergraduate degree. The certificate program is a two-year program with the certificate awarded upon completion of 36 credits. Students interested in continuing their education after certification are able to apply their coursework and credits directly to the Bachelor of Science in Construction Management.

Program of Study:
Building Materials and Construction Methods I
Building Materials and Construction Methods II
Contracts and Specifications I
Contracts and Specifications II
Estimating I
Understanding Construction Drawings
Construction Management I
Construction Management II
Value Engineering I
Marketing Construction Services
Techniques of Project Control
Construction Management of Field Operations

Course substitutions or other electives may be taken with prior approval from a liaison for Construction Management.

Minor in Construction Management

Students in Civil Engineering, Architectural Engineering and Architecture may select to pursue Construction Management as a minor area of study. Because construction is inherently related to design in these disciplines, the Construction Management minor can be a natural extension of each field of study.

The requirements for the minor include:

- completion of a minimum of 24 credits
- courses used to fulfill general education requirements may not be counted toward an academic minor
- up to nine credits earned within the student's major may be counted toward the minor with minor department approval.
- prerequisite courses may be counted toward the minor if recommended by the minor department.

Required courses
CMGT 161 Building Materials Construction Management I 3.0
CMGT 162 Building Materials Construction Management II 3.0
CMGT 361 Contracts & Specifications I 3.0
CMGT 362 Contracts & Specifications II 3.0
CMGT 363 Estimating I 3.0
CMGT 467 Techniques of Project Control 3.0

Two of the following elective courses may be chosen to meet the minor requirements* :
CMGT 261 Construction Safety 3.0
CMGT 263 Understanding Construction Drawing 3.0
CMGT 364 Estimating II 3.0
CMGT 461 Construction Management I 3.0
CMGT 462 Construction Management II 3.0
CMGT 463 Value Engineering I 3.0
CMGT 465 Marketing Construction Services 3.0

*** Choice of electives must be approved by the department based on the student's major field and prior experience.**

Certain courses within the student's major may also be used to meet the minor requirements. These include:
ARCH 261 Environmental Systems I 3.0
ARCH 262 Environmental Systems II 3.0
CIVE 240 Engineering Economics 3.0
ARCH 161 Architectural Construction* 3.0

*** ARCH 161 can be substituted for CMGT 161 for Architects. An elective may be substituted for CMGT 162.**
Communications and Applied Technology

Communications and Applied Technology

The Bachelor of Science in Communications and Applied Technology is a multidisciplinary program designed for individuals who want to increase their knowledge of all aspects of business communications and relevant communication technologies, while understanding the business principles that are necessary to achieve corporate goals. The major offers a multidisciplinary approach combining theoretical and applied learning principles and encompasses the spectrum of internal and external communications that organizations utilize in their management and marketing functions. The program is tailored to meet the needs of people who sell, communicate, and manage in industries that are heavily customer oriented and are involved in or affected by world markets. The goal of the program is to increase students' understanding of communication, management, applicable

technology, business, the world economy, and relationships within their corporate culture.

Program Goals:

- Combine communications and technology skills training with study of sound business fundamentals.
- Hone written, oral, and interpersonal communication skills for effectiveness in a variety of organizational settings, with both internal and external audiences.
- Expand written communication skills including research and design skills to produce reports, proposals, web sites, and other corporate documents.
- Provide conceptual understanding of various principles of management and organizational processes.
- Develop problem-solving, conflict-management, and decision-making skills
- Examine factors that explain international movement of persons, goods, services, financial capital, and technology across national boundaries.
- Understand legal and ethical issues in business communication, technological advancement, employer-employee relations, obligations to customers, and foreign populations.

Assessment of Prior Learning
The Goodwin College of Professional Studies will grant transfer credit for American Council on Education (ACE)-evaluated corporate training offered by professional associations such as the American Institute of Banking, the American College, and the College for Financial Planning as well as for industry certifications such as Microsoft Certified Professional. ACE-evaluated military training will be considered as well. In addition, credit by examination earned via College-Level Examination Program (CLEP), Defense Activity for Nontraditional Education Support (DANTES), Thomas Edison College Examination Program (TECEP), and Excelsior College Examinations (ECE) will also be assessed. All credits earned through assessment of prior learning are subject to advisor approval.

Curriculum
To complete the Bachelor of Science degree in Communications and Applied Technology, students must earn a minimum of 180 quarter credits comprising the following:

English Composition
Humanities
Social Sciences
Physical Sciences
Mathematics
Corporate Communication
Customer Operations
Information Systems

B.S. in Communications and Applied Technology

Degree Requirements: 180.0 credits

English composition requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0

Mathematics requirements
MATH 181 Mathematical Analysis I 3.0
MATH 182 Mathematical Analysis II 3.0
STAT 211 Calculus and Analytic Geometry III 3.0
CUST 380 Special Topics: Business Computer Applications 3.0

Science requirements (Choose one sequence)
BIO 161 General Biology I 3.0
BIO 162 General Biology II 3.0
or
CHEM 161 General Chemistry I 3.0
CHEM 162 General Chemistry II 3.0

Psychology & Sociology*
PSY 101 General Psychology 3.0
PSY 250 Industrial Psychology 3.0
SOC 101 Introduction to Sociology 3.0
SOC 215 Industrial Sociology 3.0

Philosophy*
PHIL 101 Introduction to Philosophy 3.0
PHIL 105 Critical Reasoning 3.0

History*
HIST 201 US History to 1815 3.0
HIST 202 US History, 1815-1900 3.0
HIST 203 US History since 1900 3.0
HIST 220 History of American Business 3.0

Economics*
ECON 201 Economics I 4.0
ECON 202 Economics II 4.0
ECON 340 WI International Business 3.0

Business requirements
ACCT 115 Financial Accounting 5.0
FIN 361 Financial Management I 3.0
HRMT 323 Principles of Human Resource Administration 3.0
MKTG 301 WI Introduction to Marketing Management 5.0
MKTG 348 Services Marketing 5.0
ORGB 300 Organizational Behavior 4.0
POM 300 WI Operations Management 4.0

MKTG 344 Professional Personal Selling 4.0
or
MKTG 356 Consumer Behavior
Corporate Communication requirements
COM 111 Introduction to Corporate Communication 3.0
COM 230 Techniques of Speaking 3.0
COM 240 New Technologies in Communication 3.0
COM 270 WI Business Communication 3.0
COM 280 Public Relations 3.0
COM 330 Professional Presentations 3.0

Informational Science & Technology requirements
ISYS 101 Introduction to Information Systems I 3.0
ISYS 102 Introduction to Information Systems II 3.0
ISYS 140 Information Systems Laboratory I 1.0
ISYS 141 Information Systems Laboratory II 1.0
ISYS 142 Information Systems Laboratory III 1.0
ISYS 205 Strategic Uses of Information Systems 3.0
PHIL 311 Computer Ethics 3.0

Customer Operations requirements
CUST 301 Project Management and Financial Services 3.0
CUST 302 Customer Service Theory and Practice 3.0
CUST 401 Customer Service Practicum I 4.0
CUST 402 Customer Service Practicum II 4.0
CUST 403 Customer Service Practicum III 4.0

Liberal arts electives 12.0
Free electives 16.0**
*** Courses listed are suggested.**
**** No more than three credits of free electives may be in business**

Culinary Arts

The culinary arts program prepares students for leadership positions in the fine-foods segment of the hospitality industry. This baccalaureate degree in culinary arts is among the first of its kind in the United States. Prior to this program, chefs have been trained in vocational programs or apprenticeships. This program comprises approximately equal parts liberal arts, business and administration, hospitality management, and culinary arts. Upon completing the program, students have an understanding of how to design or create a desired environment, how to market it, and how to deliver it to the customer. Students also receive the equivalent of a minor in business administration as well as completing the first year of foundation courses required for an MBA degree at Drexel.

The bachelor degree in culinary arts is completed in five years, consisting of two years of full-time study and three years of part-time study (2+3 option), during which the student works full time in industry.

B.S. in Culinary Arts

Degree Requirements: 184.0 credits

General education requirements
COM 280 Public Relations 3.0
CS 161 Introduction to Computing 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
NFS 101 Introduction to Nutrition and Foods 3.0
NFS 270 Safety and Sanitation 4.0
UNIV 101 The Drexel Experience 2.0
Arts and humanities electives 9.0
Social science electives 6.0
Free electives 9.0

Business minor courses
ACCT 115 Financial Accounting I 5.0
ECON 201 Economics I 4.0
ECON 202 Economics II 4.0
FIN 301 Introduction to Finance 5.0
MKTG 301 WI Introduction to Marketing Management 5.0
ORGB 300 Organizational Behavior 4.0
POM 300 WI Production and Operations 4.0
STAT 201 Quantitative Methods 4.0

Departmental requirements
HRM 110 Introduction to the Hospitality Industry 3.0
HRM 115 Culinary Science 3.0
HRM 120 Principles of Food-Service Management 3.0
HRM 130 Tourism I 3.0
HRM 135 Tourism II 3.0
HRM 215 Commercial Food Production 3.0
HRM 200 Productivity Software for the Hospitality Industry 3.0
HRM 230 Design Application Seminar 3.0
HRM 310 Hospitality Accounting Systems 3.0
HRM 320 Hospitality Management Information Systems 3.0
HRM 330 Hospitality Marketing 3.0
HRM 335 Beverage Management 3.0
HRM 410 Laws of Hospitality Industry 3.0
HRM 455 Hospitality Human Resources 3.0

Culinary arts requirements
CULA 200 Professional Skills Laboratory I 1.5
CULA 205 Professional Skills Laboratory II 1.5
CULA 210 Professional Skills Laboratory III 1.5
CULA 215 Foundations of Professional Baking 3.0
CULA 220 Patisserie I 2.0
CULA 225 Patisserie II 2.0
CULA 230 Major Techniques and Traditions 3.0
CULA 235 Professional Dining Room Management 1.5
CULA 300 Vegetarian Cuisine 3.0
CULA 305 The Italian Tradition 3.0
CULA 310 The French Tradition 3.0
CULA 315 The American Tradition 3.0
CULA 320 Advanced Culinary Studio 3.0
CULA 325 Charcuterie and Garde Manger 2.0
CULA 400 Directed Study With a Master Chef 2.0
CULA 405 Culture and Gastronomy I 2.0
CULA 410 Culture and Gastronomy II 2.0
CULA 415 Food Styling and Show Competition 2.0
CULA 420 Senior Design Project 3.0
HRM 465 Special Topics: Major Techniques and Traditions II 2.0

General Studies

The General Studies program is designed for students who wish to gain a breadth of knowledge in the humanities, social sciences, and natural sciences. In addition, general studies students focus on a particular area of interest by following one of the concentrations that exist in the program: Individualized Studies, Physical Sciences, Liberal Arts/Social Studies and General Management

B.S. in General Studies: Individualized Studies Concentration

Degree Requirements 180.0 credits

The Individualized Studies concentration provides students with the opportunity to mold a program suited to individual interests and needs. The aim of the concentration is to provide a smoother path to a bachelor's degree for individuals with a more technically oriented college background and accommodate students with varied educational interests that cannot be captured in a single degree program. Students have the opportunity to experiment in a variety of areas through a number of free electives or pursue a second specialization within this concentration.

English requirements 12.0 Credits
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
COM 230 Techniques of Speaking 3.0

Mathematics and Computers requirements
MATH 181 Mathematical Analysis I 3.0
MATH 182 Mathematical Analysis II 3.0
MATH 183 Mathematical Analysis II 3.0
CS 161 Introduction to Computing 3.0

Natural Science requirements
BIO 151 Applied Biology 3.0
CHEM 151 Applied Chemistry 3.0
PHYS 151 Applied Physics I 3.0

Concentration Requirements
Students must complete 45.0 credits within an area of concentration.

Liberal Studies requirements
Students must complete 36.0 credits in Liberal Studies, covering a range of subject areas in the humanities and/or social sciences: anthropology, psychology, sociology, political science, history, philosophy, literature, economics, communication, music, and art.

Free electives 66.0 Credits

Students may use free elective credit to pursue a 2nd concentration (36.0 credits in one area) or specialization (18.0 credits in one area).

B.S. in General Studies: General Management Concentration

Degree Requirements 180.0 credits

This Bachelor's program combines a broadly based curriculum in humanities and liberal studies with a solid foundation for those who are looking to enter or advance into management and business.

This concentration provides managerial skills through courses in marketing management, business communication, strategic planning, human resources, operations management, business law, economics, and information systems.

English composition requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0

Mathematics and Information Technology requirements
ISYS 102 Introduction to Information Systems II 3.0
MATH 181 Mathematical Analysis I 3.0
MATH 182 Mathematical Analysis II 3.0

Communication requirements
COM 270 WI Business Communication 3.0
COM 330 Professional Presentations 3.0

General Management requirements
BLAW 201 Business Law I 4.0
BLAW 202 Business Law II 4.0
BLAW 321 Law of Business Organizations 4.0
ECON 340 WI International Business 3.0
ORGB 300 Organizational Behavior 4.0
HRMT 323 Principles of Human Resource Administration 3.0
HRMT 321 Human Resource Management 3.0
HRMT 330 Collective Bargaining 3.0
CUST 380 Special Topics: Seminar in Quality Management 3.0
CUST 380 Special Topics: Strategic Planning 3.0
POM 300 WI Operations Management 4.0
MKTG 311 Introduction to Marketing Management 3.0
MKTG 358 Management Research 3.0
MKTG 481 Entrepreneurship

Science requirements
CUST 380 Special Topics: Strategies for Lifelong Learning 3.0
ECON 211 Economics I 3.0
ECON 212 Economics II 3.0
PHIL 301 Business Ethics 3.0
PSY 250 Industrial Psychology 3.0

Electives 97.0 Credits
Natural Science requirements 15.0
Liberal Arts electives 15.0

Free electives 67.0

B.S. in General Studies: Liberal Arts/Social Sciences Concentration

Degree Requirements 180.0 credits

The Liberal Arts/Social Sciences concentration provides individuals the opportunity provides individuals with the opportunity to study the humanistic, philosophical, and social forces that shape contemporary societies.

English requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0

Mathematics and Computers requirements
MATH 181 Mathematical Analysis I 3.0
MATH 182 Mathematical Analysis II 3.0
CS 161 Introduction to Computing 3.0
Statistics elective 3.0

Natural Science requirements
BIO 151 Applied Biology 3.0
CHEM 151 Applied Chemistry 3.0
PHYS 151 Applied Physics I 3.0

Communication requirements
COM 210 Theory and Models of Communication 3.0
COM 230 Techniques of Speaking 3.0
Communication elective 3.0

Women's or African-American Studies requirements 3.0 Credits

Music requirement
MUSC 130 Introduction to Music 3.0

Art History/Architecture requirements
ARTH 101 History of Art I: Ancient to Medieval 3.0
ARTH 102 History of Art II: Renaissance to Modern 3.0
ARTH 103 History of Art III: Early Modern to Postmodernism 3.0
or
ARCH 141 WI Architecture and Society I 3.0
ARCH 142 WI Architecture and Society II 3.0
ARCH 143 WII Architecture and Society III 3.0

Liberal Studies requirements
Students must complete 69.0 credits in Liberal Studies covering a range of subjects in the humanities and/or social sciences.
History 9.0
Literature 9.0
Philosophy 9.0
Political Science 9.0
Psychology 9.0
Anthropology or Sociology 9.0
Liberal Studies electives* 15.0
(Subjects listed above, plus economics, women's and African-American studies, and music/art history.)

Concentration Requirements

Students must complete 36.0 credits within an area of concentration focusing on the humanities and/or social sciences. Courses must be upper level with at least 18.0 credits selected from one discipline. Social Science students are required to take SOC 250 and SOC 350: Research Methods I & II as part of their concentration.

Humanities/Social Science courses include anthropology, psychology, sociology, political science, history, philosophy, and literature.

Free electives 21.0 Credits

B.S. in General Studies: Physical Sciences Concentration

Degree Requirements 180.0 credits

A concentration in Physical Sciences can lead to graduate school, careers in research and, with the selection of natural science courses, medical school. Students take courses in the following areas: calculus, biology, chemistry, and physics.

English requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0

Mathematics and Computer Science requirements
CS 171 Computer Programming I 3.0
MATH 184 Calculus and Analytic Geometry I 3.0
MATH 185 Calculus and Analytic Geometry II 3.0
MATH 186 Calculus and Analytic Geometry III 3.0
MATH 187 Calculus and Analytic Geometry IV 3.0
MATH 188 Calculus and Analytic Geometry V 3.0
MATH 189 Calculus and Analytic Geometry VI 3.0

Communication requirements
COM 230 Techniques of Speaking 3.0
COM 310 Technical Communication 3.0

Philosophy requirements
PHIL 351 Philosophy of Technology 3.0
or
PHIL 361 Philosophy of Science
PHIL 251 Ethics 3.0
or
BMES 338 Biomedical Ethics and Law
Physical Science requirements
Biology
BIO 161 General Biology I 3.0
BIO 162 General Biology II 3.0
Chemistry
CHEM 161 General Chemistry I 3.0
CHEM 162 General Chemistry II 3.0
CHEM 163 General Chemistry II 3.0
CHEM 164 General Chemistry Lab I 2.0
CHEM 165 General Chemistry Lab II 2.0
Physics
PHYS 185 Physics I 3.0
PHYS 186 Physics I-A 2.0
PHYS 187 Physics II 3.0
PHYS 188 Physics II-A 2.0

PHYS 281 Physics III 3.0
PHYS 282 Physics III-A 2.0

Physical Science electives
Students must complete 27.0 credits of natural science electives. Courses must be upper level in biology, chemistry, and/or physics.

Liberal Studies electives
Students must complete 27.0 credits covering a range of subjects in the humanities and/or social sciences: anthropology. economics, fine arts, history, literature, philosophy, political science, psychology, sociology, etc.

Free electives 47.0 Credits

Hospitality Management

Drexel University's Bachelor's of Science program in Hospitality Management (HM) recognizes the critical importance of an interdisciplinary education with a global perspective for tomorrow's leaders and managers. Building on four major strengths— innovative management, customer service, technology, and international operations— the program prepares individuals to assume leadership of projects, programs, and staff in Hospitality organizations.
Committed to building student knowledge across functional areas and contributing disciplines, the program allows for increased specialization with concentrations in one of three areas: Food & Beverage Management, Travel and Tourism, and Lodging Administration.

According to The Gourman Report, which provides rankings of undergraduate programs in American and international universities, Drexel University's Hospitality Management program was ranked in the top tenth percentile of national programs.

B.S. in Hospitality Management

Degree Requirements: 183.0 credits

General education requirements
COM 280 Public Relations 3.0
CS 161 Introduction to Computing 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
NFS 101 Introduction to Nutrition and Foods 3.0
NFS 270 Safety and Sanitation 4.0
UNIV 101 The Drexel Experience 2.0
Foreign language courses or arts and humanities electives 12.0
Social science electives 6.0
Free electives 12.0

Business minor courses
ACCT 115 Financial Accounting I 5.0
ECON 201 Economics I 4.0
ECON 202 Economics II 4.0
FIN 301 Introduction to Finance 5.0
MKTG 301 WI Introduction to Marketing Management 5.0
ORGB 300 Organizational Behavior 4.0
POM 300 WI Production and Operations 4.0
STAT 201 Quantitative Methods 4.0

Departmental requirements
HRM 110 Introduction to the Hospitality Industry 3.0
HRM 115 Culinary Science 3.0
HRM 120 Principles of Food-Service Management 3.0
HRM 130 Tourism I 3.0
HRM 135 Tourism II 3.0
HRM 200 Productivity Software for the Hospitality Industry 3.0
HRM 215 Commercial Food Production 3.0
HRM 230 Design Application Seminar 3.0
HRM 310 Hospitality Accounting Systems 3.0
HRM 320 Hospitality Management Information Systems 3.0
HRM 330 Hospitality Marketing 3.0
HRM 335 Beverage Management 3.0
HRM 410 Laws of Hospitality Industry 3.0
HRM 455 Hospitality Human Resources 3.0
HRM 465 Special Topics: Advanced Information Systems 3.0
Concentration courses 21.0-22.0
Departmental electives 15.0

Concentrations

Food and Beverage Management (F&B)
HRM 220 Purchasing for the Hospitality Industry 3.0
HRM 250 Contract Food-Service Management 3.0
HRM 315 Continental, Ethnic, and Regional Cuisine 3.0
HRM 340 Catering Management 3.0
HRM 415 Fine Dining 4.0
HRM 435 Wine and Spirits 3.0
HRM 465 Special Topics: Cost Controls in Hospitality 3.0

Hotel Management and Administration (HMA)
HRM 345 Convention and Trade Shows Management 3.0
HRM 420 Hotel/Restaurant Architecture: History and Design 3.0
HRM 465 Special Topics: Cost Controls in Hospitality 3.0
HRM 465 Special Topics: Franchise Management in HMA 3.0
HRM 465 Special Topics: Hotel Management Strategies 3.0
HRM 465 Special Topics: Hotel Sales and Marketing 3.0
HRM 465 Special Topics: Resort Development 3.0

Tourism and Travel (T&T)
HRM 345 Convention and Trade Shows Management 3.0
HRM 399 Guest Lecture Series 3.0
HRM 465 Special Topics: Airline Operations 3.0
HRM 465 Special Topics: Cultural and Heritage Tourism 3.0
HRM 465 Special Topics: Current Research in T&T 3.0
HRM 465 Special Topics: TTOO and TTAA Management 3.0
HRM 465 Special Topics: Tourism Economics 3.0

Industrial Engineering

The current demand for industrial engineers is high, but the supply of credentialed industrial engineers is limited. The trend toward an automated workplace and demands for greater efficiency in business and industry further enhance employment prospects for industrial engineers. Drexel's Goodwin College of Professional Studies curriculum leads to the bachelor of science degree, and Drexel is the only college in the Delaware Valley offering a degree in industrial engineering.

Coursework
The coursework for the Bachelor of Science in Industrial Engineering provides a solid understanding of materials, design, statistics, operations research, information systems, methods engineering, manufacturing engineering, cost accounting, and production economy. Emphasis is placed on basic engineering and applied science, with the remainder of the program devoted to the humanities and those aspects of management pertinent to organizing and managing systems to produce and distribute services and products. Through the selection of electives, the curriculum offers options for specialization in a number of areas, providing the student with a sound basis for graduate study in management and industrial engineering.

Core courses include chemistry, calculus, physics, computer programming, principles of economics, technical writing, and coursework in various engineering principles. In the final year, students complete three levels of project design in a team setting.

B.S. in Industrial Engineering

Degree Requirements: 192.0 credits

English composition requirements
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
COM 310 Technical Communication 3.0

Mathematics requirements
MATH 184 Calculus and Analytic Geometry I 3.0
MATH 185 Calculus and Analytic Geometry II 3.0
MATH 186 Calculus and Analytic Geometry III 3.0
MATH 187 Calculus and Analytic Geometry IV 3.0
MATH 188 Calculus and Analytic Geometry V 3.0
MATH 189 Calculus and Analytic Geometry VI 3.0
MATH 261 Linear Algebra 3.0
MATH 384 Theory of Probability 3.0
MATH 385 Mathematical Statistics I 3.0

Science requirements
CHEM 161 General Chemistry I 3.0
CHEM 162 General Chemistry II 3.0
CHEM 163 General Chemistry III 3.0
PHYS 185 Physics I 3.0
PHYS 186 Physics I-A 2.0
PHYS 187 Physics II 3.0
PHYS 188 Physics II-A 2.0
PHYS 281 Physics III 3.0
PHYS 282 Physics III-A 2.0

Liberal studies requirements
ECON 211 Principles of Economics I (Micro) 3.0
HIST 285 Technology in Historical Perspective 3.0
PHIL 315 Engineering Ethics 3.0
Two course liberal studies sequence 6.0
Liberal studies elective 3.0

Computer programming elective 3.0

Engineering sciences requirements
CIVE 240 Project Economics and Decisions 3.0
ECE 211 Electrical Engineering Principles 3.0
ECE 212 Electrical Engineering Principles Laboratory 1.0
MATE 101 Fundamentals of Materials 4.0
MEM 201 Fundamentals of Computer-Aided Design 3.0
MEM 202 Engineering Mechanics: Statics 3.0
MEM 210? Basic Thermodynamics 4.0
MEM 220 Basic Fluid Mechanics 4.0
MEM 230 Mechanics of Materials I 4.0
MEM 238 Engineering Mechanics: Dynamics 4.0

Industrial Engineering Core requirements
POM 300 WI Operations Management 4.0
INDE 361 Quality Control 3.0
INDE 362 Operations Research for Engineering I 3.0
INDE 363 Operations Research for Engineering II 3.0
INDE 364 Special Topics in Industrial Engineering: Fundamentals of Industrial Engineering 4.0
INDE 364 Special Topics: Ergonomics 3.0
INDE 364 Special Topics: Occupational Safety 3.0
INDE 364 Special Topics: Facilities Location / Plant Design 3.0
INDE 364 Special Topics: Manufacturing Processes I 3.0
INDE 364 Special Topics: Industrial Engineering Simulation 3.0
INDE 461 Methods Engineering and Measurement 3.0
ENGR 491 Senior Project Design I 2.0
ENGR 492 Senior Project Design II 2.0
ENGR 493 Senior Project Design III 4.0

Industrial Engineering track courses 21.0 Credits
Free electives 12.0 Credits

Sport Management

Through Drexel's Sport Management program, students master the knowledge and skills necessary for success in the fields of sports management, athletics/coaching, sports psychology and other professions supporting sports and recreation.

The program focuses on the integration of applicable areas of learning including biology, nutrition, human performance, psychology, athletics and business management. It uses a

multidisciplinary approach (athletics and human performance; sport and the psycho-socio-cultural process; sports as an industry) to understand sports and manage the sports industry. Students will also develop the important supporting skills in technology and communications. The major emphasizes the practical application of skills to the solution of problems in the management of sports, athletics and recreation on the professional, amateur and community level.

Coursework

The B. S. in Sports Management consists of 181 credits. All students enrolled in the program are required to take 47 credits of general education courses plus 43 credits of core courses on the foundations of sports management. These courses are supplemented by 30 credits of free electives. The balance of the program is based on technical elective courses drawn from four major concentrations, namely Athletics, Health & Human Performance (15 credits);The Business of Sport (15 credits); Sport & the Psycho-Socio-Cultural Process (15 credits);Technology for Sport Management (16 credits).

B.S. in Sport Management

Degree Requirements: 181.0 credits

General education requirements
BIO 151 Applied Biology I 3.0
CHEM 151 Applied Chemistry 3.0
COM 230 Techniques of Speaking 3.0
COM 270 Writing for Business 3.0
CS 161 Introduction to Computing 3.0
or
ISYS 101 Introduction to Information Systems I 3.0
ENGL 101 Expository Writing and Reading 3.0
ENGL 102 Persuasive Writing and Reading 3.0
ENGL 103 Analytical Writing and Reading 3.0
MATH 101 Introduction to Analysis I 4.0
MATH 102 Introduction to Analysis II 4.0
PHYS 151 Applied Physics 3.0
PSCI 100 Introduction to Political Science 4.0
UNIV 101 The Drexel Experience 2.0

Select one of the following three English courses:
ENGL 200 WI Classical to Medieval Literature 3.0
ENGL 201 Renaissance to the Enlightenment 3.0
ENGL 202 WI Romanticism to Modernism 3.0

Select one of the following two English courses:
ENGL 203 WI Post-Colonial Literature I: Africa/Asia/Caribbean/Japan/Middle East 3.0
ENGL 204 Post-Colonial Literature II: Africa/Asia/Caribbean/Japan/Middle East 3.0

Core courses
ANAT 101 Anatomy & Physiology I 5.0
BUSN 101 Foundations of Business I 3.0
COM 290 Sports and the Mass Media 3.0
ORGB 300 Organizational Behavior 4.0
PHIL 325 Ethics in Sports Management 3.0
PSY 245 Sports Psychology 3.0
SMT 110 Business of Sports 3.0
SMT 152 Leadership in Sport and Society 3.0
SMT 220 Recreation, Wellness and Society 3.0
SMT 230 Sport and the Law 3.0
SMT 250 Technology and Sport 3.0
SMT 300 Quantitative Analysis /Statistics in Sports 3.0
SOC 268 Sociology of Sport 3.0

Athletics, Health and Human Performance
Select five of the following courses:
BCS 352 Life-Span Human Development* 3.0
NFS 310 Nutrition and Sports 3.0
SMT 280 Kinesiology 3.0
SMT 101 Principles of Coaching 3.0
SMT 120 Life Skills for Coaches 3.0
SMT 210 Prevention/Care for Athletic Injuries 3.0
SMT 340 International Aspects of Sports Management 3.0
SMT 390 Special Topics in Sports Management 3.0
PSY 310 Drugs and Human Behavior 3.0
*** Course offered through the College of Nursing and Health Professions**

The Business of Sport
BLAW 201 Business Law I 4.0
In addition to BLAW 201, select from following electives to complete a minimum of 15.0 credits in this area:
ACCT 115 Financial Accounting Foundations 5.0
ACCT 116 Managerial Accounting Foundations 5.0
BLAW 202 Business Law II 4.0
ECON 211 Principles of Economics I (Micro) 3.0
MKTG 311 Introduction to Marketing Management 3.0
SMT 201 Sports Marketing, Promotion and Public Relations 3.0
SMT 235 Sports Administration and Governance 3.0
SMT 365 Operations Management in Sports 3.0
SMT 475 Coaching Practicum 3.0

Sport and the Psycho/Socio-cultural Process
Select five of the following courses:
PHIL 210 Philosophy of Sport 3.0
PSY 101 General Psychology 3.0
PSY 120 Developmental Psychology 3.0
PSY 140 Approaches to Personality 3.0
PSY 212 Physiological Psychology 3.0
PSY 230 Psychology of Learning 3.0
PSY 342 Counseling Psychology 3.0
PSY 355 Health Psychology 3.0
SMT 330 Gender Equity and Women in Sport 3.0
SMT 335 Minority Issues and Opportunities in Sport 3.0
SOC 101 Introduction to Sociology 3.0
SOC 210 Race and Ethnic Relations 3.0
SOC 250 Research Methods I 3.0

Technology for Sports Management
COM 240 New Technologies in Communication 3.0
COM 335 Writing for the World Wide Web 3.0
MIS 300 Management of Information Systems 4.0
Technology electives 6.0

Electives 30.0 Credits

Free electives 30.0

The Pennoni Honors College

Drexel University's Pennoni Honors College deepens and enriches the University experience for students from all majors who have demonstrated academic achievement and varied intellectual interests. Students are selected for admission based on multiple indicators of intellectual strength, accomplishment, and motivation, including a written statement, high school and perhaps college GPA, activities, and SAT scores. Honors students must maintain a GPA of 3.2 or higher once accepted, make satisfactory progress toward their degree, participate in Honors courses, and demonstrate conduct befitting an Honors student. Entering freshmen are invited to apply, based upon their credentials. Students not directly invited may apply between March 1st and June 1st. Current Drexel students may apply through the end of their pre-junior year.

The Pennoni Honors College is named after Annette and Drexel graduate C.R. "Chuck" Pennoni, CEO of Pennoni Associates and one-time interim president of the University. Honors students endeavor to emulate his qualities of strong leadership, integrity, and commitment to Drexel.

Members of Pennoni Honors College take part in a variety of courses that pair small groups of students with Drexel professors, creating the feeling of a small college without sacrificing the diverse academic opportunities offered by a major research university.

Diversity is also found inside the classroom. Honors students are drawn from all majors and represent many countries. Honors students share their interests and abilities, introducing their peers to new ideas and activities.

The Pennoni Honors College prepares students for admission to graduate and professional schools and for fellowships to further their education at home and abroad.

Reserve Officers' Training Corps (ROTC) Programs

Air Force Reserve Officers' Training Corps
Students are eligible to participate in the Air Force Reserve Officers' Training Corps (AFROTC) through a cross-enrollment agreement with St. Joseph's University. All aerospace studies courses will be held on the St. Joseph's campus. The AFROTC program enables a college student to earn a commission as an Air Force officer while concurrently satisfying requirements for his or her baccalaureate degree.

The program of aerospace studies at St. Joseph's University offers one-year, two-year, and four-year curricula leading to a commission as a second lieutenant in the Air Force. In the four-year curriculum, a student takes the General Military Course (GMC) during the freshman and sophomore years, attends a four-week summer training program, and then takes the Professional Officer Course (POC) in the junior and senior years. A student is under no contractual obligation to the Air Force until entering the POC or accepting an Air Force scholarship. In the two-year curriculum, a student attends a five-week summer training program and then enters the POC in the junior year. In the one-year curriculum, a senior or graduate student can enroll in aerospace studies and, after completing the undergraduate degree or graduate coursework, attend a seven-week summer training program and be commissioned upon completion of summer training.

The subject matter of the freshman and sophomore years is developed from a historical perspective and focuses on the scope, structure, and history of military power, with an emphasis on the development of air power. During the junior and senior years, the curriculum concentrates on the concepts and practices of leadership and management, and the role of national security forces in contemporary American society.

In addition to the academic portion of the curricula, each student participates in a leadership laboratory for two hours each week, during which the day-to-day skills and working environment of the Air Force are discussed and explained. The leadership lab utilizes a student organization designed for the practice of leadership and management techniques.

Air Force ROTC offers one-, two-, and three-year scholarships on a competitive basis to qualified applicants. All scholarships cover tuition, lab fees, and books, plus a tax-free monthly stipend. All members of the POC, regardless of scholarship status, receive the tax-free monthly stipend.

For further information on the cross-enrollment program, scholarships, and career opportunities, contact the Professor of Aerospace Studies, AFROTC Det 750, Saint Joseph's University, Philadelphia, PA 19131; 610-660-3190; rotc@sju.edu.

Army Reserve Officers' Training Corps
The purpose of the Army Reserve Officers' Training Corps program is to provide this nation with leaders of character for our Army, Army Reserve, and National Guard. ROTC

training is also intended to foster ideals of patriotism; promote an understanding of the role of the citizen-soldier; stimulate interest in a military career; and develop character, self-discipline, and leadership ability. Army ROTC is a college elective, and enrollment does not require military service.

Students who satisfactorily complete ROTC course requirements are commissioned as second lieutenants in the United States Army, Army Reserve, or National Guard. Drexel graduates who receive their commission through ROTC may apply for a commission in any branch of the Army for which they are qualified.

The military science program is divided into the basic course and the advanced course. The basic course normally coincides with the student's first two years of college. The purpose of the course is threefold: to develop certain military skills, to give the student sufficient information to decide whether to continue in the advanced course, and to allow the instructors an opportunity to evaluate the student's potential to become an officer. It consists of four or five military science courses and weekly attendance at Leadership Laboratories each term the cadet is in school. Except for scholarship cadets, no military obligation is incurred by students participating in these courses. Basic course credit may be granted to students who successfully complete a five-week leader's training course at Fort Knox, Kentucky, between the sophomore and junior years. Veterans may also receive credit for the basic course.

The advanced course is designed to prepare students for commissioned service. The first year of instruction (first two years for co-op students) is directed toward preparation for the32-day National Advanced Leadership Camp at Fort Lewis, Washington. The final year is devoted to preparation for acceptance of a commission.

To be admitted to the advanced course, a student must have credit for the two-year basic course, must volunteer, must be selected by the professor of military science, and must successfully complete the required screening and physical tests.

Enlisted Army Reservists and National Guardsmen may apply for the Simultaneous Membership program, which permits them to serve as officer trainees with their units and receive commissions upon completion of the ROTC advanced course. Veterans' benefits are not affected by entry into this program, in most cases.

Airborne training, helicopter air assault training, mountain warfare, Northern Warfare training, and Cadet Troop Leadership Training with a Regular Army unit are available to interested cadets.

Twice per school year, cadets are required to participate in a field training exercise. These exercises are usually two to three days in duration and are conducted at Fort Dix, New Jersey, or Fort Indiantown Gap, Pennsylvania. The field training exercises give students a chance to put into practice skills learned in the classroom and during Leadership Laboratories.

Uniforms—worn during Leadership Laboratory periods and field training exercises—are issued free of charge to all students enrolled in ROTC. Students are responsible for maintaining the uniforms and returning them prior to going on co-op.

The Army offers scholarships that pay up to $17,000 per year toward college tuition. Additionally, Drexel provides an ROTC grant of up to $5,500 per year for scholarship winners. The grant can be applied to any "billable charges." All scholarship students receive a tax-free subsistence allowance of $250 to $400 each month they are in school, for up to ten months per year. Scholarship students incur an obligation to serve four years on active duty or eight years in the Army Reserves or National Guard after being commissioned. A student does not have to be enrolled in ROTC to apply for these scholarships. Further information on the scholarships and Army ROTC is available from the Department of Military Science at 215-590-8808/09.

The following represents a typical sequence of study to complete the military science requirements:

4-Year Student
First Year (MS I)
MLSC 100 Leadership Laboratory
MLSC 120 Methods of Instruction in Military Skills
MLSC 130 Introduction to Leadership

Second Year (MS II)
MLSC 210 Land Navigation
MLSC 220 Military Leadership
MLSC 310 Small Unit Tactics

Third Year (MS IIIB)
MLSC 320 Platoon Tactics
MLSC 370 Advanced Military Skills and Staff Functions I
MLSC 380 Advanced Military Skills and Staff Functions II

Fourth Year (MS IV)
MLSC 410 Military Ethics and Values: Overview of Army Systems
MLSC 420 Training Management Seminar
MLSC 430 Junior Officer Orientation

5-Year Student

First Year (MS I)
MLSC 100 Leadership Laboratory
MLSC 120 Methods of Instruction in Military Skills
MLSC 130 Introduction to Leadership

Second Year (MS II)
MLSC 210 Land Navigation
MLSC 220 Military Leadership

Third Year (MS IIIA)
MLSC 310 Small Unit Tactics
MLSC 320 Platoon Tactics

Fourth Year (MS IIIB)
MLSC 370 Advanced Military Skills and Staff Functions I
MLSC 380 Advanced Military Skills and Staff Functions II

Fifth Year (MS IV)
MLSC 410 Military Justice, Ethics, and Professionalism
MLSC 420 Training Management Seminar
MLSC 430 Junior Officer Orientation

The five-week advanced camp counts as an industry term for co-op students. Each term a student is in school, he or she also participates in the weekly Leadership Laboratory (MLSC 100). To receive a commission, cadets must also take one course in the following area:

Military history

HIST 230 U.S. Military History I (to 1900)
HIST 231 U.S. Military History II (since 1900)

Naval Reserve Officers' Training Corps

Students are eligible to participate in the Naval Reserve Officers' Training Corps (NROTC) through a cross-enrollment agreement with the University of Pennsylvania. All naval science courses are held on Penn's campus. The NROTC program enables a college student to earn a commission in the Navy or the Marine Corps while concurrently satisfying requirements for his or her baccalaureate degree. Scholarship and nonscholarship programs are available.

Navy-option scholarship and college program (nonscholarship) students must enroll in Naval Science (NSCI) 101 and 102 during their freshman year, NSCI 201 and 202 during their sophomore year, NSCI 301 and 302 in their junior year, and NSCI 401 and 402 in their senior year. Those seeking commissions in the Marine Corps will enroll in NSCI 310 and 410 instead of 301-302 and 401-402.

Scholarship program students must complete one year of calculus, one year of calculus-based physics, a course in computer science, one course in American military history/national security policy, and one year of English. College program students must complete one year of college-level algebra, one year of physical science courses, one semester of a computer science course, and one year of English. Students must check with their naval science instructors to determine specific courses that fulfill the above requirements.

In addition to the above, all students are required to attend a two-hour professional laboratory period scheduled on Wednesday afternoons (no academic credit) that emphasizes military drill, physical fitness, and leadership/military topics.

For further information regarding physical and other qualifications for admission and other matters pertaining to participation in the NROTC program, you can write to the Professor of Naval Science, NROTC Unit, Hollenback Center, 3000 South Street, Philadelphia, PA 19104; 215-898-7436; fax: 215-573-2067.