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About Drexel University

Mission Statement
To serve our students and society through comprehensive integrated academic offerings enhanced by technology, co-operative education, and clinical practice in an urban setting, with global outreach embracing research, scholarly activities, and community initiatives.

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. Drexel University is privately controlled, nonsectarian, and coeducational.

Today, nearly 16,000 undergraduate and over 9,000 graduate students attend Drexel’s nine colleges and five schools:

- College of Arts and Sciences (http://drexel.edu/coas), which grants bachelor’s, master’s, and PhD degrees
- LeBow College of Business (http://www.lebow.drexel.edu), which grants bachelor’s, master’s, and PhD degrees
- Lebow College of Business: School of Economics (http://www.lebow.drexel.edu/faculty-and-research/disciplines/economics), which grants bachelor's, master's and PhD degrees
- College of Computing & Informatics (http://www.cci.drexel.edu), which grants bachelor’s, master’s, and PhD degrees
- College of Engineering (http://www.drexel.edu/coe), which grants bachelor’s, master’s, and PhD degrees
- Pennoni Honors College (http://drexel.edu/catalog/school/pennoni.htm), which enriches the University experience for students from all majors with demonstrated academic achievement and broad intellectual interests
- Westphal College of Media Arts and Design (http://drexel.edu/westphal), which grants bachelor’s and master’s degrees
- Drexel College of Medicine (http://www.drexel.edu/med), which grants MD, master’s and PhD degrees
- College of Medicine: School of Biomedical Science and Professional Studies (p. 54), which grants master’s and PhD degrees
- College of Nursing and Health Professions (http://www.drexel.edu/cnhp), which grants bachelor’s, master’s, and PhD degrees
- Goodwin College of Professional Studies (http://drexel.edu/catalog/UG/goodwin), which grants interdisciplinary bachelor’s and master’s degrees, provides academic and professional support for all part-time undergraduate students, and offers continuing professional education courses
- School of Biomedical Engineering, Science, and Health Systems (http://www.biomed.drexel.edu), which grants bachelor’s, master’s, and PhD degrees
- School (http://drexel.edu/catalog/UG/goodwin) of Education (http://www.goodwin.drexel.edu/soe), which grants bachelor’s, master’s, EdD and PhD degrees, and recommends issuance of Pennsylvania instructional and teaching certificates
- Close School of Entrepreneurship (http://catalog.drexel.edu/undergraduate/schoolofentrepreneurship), providing curriculum and activities for students to learn and practice innovative behavior in alignment with all other colleges and schools at Drexel
- Center for Hospitality and Sport Management (p. 13), which grants bachelor's and master's degrees
- School of Public Health (http://www.publichealth.drexel.edu), which grants master’s and doctorate degrees
- Thomas R. Kline School of Law (http://www.drexel.edu/law), which prepares students for the practice of law by offering a JD degree

Drexel Co-op
Drexel University has been a pioneer in cooperative education since 1919—operating one of the largest cooperative education programs in the nation. Undergraduates alternate on-campus study with full-time employment in fields related to their academic interests. More than 1,300 employer organizations in business, government, health care and education participate at locations in 30 states and 24 countries. The Steinbright Career Development Center (SCDC) is one of the most highly ranked co-op and career service organizations at any university in the country and works to ensure that students and alumni get the most from their experiential and career placement activities.

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.

A pioneer in online learning, Drexel offers distance education programs leading to certificates and degrees in areas including engineering management, business administration, information systems and library and information science. Drexel University Online has over 7,500 unique students from all 50 states and more than 20 countries pursuing one of more than 130 graduate and undergraduate degree and certificate programs. Over all, there are more than 13,000 Drexel University students taking at least one course online.

Drexel is widely recognized for excellence in technology-based, experiential learning and is ranked among the best national doctoral universities by U.S. News & World Report in its “America’s Best Colleges 2013.” Drexel ranked third in the US News 2013 poll of America's “Up-and-Coming Schools.”

Location
Drexel's 74-acre University City Main Campus is located in the vibrant University City district of Philadelphia, Pennsylvania. Drexel makes full use of its metropolitan setting by integrating Philadelphia and its resources into the classroom, co-op/internship experience, and student life, making it a model for other urban universities. The main campus is a 10-minute walk from Center City, the core of Philadelphia's commercial and business district.

Drexel teaches at six additional locations: the Center City Hahnemann Campus for the College of Nursing and Health Professions and the School of Public Health; the Queen Lane Medical Campus in East Falls for the College of Medicine; the Drexel at Delaware County Community College Campus; and the Drexel College at Camden County College in Camden, New Jersey.
College campus in Media, Pennsylvania; the Drexel at Burlington County College campus in Mount Laurel, New Jersey; the Drexel at Montgomery County Community College campus in Blue Bell, Pennsylvania; and the Sacramento, California, Center for Graduate Studies.

Programs

Civic Engagement
Civic engagement, participation in the public life of the community, is important to the Drexel University's strategic plan. Civic engagement can take many forms, from volunteerism doing community service, to electoral participation and advocacy.

Drexel University offers a Certificate in Civic Engagement (http://catalog.drexel.edu/additionalacademicprograms/lindycenterforcivicengagement/civicengagementcert), designed for those whose commitment to civic engagement extends beyond the civic-engagement requirement of University 101, enables students of all majors to attach a recognized body of civic engagement work to their transcript. The program will also provide students with an intellectual core and an element of critical thinking for future civic engagement activities. The program is administered by the Lindy Center for Civic Engagement (http://www.drexel.edu/lindycenter).

Honors Program
The Pennoni College offers a number of academic options for its students. These opportunities are designed to be intensive, and are taught by faculty members who understand and accommodate Honors students' abilities and aspirations.

The Honors Program offers a number of academic options for its students. These opportunities are designed to be intensive, and are taught by faculty members who understand and accommodate Honors students' abilities and aspirations. These options include:

- **Honors Colloquia**: These interdisciplinary courses introduce students to topics not typically covered elsewhere. These courses are small, discussion-based, seminar style classes. Past Honors Colloquia topics include: The Hidden God in Cinema; Theory of Special Relativity; The Graphic Novel; Torture and Terrorism, and many others.

- **Honors-Section Courses**: These courses fulfill traditional major requirements but offer Honors credit. While the subject remains the same, the classes are taught to smaller groups, consisting entirely of Honors students, and on an advanced level that encourages discussion and practical application. Honors-section courses include, among other subjects, physics, English, business, general psychology, chemistry, and biology.

- **Honors Options**: With permission from their instructors and approval from the Honors Program, Honors students may elect to enhance non-honors courses to yield honors credit. The student and faculty member conducting may agree on the specific terms before the course begins and jointly submit a proposal to the Honors Program.

- **Independent Study**: Honors students frequently come across topics in their general coursework that they would like to investigate in greater detail. To accommodate this, the Honors College encourages students to study and research a topic of their choosing with guidance from a faculty member.

The Great Works Symposium
The Great Works Symposium (http://www.drexel.edu/interdisciplinary-inquiry/great-works-symposium/overview) is a series of team-taught, interdisciplinary courses, each one focused upon a great human achievement or important global problem. Each course typically has at least three instructors, representing three different academic disciplines, and typically there is a series of about ten guest lecturers, recognized experts on the topic, also representing a wide variety of disciplines and points of view. Each course is broader in its content than what could be covered by any one academic discipline or any single textbook, but each has a concrete center of focus. Each topic is broad and important enough that it is relevant to the education of any student.

ROTC
The Army Reserve Officers’ Training Corps (http://www.armyrotc.com/edu/drexel), established at Drexel in 1918, is an integral part of the University. Army ROTC courses are open to all students, and enrollment alone does not carry a military obligation. Students selected for the advanced course (normally pre-junior, junior, and senior years) will complete their academic and military studies concurrently, and upon graduation will be commissioned as lieutenants in the United States Army, Army Reserve, or Army National Guard. Participation in the advanced course may qualify participants to receive financial aid through a series of scholarships and cooperative education programs. For further information, contact the Professor of Military Science, Drexel University, The Armory, 33rd and Market Streets, Philadelphia, PA 19104.

Drexel students are eligible to participate in the Air Force Reserve Officers’ Training Corps (http://www.vpul.upenn.edu/nrotc) (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.

Drexel students are eligible to participate in the Air Force Reserve Officers’ Training Corps (http://www.sju.edu/afrrotc) (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.

Study Abroad
Drexel University's Study Abroad (http://drexel.edu/catalog/school/special/study-abroad.htm) programs are open to students in all disciplines who meet the qualifications of each individual program. Please see the study abroad website (http://www.drexel.edu/studyabroad) for eligibility requirements of each individual program and for the most up to date program offerings.

Certification of Proficiency in a Foreign Language
The University awards an advanced-level Certification of Proficiency in a foreign language in recognition of exceptional ability in oral and written communication in that language. Certification is listed on the official college transcript.

Examinations leading to proficiency certification include listening comprehension, reading comprehension, and written analysis, and the ETS Achievement Test, which is also the qualifying examination for proficiency testing. Certification also requires successful completion of an extensive oral interview, with at least a “2” rating on the FSI/ACTFL rating scale. Certification indicates proven ability to function effectively in professional and social situations in a country in which the target language is spoken.
Affirmative Action and Equal Opportunity

University Policy: Affirmative Action and Equal Opportunity
It is the policy of the University to provide a working and learning environment in which employees and students are able to realize their full potential as productive members of the University community. To this end, the University affirms its commitment to equal opportunity and nondiscrimination in employment and education for all qualified individuals regardless of race, religion, color, national origin, sex, age, sexual orientation, disability or applicable veteran status or any other characteristic protected by applicable federal or state law. Further, the University is committed to taking affirmative action to increase opportunities at all levels of employment and to increase opportunities for participation in programs and activities by all faculty, staff, and students.

Affirmative Action is directed toward racial and ethnic minorities, women, persons with disabilities, and Vietnam-era veterans. All member of the University community -- faculty, staff, and students -- are expected to cooperate fully in meeting these goals.

It is the policy of the University that no qualified individual with a disability shall, on the basis of the disability, be excluded from participation in University programs and activities. Disability is defined as any physical or mental impairment that substantially limits one or more major life activities; or having a record of such impairment; or being regarded as having such impairment. A qualified individual with a disability means an individual as defined above, who is capable of performing the essential functions of a particular job or of participating in a particular course of study, with or without reasonable accommodations for his/her disability. Reasonable accommodations are determined on a case-by-case basis.
Accreditation

Drexel University’s educational programs are accredited by MSCHE (Middle States Commission on Higher Education).

The Antoinette Westphal College of Media Arts and Design

- Architecture is one of the few part-time evening programs accredited by NAAB (National Architectural Accrediting Board).
- Design curricula are accredited by NASAD (National Association of Schools of Arts and Design).
- Media arts curricula, with the exception of the BS in Dramatic Writing, are accredited by NASAD (National Association of Schools of Arts and Design).
- The BS in Interior Design is accredited by CIDA (Council for Interior Design Accreditation).
- The MS in Interior Architecture and Design is accredited by CIDA (Council for Interior Design Accreditation).

The Bennett S. LeBow College of Business

- The Bennett S. LeBow College of Business is accredited by AACSB (Association to Advance Collegiate Schools of Business).

The College of Engineering

- The Construction Management program is accredited by ACCE (American Council for Construction Education).

The College of Arts and Sciences

- The Chemistry BS is certified by ACS (American Chemical Society).
- The Clinical Psychology PhD program is accredited by APA (American Psychological Association).
- The English Language Center is accredited by CEA (Commission on English Language Program Accreditation).

The College of Nursing and Health Professions

- Nursing programs are accredited by the CCNE (Commission on Collegiate Nursing Education), and the PA State Board of Nursing.
- The Couple and Family Therapy MFT degree and Post-Master’s Certificates are accredited by COAMFTE (Commission on Accreditation of Marriage and Family Therapy Education).
- The Creative Arts in Therapy MA degrees in Dance/Movement Therapy, Music Therapy, and Art Therapy are approved by the ADTA (American Dance Therapy Association), the AMTA (American Music Therapy Association), and the AATA (American Art Therapy Association), respectively.
- The Didactic Program in Nutrition is accredited by ADA (American Dietetic Association).
- The Health Services Administration program is certified by AUPHA (Association of University Programs in Health Administration).
- The Nurse Anesthesia program is accredited by COA (Council on Accreditation of Nurse Anesthesia Educational Programs).
- The Nutrition and Foods BS is accredited by ADA (American Dietetic Association, Commission on Accreditation of Dietetic Education).
- The Professional Physical Therapy (DPT) program is accredited by CAPTE (Commission on Accreditation in Physical Therapy Education).
- The Physician Assistant program is accredited by ARC-PA (Accreditation Review Commission on Education for the Physician Assistant).
- The Radiologic Technology program is accredited by JRCERT (Joint Review Committee on Education in Radiologic Technology).

The College of Computing & Informatics

- The Computer Science BS and BA programs are accredited by the Computing Accreditation Commission (CAC) of ABET (http://catalog.drexel.edu/accreditation%20http://www.abet.org).
- The Information Systems BS is accredited by the Computing Accreditation Commission (CAC) of ABET (http://catalog.drexel.edu/accreditation%20http://www.abet.org). The College of Information Science and Technology was in the first group of schools to have their information systems programs be accredited by ABET (http://catalog.drexel.edu/accreditation%20http://www.abet.org).
- The Library and Information Science MS degree is accredited by ALA (American Library Association).

The Drexel University College of Medicine

- The MD degree is accredited by LCME (Liaison Committee on Medical Education).
- The MS degree in Pathologists’ Assistant program is accredited by NAACLS (National Accrediting Agency for Clinical Laboratory Sciences).

The Dornsife School of Public Health

- The Dornsife School of Public Health is accredited by CEPH (Council on Education for Public Health).

The School of Biomedical Engineering, Science and Health Systems

- The undergraduate biomedical engineering curriculum is accredited by the Engineering Accreditation Commission of ABET (http://catalog.drexel.edu/accreditation%20http://www.abet.org).

The School of Education

- Teacher education programs leading to Pennsylvania State Teacher Certification for various K-12 specialties as well as Instructional Technology Specialist, School Principal, and School Superintendent certification programs are approved by the Pennsylvania Department of Education. Other state-approved programs include K-12 Library Science certification in collaboration with the College of Information Science and Technology and K-12 English as a Second Language Program Specialist in collaboration with the English Language Center.

The Thomas R. Kline School of Law

- The Thomas R. Kline School of Law is accredited by ABA (American Bar Association).

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.
Graduate Catalog

- Center for Hospitality and Sport Management (p. 13)
- Close School of Entrepreneurship (p. 19)
- College of Arts and Sciences (p. 250)
- College of Computing & Informatics (p. 21)
- College of Engineering (p. 276)
- College of Nursing and Health Professions (p. 108)
- Drexel College of Medicine: MD Program (p. 341)
- Drexel College of Medicine: School of Biomedical Sciences and Professional Studies (p. 54)
- Goodwin College of Professional Studies (p. 106)
- Thomas R. Kline School of Law (p. 440)
- LeBow College of Business (p. 203)
  - School of Economics (p. 230)
- School of Biomedical Engineering, Science and Health Systems (p. 343)
- School of Education (p. 353)
- Dornsife School of Public Health (p. 403)
- Westphal College of Media Arts & Design (p. 231)
Center for Hospitality and Sport Management

Launched in 2013, the Center for Hospitality and Sport Management includes programs in hospitality management, culinary arts, food science and sport management. Through a focus on experiential learning and co-op opportunities, the center is positioned to fulfill distinct market needs. It provides experience in sport ticketing, restaurant management, arena management, food product development, recipe development, coaching, commercial kitchen design and layout, kitchen gardening and hotel front desk operations.

The Department of Culinary Arts and Food Science provides students with a well-rounded education within the realm of fine foods, service product development and quality assurance.

The Department of Hospitality and Tourism Management offers programs for students who are interested in the fast-paces fields of hospitality management, tourism, and gaming and casino operations. Due largely in part to Drexel's co-op program, graduates have a competitive advantage and invaluable training for successful career in the industry.

The Department of Sport Management produces students that embody leadership, management skills and professionalism, with a focus on sport business, media, and marketing.

Majors

- Food Science (MS) (p. 13)
- Hospitality Management (MS) (p. 14)
- Sport Coaching Leadership (MS) (p. 15)
- Sport Management (MS) (p. 16)

Food Science

Major: Food Science
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 01.1001
Standard Occupational Classification (SOC) code: 19-1012

About the Program

The Master of Science (MS) in Food Science program at the Center for Hospitality and Sport Management provides students with the opportunity to comprehensively study theoretical and applied aspects of the science, technology, and engineering of foods. Food scientists learn to integrate and apply knowledge from the disciplines of chemistry, physics, engineering, microbiology, and nutrition in order to preserve, process, package, and distribute foods that are safe, nutritious, enjoyable, and affordable.

The program provides a science-based professional education that encompasses classroom theory, practical research, and application. Food science is concerned with foods, their ingredients, and their physicochemical and biochemical interactions at the molecular and cellular levels. Students in the food science program participate in the research enterprise by completing a research project or designing and executing a thesis under faculty direction. Current research in food science includes:

- Thermal and non-thermal processing of foods and their impact on food quality
- Development of encapsulation systems for food ingredients
- Food product development
- Sensory analysis of foods

The program is designed for students who:

- are already working within the food industry and seeking professional advancement
- have an undergraduate degree in a general science-related area such as biology or chemistry, and would like to change fields or move into the more specialized field of food science

The MS in Food Science program offers students numerous opportunities for hands-on, real-world careers in applied science and technology. Potential employers include food product manufacturers, along with other companies providing services related to institutional feeding or supplying ingredients, processing equipment, and packaging materials. Technical and administrative positions are also available in various government agencies and with independent testing laboratories.

Food scientists are needed in the areas of:

- Food quality assessment and management
- Food processing and engineering
- Food product research and development
- Marketing and distribution
- Technical sales and support

Additional Information

Matthew Gray
Director, Marketing and Enrollment Management
215.895.6255
mattgray@drexel.edu

For additional information, view the Center for Hospitality and Sport Management's Master of Science in Food Science (http://drexel.edu/hsm/academics/Culinary-Arts-Food-Science/MS-in-Food-Science) web page.

Master of Science in Food Science

In addition to the program’s admission requirements, students are expected to demonstrate competency in the coursework or its equivalent listed in the following table. The graduate committee evaluates each applicant’s transcripts at the time of application. In some cases, courses listed as prerequisites may be taken as co-requisites during the first year of graduate study if deemed appropriate by the graduate admissions committee.

- General chemistry - One year to include organic chemistry
- Biochemistry - One or two quarters or semesters to include structures and basic metabolism
- Biological Science - Three courses to include general biology, genetics, and microbiology
- Mathematics - One year to include calculus
- Statistics - One course to include hypothesis testing, correlation, and regression
• Physics - Two terms or one year (non-calculus based) to include mechanics, optics, electricity, and magnetism

For information about admission requirements and to apply to the MS in Food Science, please visit the Office of Graduate Admissions (http://drexel.edu/grad/programs/hsm/food-science).

If you have any questions, or would like more information, please contact:

Matthew Gray
Director, Marketing and Enrollment Management
215.895.6255
mattgray@drexel.edu

Degree Requirements

Food Science Core Competency - Required

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<thead>
<tr>
<th>Course</th>
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<td>or NFS 530</td>
<td>Macronutrient Metabolism</td>
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<td>or NFS 531</td>
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<td>FDSC 550</td>
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<td>Food Preservation Processes</td>
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Food Science Electives

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<td>FDSC 506</td>
<td>Food Composition &amp; Behavior</td>
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<td>FDSC 554</td>
<td>Microbiology &amp; Chemistry of Food Safety I</td>
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<td>FDSC 558</td>
<td>Nutritional Impact of Food Processing Methods</td>
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<td>FDSC 561</td>
<td>Food Analysis</td>
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<td>FDSC 568</td>
<td>Functional Foods</td>
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<td>FDSC 654</td>
<td>Microbiology &amp; Chemistry of Food Safety II</td>
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<td>FDSC 669</td>
<td>Readings in Food Science</td>
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Electives

Select 12.0 credits from the following:

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<th>Course</th>
<th>Title</th>
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<td>BIO 610</td>
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<td>Microbial Physiology</td>
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<td>CHEM 753</td>
<td>Chemical Instrumentation</td>
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<td>ENVS 636</td>
<td>Principles of Toxicology I</td>
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<td>NFS 531</td>
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<tr>
<td>PSY 512</td>
<td>Cognitive Psychology</td>
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</table>

Total Credits 45.0

Interdepartmental Faculty

Tali Gidalevitz, PhD (University of Chicago). Assistant Professor. Genetic and molecular pathways regulating protein folding homeostasis, and their role in protein conformation diseases, aging, and development.

Donna H. Mueller, PhD (Temple University) Registered Dietitian, Nutrition and Foods. Associate Professor. Clinical nutrition; pediatric nutrition; nutrition in pulmonary diseases, especially cystic fibrosis; nutrition in developmental delay; dental nutrition; dietetic education and professional development.

Jennifer Quinlan, PhD (North Carolina State University). Associate Professor. Food microbiology; microbiological quality and safety of produce, dairy and meat products in markets in high vs. low socioeconomics areas, Bacillus and Clostridium spores in food processing.

Vicki Schwartz, MS (Drexel University) Nutrition and Foods. Assistant Clinical Professor. Advanced nutrition, clinical nutrition, nutrition support.

Hospitality Management

Major: Hospitality Management

Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 52.0904
Standard Occupational Classification (SOC) code: 11-9051; 11-9071; 11-9081

About the Program

This two-year online master’s program provides a solid education in management, travel and tourism and allows students to choose concentrations in global tourism or gaming and casino management. Career paths include senior management of hotels and resorts, convention services, strategic development for online distribution of travel services, real-estate development projects and business ownership.

Both at the national and international level, travel and hospitality have become primary industries that require increasing numbers of professionals at all skill levels. Additional educational opportunities at the graduate level will be required to fill the needs of the tourism industry. Top professionals with an MS degree have excellent prospects at home and in the global marketplace.

Drexel University has a professional and technological emphasis as well as a track record of supporting the relationship between academics and industry. The degree in hospitality management is designed to prepare graduates to be key decision makers in the hospitality industry.

This two-year online master’s degree will include courses such as program planning and creativity as well as specialized preparation in a concentration of either tourism or gaming and casino management.

For additional information, visit the Center for Hospitality & Sport Management’s Master of Science in Hospitality Management (http://drexel.edu/hsm/academics/Hospitality-and-Tourism/MS-in-Hospitality-Management) page.

Admission Requirements

Classes start in the fall and spring terms. Applications are submitted throughout the year. Admission requirements include:

• a completed application form
• a Bachelor's degree from an accredited institution
• an undergraduate GPA of 3.0 or higher (graduate degree GPAs will be considered along with the undergraduate GPA)
• official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Applicants must supply transcripts regardless of the number of credits earned or the type of school attended. If an applicant does not list all post-secondary institutions on the application and these are listed on transcripts received from other institutions, processing of the application will be delayed until the remaining transcripts have been submitted.
• two letters of recommendation
• a personal essay
• a resume
• International students must submit a TOEFL score of 550 or higher. For more information regarding international applicant requirements, view the International Students Admissions Information (http://drexel.edu/iss/StudentInformation.html) page.

Visit the Graduate Admissions (http://www.drexel.edu/grad/programs/hsm/hospitality-management) website for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements
The Master of Science in Hospitality Management program requires completion of 45.0 credit hours (quarter) of study. The curriculum includes a core of 10 required courses (33.0 credits), including a research course where students consult with a faculty advisor to identify a suitable problem area in hospitality management and develop and carry out appropriate methodology to address the problem. Students also select one elective in consultation with their advisor. In addition, students take 12.0 credits in a concentration, either global tourism or gaming and casino management.

Core Courses
- CRTV 501 Foundations in Creativity 3.0
- PROJ 501 Introduction to Project Management 3.0
- PRST 503 Ethics for Professionals 3.0
- PRST 504 Research Methods & Statistics 3.0

Hospitality Management Required Courses
- HRM 501 Foundations of the Hospitality Industry 3.0
- HRM 505 Customer Service for Professionals 3.0
- HRM 520 Hospitality Management Information Systems 3.0
- HRM 555 Hospitality Human Resource Management 3.0
- HRM 650 Strategic Management & Leadership in Hospitality 3.0
- HRM 997 Research Project in Hospitality Management 3.0

Elective
Students select one free elective in either the Hospitality Management department or outside the program in consultation with advisor.

Concentrations
Students select a concentration in either Global Tourism or Gaming and Casino Management

Global Tourism
Select four of the following:
- HRM 515 Destination and Resort Management
- HRM 595 Economics of Tourism
- HRM 610 The Global Tourism System
- HRM 612 Tourism and Sustainability
- HRM 614 Tourism Development
- HRM 616 Tourism Marketing and Branding

Gaming and Casino Management
Select four of the following:
- HRM 515 Destination and Resort Management
- HRM 572 Gaming Information Systems
- HRM 575 Current Issues in Gaming
- HRM 670 Casino Financial Analysis
- HRM 672 Security and Risk Management
- HRM 674 Tribal Gaming Management
- HRM 676 Casino Marketing

Total Credits 45.0

Hospitality and Tourism Faculty
Robert Ambrose, MS (Fairleigh Dickinson University). Instructor. Creative gaming floor applications, strategy development and implementation, executive decision making, the customer service experience within the casino/hospitality environment.

Linda Forristal, PhD (Purdue University). Associate Teaching Professor. Destination management, marketing, branding, communications, cultural heritage tourism including foodways, indigenous tourism.

Donna Maguire, MPS (Cornell University's School of Hotel Administration). Assistant Teaching Professor. Restaurant management, catering management, recipe and menu management, quality assurance, and food cost controls.

Michael Traud, JD (Villanova University) Program Director, Hospitality and Tourism Management. Assistant Clinical Professor. Implementation of Korean Cuisine in the United States; hospitality law; Italian cuisine.

Interdepartmental Faculty
Rosemary Trout, MS (Drexel University) Interim Program Director, Culinary Arts and Food Science. Instructor. Food labeling and regulations; food safety and sanitation in food service and food manufacturing; food processing; sensory evaluation.

Sport Coaching Leadership

Major: Sport Coaching Leadership
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 13.1314
Standard Occupational Classification (SOC) code: 27-2022

About the Program
The MS in Sport Coaching Leadership program is an online master's program with a global component. The MS degree will prepare students in the areas of coaching theory, development of a coaching philosophy, understanding of the needs of athletes, recruitment, compliance, and program planning. The program will also expose students to comparative, global coaching models and allows for hands-on opportunities in the form of three practicums. The goal of the program is to prepare students for professional coaching careers in scholastic, collegiate, or competitive developmental leagues.
Admission Requirements

The MS in Sport Coaching Leadership requires a bachelor's degree from an accredited university. Candidates should have an undergraduate GPA of 3.00 or higher and some experience in the coaching, teaching, or sport management fields.

Degree Requirements

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<tr>
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<th>Course Title</th>
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<td>PHIL 502</td>
<td>Ethics in Coaching</td>
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<tr>
<td>SMT 602</td>
<td>Sport Law &amp; Risk Management</td>
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<td>SCL 614</td>
<td>Sport Performance &amp; Energy Systems</td>
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<tr>
<td>SCL 615</td>
<td>Athletic Recruiting</td>
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<tr>
<td>SCL 616</td>
<td>Sport Conditioning</td>
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<tr>
<td>SCL 618</td>
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<td>SCL 617</td>
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<td>Sport Budgets &amp; Fiscal Practices</td>
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<td>SMT 612</td>
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<td>SMT 628</td>
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<td>SMT 629</td>
<td>Managing Coaches &amp; Teams</td>
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Total Credits: 45.0

Sample Plan of Study

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<td>SCL 614</td>
<td>Sport Performance Energy Systems</td>
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<td>Term 3</td>
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Sport Management Faculty

Lawrence Cohen, JD (Temple University). Assistant Teaching Professor. Sports and antitrust law; tickets sales data analytics; sport sponsorship trends.

Amy Giddings, PhD (Temple University) Director, Sport Coaching Leadership. Associate Teaching Professor. International aspects of sport and culture, principles of coaching, teambuilding, group dynamics, minority issues in sport including availability and accessibility concerns, character development.

Joel Maxcy, PhD (Washington State University) Interim Program Director, Sport Management. Associate Professor. Economics of sport; labor economics & policy; economics of antitrust & regulation; sports analytics.

Jim Reese, EdD (University of Northern Colorado). Associate Professor. Sport ticket sales, strategies, and operations; quantitative analysis and statistics for sport; economic aspects of sport management.

Ellen Staurowsky, EdD (Temple University). Professor. Social justice issues in sport; gender equity in sport; Title IX pay equity and equal employment opportunity; athlete exploitation; college sport reform; and misappropriation of American Indian imagery in sport.

Karen Weaver, EdD (University of Pennsylvania). Associate Clinical Professor. Sport marketing, promotions, public relations, media, and leadership in sport.

Sport Management

Major: Sport Management
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 31.0504
Standard Occupational Classification (SOC) code: 11-1021

About the Program

This program is designed both for individuals already working in the sport management industry as well as for individuals who are new to the industry and looking to make a career change from a “mainstream industry” (such as marketing or finance) into the more specialized field of sport management. Graduates of the MS program in Sport Management will be uniquely qualified in leadership and management in a wide spectrum of organizations within the sport industry including professional sport, collegiate athletics, recreation and leisure sport venues, sport agency, and corporate sport enterprises as well as a range of health and fitness facilities.
The Master of Science in Sport Management program prepares its graduates for positions in sport management at all levels (recreational, youth, inter-scholastic, amateur, collegiate, professional) and within several organizational settings (public, private, non-profit, corporations).

The program content provides an integrated educational experience directed toward developing the ability to apply knowledge and skills to the planning, design, implementation, and evaluation of sport programs and offer solutions to practical problems in the sport management field. Graduates are expected to be leaders in their chosen area of interest by incorporating the various perspectives from the multidisciplinary training and applying them to current issues in sport and society.

**Program Goals**

Graduates of the Master of Science in Sport Management will be able to:

- Apply the fundamentals of business to sport management.
- Integrate the principles of management; organizing people and resources to get results in the field of sport.
- Apply the area of law and labor relations to the sports industry and agency.
- Use existing technologies and be prepared for emerging technologies in the sport management field.
- Forecast new developments and adapt to the rapidly changing sports environment.
- Creatively direct the economic contributions that sports and recreation offer to people, organizations, and the community.
- Effectively organize, evaluate and improve and use new information in sports.
- Utilize the knowledge and skills learned to produce an in-depth research project or thesis, which will serve to advance the study of sport management.

For additional information, view the Center for Hospitality and Sport Management's Sport Management program (http://drexel.edu/hsm/academics/Sport-Management) web page.

**Degree Requirements**

**Core Foundation Courses**

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<tr>
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<td>Sports Industry Management</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 602</td>
<td>Sports Law &amp; Risk Management</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 604</td>
<td>Sport Media &amp; Technology</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 607</td>
<td>Sport Budgets &amp; Fiscal Practices</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 608</td>
<td>Sport Information &amp; Public Relations</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 609</td>
<td>Sports Ticket Sales &amp; Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 611</td>
<td>Corporate Sponsorship Sales &amp; Strategies in Sport</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 612</td>
<td>Development &amp; Fundraising Strategies in Sport</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 621</td>
<td>Leadership in Sport Management</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 626</td>
<td>Globalization of Sport</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 635</td>
<td>Sport Facilities &amp; Event Management</td>
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</tr>
</tbody>
</table>

**Sport Management Elective Courses** * 6.0

Select two of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
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<tbody>
<tr>
<td>SMT 606</td>
<td>Contemporary Issues in Sport</td>
</tr>
<tr>
<td>SMT 622</td>
<td>Labor Relations &amp; Collective Bargaining in Sport</td>
</tr>
<tr>
<td>SMT 629</td>
<td>Managing Coaches &amp; Teams</td>
</tr>
<tr>
<td>SMT 630</td>
<td>Sports Industry Practicum</td>
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<tr>
<td>SMT 633</td>
<td>Sport Tourism Strategies</td>
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**Project/ Research Thesis**

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<tr>
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<th>Credits</th>
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<tbody>
<tr>
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<tr>
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<td>Course SMT 690 Not Found</td>
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**Total Credits** 45.0

* Additional options for electives outside the Department may be approved by the advisor.

**Sample Plan of Study**

**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>SMT 601</td>
<td>Sports Industry Management</td>
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<tr>
<td>SMT 602</td>
<td>Sport Law Risk Management</td>
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**Term Credits** 6.0

**Winter**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT 604</td>
<td>Sport Media Technology</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 626</td>
<td>Globalization of Sport</td>
<td>3.0</td>
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</table>

**Term Credits** 6.0

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SMT 607</td>
<td>Sport Budgets Fiscal Practices</td>
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</tr>
<tr>
<td>SMT 608</td>
<td>Sport Information Public Relations</td>
<td>3.0</td>
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</table>

**Term Credits** 6.0

**Summer**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT 621</td>
<td>Leadership in Sport Management</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 635</td>
<td>Sport Facilities Event Management</td>
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</table>

**Term Credits** 6.0

**Second Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SMT 609</td>
<td>Sports Ticket Sales Strategies</td>
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<tr>
<td>SMT 611</td>
<td>Corporate Sponsorship Sales &amp; Strategies in Sport</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits** 6.0

**Winter**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMT 612</td>
<td>Development Fundraising Strategies in Sport</td>
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</table>

**Term Credits** 3.0

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>SMT 698</td>
<td>Research Design Techniques in Sport</td>
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**Term Credits** 3.0

**Summer**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>SMT 699</td>
<td>Project/Research Thesis</td>
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</table>

**Term Credits** 3.0

**Total Credit: 45.0**

* One (1) Sport Management elective (http://www.drexel.edu/catalog/masters/sport.htm)
Sport Management Faculty

Lawrence Cohen, JD *(Temple University)*. Assistant Teaching Professor. Sports and antitrust law; tickets sales data analytics; sport sponsorship trends.

Amy Giddings, PhD *(Temple University)* Director, Sport Coaching Leadership. Associate Teaching Professor. International aspects of sport and culture, principles of coaching, teambuilding, group dynamics, minority issues in sport including availability and accessibility concerns, character development.

Joel Maxcy, PhD *(Washington State University)* Interim Program Director, Sport Management. Associate Professor. Economics of sport; labor economics & policy; economics of antitrust & regulation; sports analytics.

Jim Reese, EdD *(University of Northern Colorado)*. Associate Professor. Sport ticket sales, strategies, and operations; quantitative analysis and statistics for sport; economic aspects of sport management.

Ellen Staurowsky, EdD *(Temple University)*. Professor. Social justice issues in sport; gender equity in sport; Title IX pay equity and equal employment opportunity; athlete exploitation; college sport reform; and misappropriation of American Indian imagery in sport.

Karen Weaver, EdD *(University of Pennsylvania)*. Associate Clinical Professor. Sport marketing, promotions, public relations, media, and leadership in sport.
Close School of Entrepreneurship

Entrepreneurship is a central theme of the Drexel University Strategic Plan 2012-2017: Transforming the Modern University. The cultivation of entrepreneurship and innovation is the key to success in today’s world. Drexel’s strong entrepreneurial and innovative culture extends across academic programs through curricular and experiential activities, faculty and student research, and various partnerships with business, non-profits, and government.

The Charles D. Close School of Entrepreneurship is the hub of such activities, working in alignment with all colleges and schools at Drexel. As a freestanding academic school it provides curricula and activities for students to learn and practice innovative behavior.

The Close School defines entrepreneurship as more than starting a company or sparking innovation with established companies. For the Close School, entrepreneurship consists of three dimensions:

- A habit of mind and an attitude; a skill set applicable to pursuing innovation in business, personal, and career contexts.
- An approach to life built around innovative thinking, calculated daring, and proactive behavior.
- The process through which an individual or team creates or recognizes opportunities to pursue something of value, regardless of the resources available.

Majors

- Entrepreneurship and Innovation (MS) (p. 19)

Entrepreneurship and Innovation

Major: Entrepreneurship and Innovation
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 52.0701
Standard Occupational Classification (SOC) code: 11-1011; 11-1021; 11-9199

About the Program

The Charles D. Close School of Entrepreneurship is founded on the principle that entrepreneurship encompasses more than starting a new venture. Entrepreneurship is a habit of mind and an attitude; a skill set applicable to pursuing innovation in business, personal, and career contexts; and an approach to life built around innovative thinking, calculated daring, and proactive behavior.

The MS in Entrepreneurship and Innovation is designed for recent graduates or working professionals who wish to increase their knowledge and experiences in innovation and entrepreneurship. The MS focuses on developing the “individual as entrepreneur” as well as an understanding of the “process of entrepreneurship.”

The MS in Entrepreneurship and Innovation is preparing to enroll students beginning in the Fall of 2017.

For additional information about the MS in Entrepreneurship and Innovation, please contact Ian Sladen at is27@drexel.edu.

Degree Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTP 501</td>
<td>Entrepreneurship Essentials</td>
<td>3.0</td>
</tr>
<tr>
<td>BUSN 501</td>
<td>Measuring and Maximizing Financial Performance</td>
<td>3.0</td>
</tr>
<tr>
<td>CRTV 503</td>
<td>Creativity in the Workplace</td>
<td>3.0</td>
</tr>
<tr>
<td>PLCY 509</td>
<td>Sustainability &amp; Public Policy</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 610</td>
<td>Leading New Ventures</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 620</td>
<td>Learning from Failure</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 640</td>
<td>Methods of Entrepreneurship</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 650</td>
<td>Innovation &amp; Ideation</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 660</td>
<td>Early Stage Venture Funding</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 690</td>
<td>The Lean Launch</td>
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Required Sequence

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ENTP 647</td>
<td>Personal Dynamics: Starting a New Venture</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 667</td>
<td>Building Internal &amp; External Relationships</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 697</td>
<td>Defining Entrepreneurial Success</td>
<td>3.0</td>
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Electives

Choose two of the following graduate electives, OR two from other units (upon advisor approval):

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTP 535</td>
<td>Social Entrepreneurship</td>
</tr>
<tr>
<td>ENTP 545</td>
<td>Entrepreneurship in Emerging Markets</td>
</tr>
<tr>
<td>ENTP 565</td>
<td>Franchising</td>
</tr>
<tr>
<td>ENTP 585</td>
<td>Innovation in Established Companies</td>
</tr>
<tr>
<td>ENTP 670</td>
<td>Clean Venture Lab</td>
</tr>
<tr>
<td>BLAW 646</td>
<td>Legal Issues in New Ventures</td>
</tr>
<tr>
<td>MGMT 620</td>
<td>Technology Commercialization</td>
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</table>

Total Credits 45.0

Sample Plan of Study

Term 1

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENTP 501</td>
<td>Entrepreneurship Essentials</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 610</td>
<td>Leading New Ventures</td>
<td>3.0</td>
</tr>
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Term 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BUSN 501</td>
<td>Measuring and Maximizing Financial Performance</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 620</td>
<td>Learning from Failure</td>
<td>3.0</td>
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<td>Term Credits</td>
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Term 3

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CRTV 503</td>
<td>Creativity in the Workplace</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 640</td>
<td>Methods of Entrepreneurship</td>
<td>3.0</td>
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Term 4

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENTP 650</td>
<td>Innovation Ideation</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 660</td>
<td>Early Stage Venture Funding</td>
<td>3.0</td>
</tr>
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<td>Term Credits</td>
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Term 5

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ENTP 647</td>
<td>Personal Dynamics: Starting a New Venture</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Entrepreneurship Elective | 3.0
---|---
**Term Credits** | **6.0**

**Term 6**
- ENTP 690  The Lean Launch  3.0
- ENTP 667  Building Internal External Relationships  3.0

**Term Credits** | **6.0**

**Term 7**
- PLCY 509  Sustainability Public Policy  3.0
- ENTP 697  Defining Entrepreneurial Success  3.0
- Entrepreneurship Elective | 3.0

**Term Credits** | **9.0**

**Total Credit:** 45.0
College of Computing and Informatics

The College of Computing & Informatics provides a focal point for the broad range of inquiry related to computation and information. The College addresses both theory and practice along dimensions that include technical, human, organizational, policy, and societal considerations. This broad expertise positions the College’s educational and research programs to address the complex, multi-disciplinary problems that are increasingly common as society becomes ever more dependent on information technology.

Founded in fall 2013, the College unites the faculty, staff, and students from the former College of Information Science and Technology (the iSchool), the Department of Computer Science from the College of Engineering and the Department of Computing and Security Technology from Goodwin College of Professional Studies. For more information, please visit the College’s website (http://www.drexel.edu/cci).

Majors

- Computer Science (MSCS, PhD) (p. 24)
- Health Informatics (MSHI) (p. 32)
- Information Studies (PhD) (p. 30)
- Information Systems (MSIS) (p. 36)
- Library and Information Science (MSLIS) (p. 40)
- National Security Management (MSNSM) (p. 47)
- Software Engineering (MSSE) (p. 49)

Certificates

- Archives Specialist (p. 21)
- Competitive Intelligence/Knowledge Management Specialist (p. 23)
- Continuity Management (p. 22)
- Cybersecurity, Law and Policy (p. 22)
- Digital Curation Specialist (p. 29)
- Digital Libraries Specialist (p. 30)
- Healthcare Informatics (p. 33)
- Homeland Security (p. 22)
- Information Studies and Technology (Advanced Certificate) (p. 21)
- Intelligence (p. 23)
- Youth Services Specialist (p. 53)

Advanced Certificate in Information Studies and Technology

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Not eligible
Classification of Instructional Program (CIP) Code: 25.0103
Standard Occupational Classification (SOC) Code: 15-1199

This non-degree program provides specialized training beyond the master's degree so that practitioners can update and extend their skills and knowledge by adding position-relevant coursework in order to meet their current employment requirements. It is not intended to provide coursework that can be applied to the College of Computing & Informatics' master's or doctoral degrees. The program leads to an Advanced Certificate in Information Studies and Technology awarded through the College of Computing & Informatics.

Admission Requirements

Applicants must have completed a master's degree in areas such as library science, computer or information science, information systems, instructional technology, software engineering, or other appropriate degrees from a suitable accredited program that has prepared them for advanced study in the area chosen for specialization. Applicants must meet all the general requirements for admission to graduate studies and the College of Computing & Informatics. Admissions requirements include: completed graduate application form, photocopies of transcripts from all colleges and/or universities attended, essay, resume and Graduate Record Examination (or equivalent), if required.

Requirements

The Advanced Certificate in Information Studies and Technology consists of a minimum of eight courses that must be completed within three calendar years. Students must take four INFO courses as well as complete the final independent study within the College. The three remaining courses may be taken from offerings within the College or from other programs in the University, based on consultation with the student's advisor and agreement of the faculty mentor.

More courses, including a practicum in place of the independent study, may be required for students holding a master's in library science who are seeking certification as School Library/Media specialists in Pennsylvania.

Additional Information

For additional information, view the College of Computing & Informatics Advanced Certificate in Information Studies and Technology (http://drexel.edu/cci/programs/professional-development-programs/advanced-certificate-in-information-studies-and-technology) web page.

Archives Specialist Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Not eligible
Classification of Instructional Program (CIP) Code: 25.0103
Standard Occupational Classification (SOC) Code: 25-4011

This certificate is designed for professionals already holding a master's degree from an ALA-accredited program or a graduate degree closely related to this specialization.

The specialization in archival studies focuses on the practice and theory of managing collections of records and papers in a variety of archival settings, including governmental agencies, libraries, historical societies,
Certificate in Continuity Management

The course content within this specialization provides the educational component required for post-graduate certification by the Academy of Certified Archivists. This certification may also be of interest to students planning careers in academic and special libraries.

The program must be completed within five years.

Additional Information

For more information about this certificate program, please visit the College of Computing & Informatics' website (http://drexel.edu/cci/programs/professional-development-programs/post-masters-specialist-program).

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>INFO 560</td>
<td>Introduction to Archives I</td>
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</tr>
<tr>
<td>INFO 561</td>
<td>Introduction to Archives II</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 750</td>
<td>Archival Access Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>Students select two of the following courses:</td>
<td></td>
<td>6.0</td>
</tr>
<tr>
<td>INFO 751</td>
<td>Archival Appraisal</td>
<td></td>
</tr>
<tr>
<td>INFO 755</td>
<td>Electronic Records Management</td>
<td></td>
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<tr>
<td>INFO 756</td>
<td>Digital Preservation</td>
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</tbody>
</table>

Total Credits 15.0

Certificate in Cybersecurity, Law and Policy

Certificate Level: Graduate
Admission Requirements: Bachelor's Degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 9.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 11.1003
Standard Occupational Classification (SOC) Code: 15-1122

The certificate explores the vulnerabilities that arise from the use of cyberspace. The certificate coursework explores how the United States and the many other nations are responding to those vulnerabilities and how to analyze the policy and legal frameworks that are developing.

Students will examine issues relating to the organization of the Internet and cyberspace to understand how both governmental entities, and private parties, may – and do – respond to cyber threats under the current legal and policy frameworks. Students will be introduced to policy and legal concepts relating to the private sector and civilian government engagement in cyberspace. The program will also include an examination of the application of traditional laws of armed conflict to the new cyber domain.

Credits earned in the Certificate in Cybersecurity, Law & Policy program may not be transferred to the MS in National Security Management.

Additional Information

For more information about this certificate program, please visit the College of Computing & Informatics' website (http://drexel.edu/cci/programs/professional-development-programs/certificate-in-cybersecurity-law-and-policy).

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>INFO 517</td>
<td>Princ of Cybersec</td>
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</tr>
<tr>
<td>INFO 717</td>
<td>Cyber Crime Law</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 718</td>
<td>Cybersec Policy</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits 9.0

Certificate in Homeland Security

Certificate Level: Graduate
Admission Requirements: Bachelor's Degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 9.0
Instructional Delivery: Online
Calendar Type: Quarter

Credits earned in the Certificate in Homeland Security Management program may not be transferred to the MS in National Security Management.

Additional Information

For more information about this certificate program, please visit the College of Computing & Informatics' website (http://drexel.edu/cci/programs/professional-development-programs/graduate-certificate homeland-security-management).
The Homeland Security Certificate will introduce students to the various aspects of Homeland Security. It will examine the evolution of Homeland Security as a concept, a legal framework and the redirection of national policies to align with various threats. By completing the certificate, students will understand the complexities of today’s security environment and be prepared to use that knowledge in a variety of security related fields.

Credits earned in the Certificate in Homeland Security program may not be transferred to the MS in National Security Management.

Additional Information
For more information about this certificate program, please visit the College of Computing & Informatics’ website (http://drexel.edu/cci/programs/professional-development-programs/graduate-certificate-homeland-security).

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>HSM 544</td>
<td>Introduction to Homeland Security</td>
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</tr>
<tr>
<td>CST 604</td>
<td>Technology for Homeland Security</td>
<td>3.0</td>
</tr>
<tr>
<td>HSM 549</td>
<td>Terrorism and Homeland Security</td>
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<tr>
<td>Total Credits</td>
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</table>

Competitive Intelligence and Knowledge Management Specialist Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Not eligible
Classification of Instructional Program (CIP) Code: 25.9999
Standard Occupational Classification (SOC) Code: 15-1112

Intelligence is produced from information which is gathered to enhance the security of the state. It divides into two kinds of materials and activities: foreign intelligence, designed to enable the state to conduct effective diplomatic, military and economic activities in the international arena; and domestic intelligence, utilized by the state to monitor perceived threats within its territory.

The Certificate in Intelligence program will introduce students to advanced theoretical and practical frameworks for the study of intelligence and its application in a wide variety of contexts, both foreign and domestic. Students will develop skills in each stage of the intelligence cycle: requirements, collection, analysis, and dissemination.

Credits earned in the Certificate in Intelligence program may not be transferred to the MS in National Security Management.

Additional Information
For more information about this certificate program, please visit the College of Computing & Informatics’ website (http://drexel.edu/cci/programs/professional-development-programs/post-masters-specialist-program).

<table>
<thead>
<tr>
<th>Course Code</th>
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<tr>
<td>INFO 643</td>
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<td>Digital Scholarship in Science &amp; Technology</td>
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<td>INFO 675</td>
<td>Resources in the Health Sciences</td>
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<td>US Government Information</td>
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<td>Content Representation</td>
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<td>Public Library Service</td>
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<td>Information Architecture</td>
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<tr>
<td>INFO 662</td>
<td>Metadata and Resource Description</td>
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</tr>
</tbody>
</table>
Computer Science

Major: Computer Science
Degree Awarded: Master of Science in Computer Science (MSCS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MSCS); 90.0 (PhD)
Classification of Instructional Programs (CIP) code: 11.0701
Standard Occupational Classification (SOC) code: 11-3021; 15-1111; 15-1131; 15-1132; 15-1199

About the Program
The Department of Computing in the College of Computing & Informatics (http://www.drexel.edu/cci) houses research groups actively conducting research on a wide range of topics in Computer Science including artificial intelligence, algorithms, computer vision and graphics, programming languages, networks, privacy and security, high-performance computing, software engineering, computer algebra, and algorithms. The department emphasizes both interdisciplinary and applied research and is supported by major federal research grants from the National Science Foundation, Department of Defense, Department of Energy, and the National Institute of Standards and Technology, as well as by private sources.

Master of Science in Computer Science
The Master of Science in Computer Science program is designed to provide breadth of understanding in the core topics of computer science, in-depth advanced material, and a range of topics in the research areas of the faculty. A balance of theory and practice is presented, preparing students to perform cutting edge research as well as training students to become practicing computer scientists or software engineers in business, industry, or government. A thesis option is available to prepare students for doctoral studies or other research-oriented career paths.

Doctorate in Computer Science
Students enrolled in the PhD in Computer Science program are expected to become an expert in a research area in computer science or its interdisciplinary field with other disciplines. They are expected to conduct research in considerable depth, and make substantial contributions through creative research and serious scholarship. The program is designed for students to ensure core knowledge of the fundamental computer science areas and to conduct bleeding edge research at the forefront of a selected area. Students are prepared for leadership careers in research and education in computer science and interdisciplinary work using computer science.

Additional Information
For more information about these programs, visit the College of Computing & Informatics’ website (http://drexel.edu/cci).

Master of Science in Computer Science

General Requirements
Students must complete a minimum of 45.0 graduate credits for the MS degree. All students are required to submit a plan of study form with a Graduate Advisor (http://drexel.edu/cci/resources/current-students/graduate-professional-development/advising) at the beginning of their studies. Significant changes to the plan of study should be discussed with a Graduate Advisor.

Precore Classes
Precore classes may only count towards the degree requirement listed below as free electives with approval from a Graduate Advisor (http://drexel.edu/cci/resources/current-students/graduate-professional-development/advising). Precore courses are intended for students without adequate CS background. The material in these courses is considered prerequisite knowledge for all other graduate CS courses.

- CS 520 Foundations of Computer Science
- CS 571 Programming Tools and Environments

Core Requirements
Students must take 1 course marked “Core Candidate” from each of the 6 categories below. There are 2 Core Candidate courses in each category.

Theory
- CS 521 Data Structures and Algorithms I (Core Candidate)
- CS 522 Data Structures and Algorithms II
- CS 525 Theory of Computation (Core Candidate)

Intelligent Systems
- CS 500 Database Theory (Core Candidate)
- CS 510 Introduction to Artificial Intelligence (Core Candidate)
- CS 511 Robot Laboratory
- CS 610 Advanced Artificial Intelligence
- CS 611 Game Artificial Intelligence
- CS 612 Knowledge-based Agents
- CS 613 Machine Learning

Programming Systems
- CS 550 Programming Languages (Core Candidate)
- CS 575 Software Design (Core Candidate)
- CS 576 Dependable Software Systems
- CS 650 Program Generation and Optimization
- CS 675 Reverse Software Engineering
- CS 676 Parallel Programming

Computer Systems
- CS 543 Operating Systems (Core Candidate)
- CS 544 Computer Networks (Core Candidate)
- CS 643 Advanced Operating Systems
- CS 645 Network Security
- CS 647 Distributed Systems Software

Vision and Graphics
- CS 536 Computer Graphics (Core Candidate)
- CS 537 Interactive Computer Graphics
- CS 558 Game Engine Programming
- CS 583 Introduction to Computer Vision (Core Candidate)
- CS 634 Advanced Computer Vision
- CS 636 Advanced Computer Graphics

Applications

INFO 679 Information Ethics

Total Credits 15.0
CS 530  Developing User Interfaces (Core Candidate)
CS 540  High Performance Computing (Core Candidate)
CS 567  Applied Symbolic Computation
CS 590  Privacy
CS 630  Cognitive Systems
CS 668  Computer Algebra I
CS 669  Computer Algebra II

**Breadth Requirements**  9.0
Students must take an additional 3 courses from the remaining courses above, spanning at least 2 of the listed categories.

**Depth Requirements**  6.0
Students are required to complete at least 2 600- or 700-level Computer Science (CS) courses beyond the breadth requirement. The CS 690 Independent Study course may be taken if approved by the College.

**Additional Graduate-Level Courses**  6.0
Two additional graduate level courses are required. These courses are typically 600- or 700-level Computer Science (CS) courses. Graduate courses may be taken from outside the department, if on the list of approved external courses, and may include CS 690 Independent Study and CS 997 Research in Computer Science, if approved by the College.

**Thesis or Non-Thesis Option**  6.0

**Thesis Option**
Usually students pursuing a Master's Thesis will first do 3.0 research credits (CS 690 or CS 997) to obtain background knowledge required by the thesis topic. It is the responsibility of the student to find a thesis supervisor.

**Non-thesis Option**
The non-thesis option requires 2 additional 600- or 700-level Computer Science (CS) courses taken in place of the 6.0 thesis credits.

**Total Credits**  45.0

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**PhD in Computer Science**

**Core Requirements**  18.0
Students must take 1 course marked "Core Candidate" from each of the 6 categories below. There are 2 Core Candidate courses in each category.

**Theory**
- CS 521  Data Structures and Algorithms I (Core Candidate)
- CS 525  Theory of Computation (Core Candidate)
- CS 522  Data Structures and Algorithms II
- CS 620  Advanced Data Structure and Algorithms
- CS 621  Approximation Algorithms
- CS 623  Computational Geometry

**Intelligent Systems**
- CS 500  Database Theory (Core Candidate)
- CS 510  Introduction to Artificial Intelligence (Core Candidate)
- CS 511  Robot Laboratory
- CS 510  Advanced Artificial Intelligence
- CS 511  Game Artificial Intelligence
- CS 612  Knowledge-based Agents
- CS 613  Machine Learning

**Programming Systems**
- CS 550  Programming Languages (Core Candidate)
- CS 575  Software Design (Core Candidate)
- CS 576  Dependable Software Systems
- CS 560  Program Generation and Optimization
- CS 675  Reverse Software Engineering
- CS 676  Parallel Programming

**Computer Systems**
- CS 543  Operating Systems (Core Candidate)
- CS 544  Computer Networks (Core Candidate)
- CS 643  Advanced Operating Systems
- CS 645  Network Security
- CS 647  Distributed Systems Software

**Vision and Graphics**
- CS 536  Computer Graphics (Core Candidate)
- CS 583  Introduction to Computer Vision (Core Candidate)
- CS 537  Interactive Computer Graphics
- CS 558  Game Engine Programming
- CS 634  Advanced Computer Vision
- CS 636  Advanced Computer Graphics

**Applications**
- CS 530  Developing User Interfaces (Core Candidate)
- CS 540  High Performance Computing (Core Candidate)
- CS 567  Applied Symbolic Computation
- CS 590  Privacy
- CS 630  Cognitive Systems
- CS 668  Computer Algebra I
- CS 669  Computer Algebra II

**Breadth Requirement**  12.0
Students must take another 4 intermediate and advanced courses from the remaining courses above, spanning at least 3 of the listed course categories while earning at least a grade of B in each course.

**Depth Requirement**

Students are required to complete at least 18.0 credits of CS courses beyond the Breadth Requirement. These courses should be 600- or 700-level courses. Course selection must be approved by the student’s research advisor. The department will periodically offer topics courses, typically run in a seminar fashion, on current research areas of interest to faculty. As part of the Depth Requirements, 3.0 out of the 18.0 credits, but no more than 9.0 credits, are to be Independent Study work (CS 690).

**Plan of Study**

Upon entering the PhD program, each student will be assigned an Graduate Advisor, and with the help of the Advisor will develop and file a plan of study (which can be brought up to date when necessary). The plan of study should be filed with the Graduate Advisor no later than the end of the first term.

**Qualifying Requirements**

PhD student must pass each of the six core courses selected as part of the “Core Requirements” (one “Core Candidate” course from each of the listed categories) with a grade B+ or higher. If a student fails to meet this minimum grade requirement, he or she may either (1) take the other “Core Candidate” course in the same category and obtain a grade of B+ or higher; (2) retake the same course at the next offering; or (3) retake the final exam of the same course with permission by the instructor, if deemed appropriate by the instructor and the College. Normally, a student is expected to satisfy this requirement by the end of the student’s first year. These requirements, including the remedial actions, must be completed by the end of the student’s second year. Transfer credits may count towards these requirements subject to course instructor approval of the syllabus for the transferred course.

**Candidacy Exam**

The Computer Science candidacy examination serves to define the student’s research domain and to evaluate the student’s knowledge and understanding of various fundamental and seminal results in that domain. At this point the student is expected to be able to read, understand, analyze, and explain advanced technical results in a specialized area of computer science at an adequate level of detail. The candidacy examination will evaluate those abilities using a defined set of published manuscripts. The student will prepare a written summary of the contents of the material, present the summary orally, and answer questions about the material. The examination committee will evaluate the written summary, the oral presentation, and the student’s answers.

**Thesis Proposal**

After completing the candidacy examination successfully, the PhD candidate must prepare a thesis proposal that outlines, in detail, the specific problems that will be solved in the PhD dissertation. The quality of the research proposal should be at the level of, for example, a peer-reviewed proposal to a federal funding agency, or a publishable scientific paper. The candidate is responsible for sending the research proposal to the PhD committee two weeks before the oral presentation. The PhD committee need not be the same as the candidacy exam committee, but it follows the same requirements and must be approved by the Office of Graduate Studies. The oral presentation involves a 30-minute presentation by the candidate followed by an unspecified period during which the committee will ask questions. After the question and answer period, the candidate will be asked to leave the room and the committee will determine if the research proposal has been accepted. The research proposal can be repeated at most once.

**Thesis Defense**

After completing the research proposal successfully, the PhD candidate must conduct the necessary research and publish the results in a PhD dissertation. The dissertation must be submitted to the PhD committee two weeks prior to the oral defense. The oral presentation involves a 45-minute presentation by the candidate, open to the public, followed by an unspecified period during which the committee will ask questions. The question-and-answer period is not open to the public. After the question and answer period, the candidate will be asked to leave the room and the committee will determine if the candidate has passed or failed the examination. The candidate will be granted one more chance to pass the final defense if (s)he fails it the first time. Paperwork selecting the thesis committee and indicating the results of the thesis defense must be filed with the College of Computing & Informatics (http://www.drexel.edu/ccI) and the Graduate College (http://www.drexel.edu/graduatestudies).

**Dual MS Degree Opportunities**

Graduate students already enrolled in a master's degree program at Drexel have the opportunity, through the dual master’s program, to work simultaneously on two CCI master’s degrees and to receive both upon graduation. To be eligible, graduate students must be currently working on their first CCI master's degree when requesting admission to the second CCI master's degree. They must obtain approval from the graduate advisors of both programs and work out a plan of study encompassing coursework and/or research (thesis) credits for both degrees.

To satisfy dual degree requirements for the MSCS and another degree the plan of study must include the following: mandatory core, flexible core, breadth and one depth course for a total of 30.0 credits. To obtain a dual degree you must have a minimum of 60 credits, thesis and research credits will be in excess of the 30.0 credits required by MSCS. The dual degree for MSCS students is only available to on-campus students. Please contact your advisor (http://drexel.edu/ccI/resources/current-students/graduate-professional-development/advising) for more information on program requirements as some CCI master’s degree combinations may require additional prerequisites.

The dual master's student must complete the Change of Curriculum and Status form (http://www.drexel.edu/~media/Files/GraduatesTudies/forms/Change_of_Curriculum_and_Status.ashx?la=en) and obtain approvals from both graduate advisors. Final approval is granted by the Office of Graduate Studies. The student is then registered in both majors simultaneously. Upon graduation, the student must file two Application for Degree (http://drexel.edu/drexelcentral/graduation/information/applying-for-degree) forms.

**Drexel University Libraries**

Drexel University Libraries (http://www.library.drexel.edu) is a learning enterprise, advancing the University’s academic mission through serving as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics
students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, systems engineering, health informatics, information systems, and technology. Resources are available online at library.drexel.edu or in-person at W. W. Hagerty Library (http://www.library.drexel.edu/about/w-w-hagerty).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

**iCommons**

Located in Room 106 of the Rush Building, the College’s iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42” display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as “DreamSpark” which allows students free access to a wide array of Microsoft software titles and operating systems.

CCI students can access Drexel’s mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University’s network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

**Rush Building**

The Rush Building houses on-campus classes, CCI administrative offices (academic advising, admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

In 2013, CCI redesigned its Information Technology Laboratory, located in the Rush Building, in support of the undergraduate degree program in information technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports.

In addition a special system has been built into to the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

**Cyber Learning Center**

The Cyber Learning Center, located in University Crossings, provides consulting and other learning resources for students taking computer science classes. It is staffed by graduate and undergraduate computer science students in the College of Computing & Informatics.

**Research Laboratories**

The College houses multiple research labs, led by CCI faculty, across Drexel’s main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GICL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College’s research web page.

**Alumni Garden**

The Rush Building’s Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx) may be reserved for Drexel events.

**University Crossings**

CCI also has on campus classrooms, administrative offices and faculty offices at University Crossings 100, located at the corner of JFK and Market Streets. The building houses a student computer lab (featuring workstations and laptop plug-in stations, arranged in pods, to encourage collaboration among CCI students), as well as several classrooms with video-conference enabled technology and media projection capabilities. Its Cyber Learning Center provides consulting and other learning resources for students taking computer science classes within the College. University Crossings is also home to several of the College’s research groups and laboratories (http://cci.drexel.edu/research).

**3401 Market Street**

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such as the Applied Informatics Group (http://cci.drexel.edu/about/our-facilities/other-cci-facilities.aspx), and University initiatives such as the Drexel University Cybersecurity Institute (http://cci.drexel.edu/cybersecurity). The Institute’s newly opened Auerbach and Berger Families Cybersecurity Laboratory serves as University’s first training facility dedicated to identifying challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

**One Drexel Plaza**
Computer Science Faculty

Yuan An, PhD (http://drexel.edu/cci/contact/Faculty/An-Yuan) (University of Toronto, Canada) Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web.

David Augenblick, MS (http://drexel.edu/cci/contact/Faculty/Augenblick-David) (University of Pennsylvania) Associate Teaching Professor. Introductory and object-oriented programming, data structures and database systems, computer application project management, application of computer programming principles and solutions to engineering problems.

Marcello Baldi, PhD (http://drexel.edu/cci/contact/Faculty/Baldi-Marcello) (Texas Tech University) Senior Research Scientist, Assistant Research Professor, Applied Informatics Group. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning.

David Breen, PhD (http://drexel.edu/cci/contact/Faculty/Breen-David) (Rensselaer Polytechnic Institute) Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization.

Yuanfang Cai, PhD (http://drexel.edu/cci/contact/Faculty/Cai-Yuanfang) (University of Virginia) Associate Professor. Formal software design modeling and analysis, software economics, software evolution and modularity.

Bruce Char, PhD (http://drexel.edu/cci/contact/Faculty/Char-Bruce) (University of California, Berkeley) Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments, parallel and distributed.

Andrea Forte, PhD (http://drexel.edu/cci/contact/Faculty/Forte-Andrea) (Georgia Institute of Technology) Assistant Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy.

Christopher Geib, PhD (http://drexel.edu/cci/contact/Faculty/Geib-Christopher) (University of Pennsylvania) Associate Professor. Decision making and reasoning under conditions of uncertainty, planning, scheduling, constraint, based reasoning, human computer and robot interaction, probabilistic reasoning, computer network security, large scale process control, user interfaces.

Rachel Greenstadt, PhD (http://drexel.edu/cci/contact/Faculty/Greenstadt-Rachel) (Harvard University) Associate Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security.

Tony H. Grubesci, PhD (http://drexel.edu/cci/contact/Faculty/Grubesci-Tony) (The Ohio State University) Professor (Joint appointment in the Department of Culture & Communication with the College of Arts and Sciences). Geographic information science, spatial analysis, development, telecommunication policy, location modeling.

Xiaohua Tony Hu, PhD (http://drexel.edu/cci/contact/Faculty/Hu-Xiaohua-Tony) (University of Regina, Canada) Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics.

Jeremy Johnson, PhD (http://drexel.edu/cci/contact/Faculty/Johnson-Jeremy) (Ohio State University) Professor. Computer algebra, parallel computations, algebraic algorithms, scientific computing.

Constantine Katsinis, PhD (http://drexel.edu/cci/contact/Faculty/Katsinis-Constantine) (University of Rhode Island) Associate Teaching Professor. Computer Security, network security, parallel computer architectures, mobile computing, information assurance, fault tolerant systems, image processing and pattern recognition.

Weimao Ke, PhD (http://drexel.edu/cci/contact/Faculty/Ke-Weimao) (University of North Carolina at Chapel Hill) Assistant Professor. Information retrieval (IR), distributed systems, intelligent filtering/recommendation, information visualization, network science, complex systems, machine learning, text/data mining, multi-agent systems, the notion of information.

Geoffrey Mainland, PhD (http://drexel.edu/cci/contact/Faculty/Mainland-Geoffrey) (Harvard University) Assistant Professor. High-level programming languages and runtime support for non-general purpose computation.

Spiros Manolas, PhD (http://drexel.edu/cci/contact/Faculty/Manolas-Spiros) (University of Toronto) Senior Associate Dean of Computing & Academic Affairs, Professor. Software engineering, software security, code analysis, evolutionary computation.

Adelaide Alban Medlock, MS (http://drexel.edu/cci/contact/Faculty/Medlock-Adelaide-Alban) (Drexel University) Associate Teaching Professor. Introductory programming, computer science education.

William Mongan, MS (http://drexel.edu/cci/contact/Faculty/Mongan-William) (Drexel University) Associate Teaching Professor. Service-oriented architectures, program comprehension, reverse engineering, software engineering, computer architecture, computer science education.

Alan T. Murray, PhD (http://drexel.edu/cci/contact/Faculty/Murray-Alan) (University of California, Santa Barbara) Professor. Geographic information science, urban, regional and natural resource planning; location modeling, spatial decision support systems, land use decision making.

Ko Nishino, PhD (http://drexel.edu/cci/contact/Faculty/Nishino-Ko) (University of Tokyo) Director of Computing Graduate Affairs & Research, Associate Professor. Computer vision, computer graphics, analysis and synthesis of visual appearance.

Krzysztof Nowak, PhD (http://drexel.edu/cci/contact/Faculty/Nowak-Krzysztof) (Washington University) Associate Teaching Professor. Fourier analysis, partial differential equations, image processing, wavelets, asymptotic distribution of eigenvalues, numerical methods and algorithms, computer science education.

Santiago Ontañón, PhD (http://drexel.edu/cci/contact/Faculty/Ontanon-Santiago) (University of Barcelona) Assistant Professor. Game AI, computer games, artificial intelligence, machine learning, case-based reasoning.

Jeffrey L. Popyack, PhD (http://drexel.edu/cci/contact/Faculty/Popyack-Jeffrey) (University of Virginia) Professor. Operations research, stochastic
About the Program

Digital Curation Specialist Certificate program focuses on the active management and preservation of digital resources throughout their lifecycle, supporting the needs of current and future researchers. The rapid expansion of digital information in all disciplines has created a growing need for information professionals who can plan and implement projects to create, select, maintain, preserve, provide access to, and add value to digital resources in a variety of institutional settings.

This Certificate meets the needs of students planning careers in a wide range of settings and complements the concentrations in Digital Libraries and Archival Studies. The Certificate addresses the growing importance of digital information in all environments.

Students will take the following courses required for the Certificate:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>INFO 550</td>
<td>Introduction to Archives I</td>
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<tr>
<td>INFO 753</td>
<td>Introduction to Digital Curation</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 756</td>
<td>Digital Preservation</td>
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<td>Introduction to Database Management</td>
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<tr>
<td>INFO 633</td>
<td>Information Visualization</td>
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<tr>
<td>INFO 653</td>
<td>Digital Libraries</td>
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<tr>
<td>INFO 658</td>
<td>Information Architecture</td>
<td></td>
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<tr>
<td>INFO 755</td>
<td>Electronic Records Management</td>
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<tr>
<td>Select one from the following (Content add-value courses):</td>
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<tr>
<td>INFO 555</td>
<td>Introduction to Geographic Information Systems</td>
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<tr>
<td>INFO 622</td>
<td>Content Representation</td>
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<tr>
<td>INFO 661</td>
<td>Cataloging Special Materials</td>
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<tr>
<td>INFO 662</td>
<td>Metadata and Resource Description</td>
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</tr>
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Total Credits: 15.0
Digital Libraries Specialist Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13.1334
Standard Occupational Classification (SOC) Code: 25-4021

The Digital Libraries Specialist certificate program is designed for professionals already holding a master's degree from an ALA-accredited program or a graduate degree closely related to this specialization. This specialization covers a range of topics in digital resources, collections and services.

The program must be completed within five years.

Additional Information
For more information about this certificate program, please visit the College of Computing & Informatics' website (http://drexel.edu/cci/programs/professional-development-programs/post-masters-specialist-program).

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 552</td>
<td>Introduction to Web Design for Information Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 653</td>
<td>Digital Libraries</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 657</td>
<td>Digital Library Technologies</td>
<td>3.0</td>
</tr>
<tr>
<td>Select two courses from the following:</td>
<td>6.0</td>
<td></td>
</tr>
<tr>
<td>INFO 605</td>
<td>Introduction to Database Management</td>
<td></td>
</tr>
<tr>
<td>INFO 608</td>
<td>Human-Computer Interaction</td>
<td></td>
</tr>
<tr>
<td>INFO 622</td>
<td>Content Representation</td>
<td></td>
</tr>
<tr>
<td>INFO 624</td>
<td>Information Retrieval Systems</td>
<td></td>
</tr>
<tr>
<td>INFO 658</td>
<td>Information Architecture</td>
<td></td>
</tr>
<tr>
<td>INFO 662</td>
<td>Metadata and Resource Description</td>
<td></td>
</tr>
<tr>
<td>INFO 740</td>
<td>Digital Reference Services</td>
<td></td>
</tr>
<tr>
<td>INFO 756</td>
<td>Digital Preservation</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 15.0

Information Studies

Major: Information Studies
Degree Awarded: Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 90.0
Classification of Instructional Programs (CIP) code: 11.0401
Standard Occupational Classification (SOC) code: 15-1111

About the Program
The College of Computing & Informatics' on-campus PhD in Information Studies program educates interdisciplinary professionals in the fields of information services, studies and systems. The main focus of the program is on research that increases the benefits of information science and technology for all sectors of society.

Purpose and Scope
The program is not based on the accumulation of credits but represents a high level of scholarly achievement in both supervised and independent study and research. There are few fixed program requirements, and the master's degree is not a prerequisite for the PhD. The doctoral program has two major goals: to allow students to acquire in-depth knowledge of a specialized area within the field of information science and technology and to prepare students for a career in which research is a basic element; whether that career is in administration, research, or teaching.

Opportunities
Most graduates move into academic programs, research and development (R&D) positions, or become high-level managers of information organizations in the private or public sectors.

Additional Information
For more information about this program, visit the College of Computing & Informatics' Doctoral Program in Information Studies (http://drexel.edu/cci/programs/graduate-programs/phd-information-studies) web page.

Degree Requirements

Coursework
The degree requires a minimum of 90.0 credits beyond the bachelor's degree for the PhD degree or 45.0 credits beyond an applicable MS degree. At least three consecutive terms of full-time resident doctoral study are required. Students may be admitted to the program for part-time study, but they must be formally accepted as doctoral students and must meet the residency requirement.

Courses are taken, under an approved plan of study, to ensure the development of competence in:

- Information science and technology broadly construed
- One or more domains of study
- Research methodology

Advancement to Candidacy
To measure proficiencies in research and to assess students' mastery of their chosen area of study, students maintain a portfolio that is reviewed on a regular basis. Candidacy is awarded based on satisfactory reviews and the presentation of a scholarly document reviewing the literature and developing research questions in the student's dissertation area.

Dissertation
The dissertation must be an original scholarly contribution to the field of information science and technology that will demonstrate the student's capacity to conduct research. The final defense of the dissertation completes the program.

For a sample plan of study and more information about the degree, visit the College of Computing & Informatics' Doctoral Program in Information Studies (http://drexel.edu/cci/programs/graduate-programs/phd-information-studies) web page.
College of Computing & Informatics
Computer Science Faculty

David Augenblick, MS (University of Pennsylvania) Associate Teaching Professor. Introductory and object-oriented programming, data structures and database systems, computer application project management, application of computer programming principles and solutions to engineering problems

Marcello Balduccini, PhD (Texas Tech University) Senior Research Scientist, Assistant Research Professor, Applied Informatics Group. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

Ko Nishino, PhD (University of Tokyo) Associate Professor & Associate Department Head for Graduate Affairs. Computer vision, computer graphics, analysis and synthesis of visual appearance

David Breen, PhD (Rensselaer Polytechnic Institute) Associate Professor & Deputy Director, Center for Visual & Decision Informatics. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Yuanfang Cai, PhD (University of Virginia) Associate Professor. Formal software design modeling and analysis, software economics, software evolution and modularity

Bruce Char, PhD (University of California, Berkeley) Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments, parallel and distributed computation

Christopher Geib, PhD (University of Pennsylvania) Associate Professor. Decision making and reasoning under conditions of uncertainty, planning, scheduling, constraint, based reasoning, human computer and robot interaction, probabilistic reasoning, computer network security, large scale process control, user interfaces

Rachel Greenstadt, PhD (Harvard University) Associate Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security

Jeremy Johnson, PhD (Ohio State University) Professor. Computer algebra, parallel computations, algebraic algorithms, scientific computing

Constantine Katsinis, PhD (University of Rhode Island) Associate Teaching Professor. Computer Security, network security, parallel computer architectures, mobile computing, information assurance, fault tolerant systems, image processing and pattern recognition

Geoffrey Mainland, PhD (Harvard University) Assistant Professor. High-level programming languages and runtime support for non-general purpose computation

Spiros Mancoridis, PhD (University of Toronto) Interim Dean & Professor. Software engineering, software security, code analysis, evolutionary computation

Adelaïda Alben Medlock, MS (Drexel University) Associate Teaching Professor. Introductory programming, computer science education

William Mongan, MS (Drexel University) Associate Teaching Professor. Service-oriented architectures, program comprehension, reverse engineering, software engineering, computer architecture, computer science education

Krysztof Nowak, PhD (Washington University) Associate Teaching Professor. Fourier analysis, partial differential equations, image processing, wavelets, asymptotic distribution of eigenvalues, numerical methods and algorithms, computer science education

Santiago Ontañón, PhD (University of Barcelona) Assistant Professor. Game AI, computer games, artificial intelligence, machine learning, case-based reasoning

Ali Shokoufandeh, PhD (Rutgers University) Assistant Professor. Algorithms for decentralized networks that yield provable guarantees with respect to fault tolerance and performance.

Julia Stoyanovich, PhD (Columbia University) Assistant Professor. Data and knowledge management, software development, database management, data-intensive workflow, social context search and ranking, information discovery

Brian Stuart, PhD (Purdue University) Associate Teaching Professor. Machine learning, networking, robotics, image processing, simulation, interpreters, data storage, operating systems, computer science, data communications, distributed/operating systems, accelerated computer programming, computer graphics

Filippos Vokolos, PhD (Polytechnic University) Associate Teaching Professor. System architecture, principles of software design and construction, verification and validation methods for the development of large software systems, foundations of software engineering, software verification & validation, software design, programming languages, dependable software systems

Maxwell Young, PhD (University of Waterloo) Assistant Professor. Algorithms for decentralized networks that yield provable guarantees with respect to fault tolerance and performance.

Emertitus Faculty

Thomas T. Hewett, PhD (University of Illinois) Professor Emeritus of Psychology and of Computer Science, Departments of Psychology and of Computer Science. Cognitive engineering of computing support systems
for a variety of creative expert knowledge workers and computing support for teaching-learning activities.

Health Informatics

Major: Health Informatics
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 51.2706
Standard Occupational Classification (SOC) code: 15-1111

About the Program
The College of Computing & Informatics’ Master of Science in Health Informatics (MSHI) provides students with the ability to use information systems (including knowledge processing methods as well as information and communication technologies) efficiently and responsibly in order to improve health outcomes in such varied settings as clinical medicine, nursing, and public health in primary and hospital care, industry, government and academia.

This program, housed at the College of Computing & Informatics and delivered online, is a collaborative effort with the College of Nursing and Health Professions and Drexel University College of Medicine.

Graduates of the MS in Health Informatics program will be prepared to fill the rapidly growing demand for professionals who understand healthcare, information systems, and technology.

Learning Objectives
Specific learning outcomes for program graduates include the following:

• Articulate the ways in which data, information, and knowledge are used to solve health problems from the individual to the population level.
• Apply theories, methods, and processes for the generation, storage, retrieval, use, management, and sharing of healthcare data, information, and knowledge.
• Apply, adapt, and validate informatics concepts and approaches as they relate to specific biomedical and healthcare problems.
• Select relevant concepts and techniques from the social sciences to solve problems in health informatics.
• Work collaboratively across disciplines to define, discuss, and resolve health problems from the individual to the population level.
• Analyze the ethical and policy issues related to biomedical and healthcare informatics.

Additional Information
For more information about this program, visit the College of Computing & Informatics’ MS in Health Informatics (http://drexel.edu/cci/programs/graduate-programs/ms-in-health-informatics) web page.

Degree Requirements
The curriculum is based around contemporary health issues and has been designed to help students understand the current landscape of health informatics and how information, technology and people relate and intersect in healthcare environments. Because health informatics is an interdisciplinary field, all students will complete a common core of 10 courses (30 quarter hours) from the College of Computing & Informatics before choosing from a suite of specialized electives offered by the College of Computing & Informatics or other Colleges at Drexel University.

The College recommends that all students take INFO 648 in their first term, if possible. Students wishing to take two classes their first term should consider enrolling in INFO 530 as well.

Students are strongly encouraged to consult with their graduate advisor when registering for courses.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 530</td>
<td>Foundations of Information Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 605</td>
<td>Introduction to Database Management</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 608</td>
<td>Human-Computer Interaction</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 614</td>
<td>Distributed Computing and Networking</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 620</td>
<td>Information Systems Analysis and Design</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 638</td>
<td>Software Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 648</td>
<td>Healthcare Informatics</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 712</td>
<td>Information Assurance</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 731</td>
<td>Organization &amp; Social Issues in Healthcare Informatics</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 732</td>
<td>Healthcare Informatics: Planning &amp; Evaluation</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Track Courses
In addition to these requirements, students complete either Track 1 or Track 2 courses (listed below)

Total Credits: 45.0

Track 1: Students Admitted Without a Health-Related Background
Students who lack a health-related background are required to take at least 9.0 credits from the following list of electives, and must complete 1 term clinical experience in a healthcare setting.

Electives
Select three of the following: 9.0

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 517</td>
<td>Principles of Cybersecurity</td>
</tr>
<tr>
<td>INFO 526</td>
<td>Information, Innovation &amp; Technology in Advanced Nursing Practice</td>
</tr>
<tr>
<td>INFO 555</td>
<td>Introduction to Geographic Information Systems</td>
</tr>
<tr>
<td>INFO 733</td>
<td>Public Health Informatics</td>
</tr>
<tr>
<td>INFO 753</td>
<td>Introduction to Digital Curation</td>
</tr>
<tr>
<td>NURS 531</td>
<td>Epidemiology in Action: Tracking Health &amp; Disease</td>
</tr>
<tr>
<td>NURS 532</td>
<td>Evaluation of Health Outcomes</td>
</tr>
<tr>
<td>NURS 557</td>
<td>Leadership and Stewardship in the Health Professions</td>
</tr>
<tr>
<td>NURS 558</td>
<td>Economics of Healthcare Management &amp; Policy</td>
</tr>
<tr>
<td>NURS 564</td>
<td>The Business of Healthcare</td>
</tr>
<tr>
<td>RSCH 519</td>
<td>Introduction to Biostatistics</td>
</tr>
<tr>
<td>RSCH 523</td>
<td>Methods for Health Research</td>
</tr>
<tr>
<td>BUSN 651</td>
<td>Healthcare Business Practice I: Foundations</td>
</tr>
<tr>
<td>BUSN 652</td>
<td>Healthcare Business Practice II</td>
</tr>
<tr>
<td>BUSN 653</td>
<td>Healthcare Business Practice III: Capstone</td>
</tr>
</tbody>
</table>

Clinical Experience
INFO 896 Clinical Experience 3.0

Free Elective
### Track 2: Students Admitted With a Health-Related Background

Students who have a clinical background and who wish to develop additional expertise in a specific area may take 3 additional courses (9.0 credits) from the following list. Students intending to sit for Certification in Nursing Informatics should consult the requirements for that credential to determine the additional eligibility requirements.

#### Electives

Select three of the following:  
9.0

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 517</td>
<td>Principles of Cybersecurity</td>
</tr>
<tr>
<td>INFO 526</td>
<td>Information, Innovation &amp; Technology in Advanced Nursing Practice</td>
</tr>
<tr>
<td>INFO 555</td>
<td>Introduction to Geographic Information Systems</td>
</tr>
<tr>
<td>INFO 606</td>
<td>Advanced Database Management</td>
</tr>
<tr>
<td>INFO 610</td>
<td>Analysis of Interactive Systems</td>
</tr>
<tr>
<td>INFO 611</td>
<td>Design of Interactive Systems</td>
</tr>
<tr>
<td>INFO 622</td>
<td>Content Representation</td>
</tr>
<tr>
<td>INFO 624</td>
<td>Information Retrieval Systems</td>
</tr>
<tr>
<td>INFO 634</td>
<td>Data Mining</td>
</tr>
<tr>
<td>INFO 733</td>
<td>Public Health Informatics</td>
</tr>
<tr>
<td>INFO 753</td>
<td>Introduction to Digital Curation</td>
</tr>
<tr>
<td>NURS 531</td>
<td>Epidemiology in Action: Tracking Health &amp; Disease</td>
</tr>
<tr>
<td>NURS 532</td>
<td>Evaluation of Health Outcomes</td>
</tr>
<tr>
<td>NURS 537</td>
<td>Leadership and Stewardship in the Health Professions</td>
</tr>
<tr>
<td>NURS 558</td>
<td>Economics of Healthcare Management &amp; Policy</td>
</tr>
<tr>
<td>NURS 564</td>
<td>The Business of Healthcare</td>
</tr>
<tr>
<td>RSCH 519</td>
<td>Introduction to Biostatistics</td>
</tr>
<tr>
<td>RSCH 523</td>
<td>Methods for Health Research</td>
</tr>
<tr>
<td>BUSN 651</td>
<td>Healthcare Business Practice I: Foundations</td>
</tr>
<tr>
<td>BUSN 652</td>
<td>Healthcare Business Practice II</td>
</tr>
<tr>
<td>BUSN 653</td>
<td>Healthcare Business Practice III: Capstone</td>
</tr>
</tbody>
</table>

#### Free Electives

Two free electives  
6.0

**Total Credits**  
15.0

### Dual MS Degree Opportunities

Graduate students already enrolled in a master's degree program at Drexel have the opportunity, through the dual master's program, to work simultaneously on two CCI master's degrees and to receive both upon graduation. To be eligible, graduate students must be currently working on their first CCI master's degree when requesting admission to the second CCI master's degree. They must obtain approval from both graduate advisors. Final approval is granted by the Office of Graduate Studies. The student is then registered in both majors simultaneously. Upon graduation, the student must file two Application for Degree (http://drexel.edu/drexelcentral/graduation/information/applying-for-degree) forms.

**Certificate Level:** Graduate  
**Admission Requirements:** Master's degree  
**Certificate Type:** Graduate Certificate  
**Number of Credits to Completion:** 9.0  
**Instructional Delivery:** Online  
**Calendar Type:** Quarter  
**Expected Time to Completion:** 3 years  
**Financial Aid Eligibility:** Not aid eligible  
**Classification of Instructional Program (CIP) Code:** 51.2706  
**Standard Occupational Classification (SOC) Code:** 15-1111

### Certificate in Healthcare Informatics

This online certificate program is designed for working professionals who want to increase their knowledge of how health information technology can be deployed to improve health outcomes. Clinicians and information professionals gain a broad knowledge of contemporary health informatics, and the complex social and organizational issues surrounding this major change in healthcare. Students also acquire skills in planning and evaluation.

Graduates of the program may advance their careers in health IT-related responsibilities or explore new opportunities in this growing field. Students enrolled in any master's program in the College of Computing & Informatics may also complete the certificate in healthcare informatics.

#### Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 648</td>
<td>Healthcare Informatics</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 731</td>
<td>Organization &amp; Social Issues in Healthcare Informatics</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 732</td>
<td>Healthcare Informatics: Planning &amp; Evaluation</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits**  
9.0

### Additional Information

For additional information about this program, visit the Certificate in Healthcare Informatics (http://www.drexel.com/online-degrees/information-sciences-degrees/cert-hci) page at Drexel University Online.

### Facilities

**Drexel University Libraries**

Drexel University Libraries (http://www.library.drexel.edu) is a learning enterprise, advancing the University's academic mission through serving as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, systems engineering, health informatics, information systems,
and technology. Resources are available online at library.drexel.edu or in-person at W. W. Hagerty Library (http://www.library.drexel.edu/about/w-w-hagerty).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

**iCommons**

Located in Room 106 of the Rush Building, the College's iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42" display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as "DreamSpark" which allows students free access to a wide array of Microsoft software titles and operating systems.

CCI students can access Drexel's mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University's network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

**Rush Building**

The Rush Building houses on campus classes, CCI administrative offices (academic advising, admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

In 2013, CCI redesigned its Information Technology Laboratory, located in the Rush Building, in support of the undergraduate degree program in information technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports.

In addition a special system has been built into the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

**Cyber Learning Center**

The Cyber Learning Center, located in University Crossings, provides consulting and other learning resources for students taking computer science classes. It is staffed by graduate and undergraduate computer science students in the College of Computing & Informatics.

**Research Laboratories**

The College houses multiple research labs, led by CCI faculty, across Drexel's main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GiCL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College's research web page.

**Alumni Garden**

The Rush Building’s Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx) may be reserved for Drexel events.

**University Crossings**

CCI also has on campus classrooms, administrative offices and faculty offices at University Crossings 100, located at the corner of JFK and Market Streets. The building houses a student computer lab (featuring workstations and laptop plug-in stations, arranged in pods, to encourage collaboration among CCI students), as well as several classrooms with video-conference enabled technology and media projection capabilities. Its Cyber Learning Center provides consulting and other learning resources for students taking computer science classes within the College. University Crossings is also home to several of the College's research groups and laboratories (http://cci.drexel.edu/research).

**3401 Market Street**

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such as the Applied Informatics Group (http://cci.drexel.edu/about/our-facilities/other-cci-facilities.aspx), and University initiatives such as the Drexel University Cybersecurity Institute (http://cci.drexel.edu/cybersecurity). The Institute’s newly opened Auerbach and Berger Families Cybersecurity Laboratory serves as University’s first training facility dedicated to identifying challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

**One Drexel Plaza**

One Drexel Plaza at 30th and Market Streets houses CCI faculty offices and on campus classes via the Computing & Security Technology program.
Health Informatics Faculty

Larry Alexander, PhD (http://drexel.edu/cci/contact/Faculty/Alexander-Larry) (University of Pennsylvania) Research Professor & Interim Senior Associate Dean for CCI Research and Scholarly Activities. Large scale modeling and simulation, pattern recognition, future of information technology

Yuan An, PhD (http://drexel.edu/cci/contact/Faculty/An-Yuan) (University of Toronto, Canada) Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web

Marcello Balduccini, PhD (http://drexel.edu/cci/contact/Faculty/Balduccini-Marcello) (Texas Tech University) Senior Research Scientist, Assistant Research Professor, Applied Informatics Group. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

Ellen Bass, PhD (http://drexel.edu/cci/contact/Faculty/Bass-Ellen) (Georgia Institute of Technology) Professor (Joint Appointment with the College of Nursing and Health Professions). Human-centered systems engineering research and design, biomedical informatics, healthcare, quantitative modeling, human-automation interaction, computational modeling

Jennifer Booker, PhD (http://drexel.edu/cci/contact/Faculty/Booker-Jennifer) (Drexel University) Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems

David Breen, PhD (http://drexel.edu/cci/contact/Faculty/Breen-David) (Rensselaer Polytechnic Institute) Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Chaomei Chen, PhD (http://drexel.edu/cci/contact/Faculty/Chen-Chaomei) (University of Liverpool) Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction

Prudence W. Dalyrymple, PhD (http://drexel.edu/cci/contact/Faculty/Dalyrymple-Prudence) (University of Wisconsin-Madison) Director, Institute for Healthcare Informatics, Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice

M. Carl Drott, PhD (http://drexel.edu/cci/contact/Faculty/Drott-Carl) (University of Michigan) Associate Professor. Systems analysis techniques, Web usage, competitive intelligence

Andrea Forte, PhD (http://drexel.edu/cci/contact/Faculty/Forte-Andrea) (Georgia Institute of Technology) Assistant Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy

Susan Gasson, PhD (http://drexel.edu/cci/contact/Faculty/Gasson-Susan) (University of Warwick) Associate Professor. The co-design of business and IT-systems, distributed cognition & knowledge management in boundary-spanning groups, human-centered design, social informatics, online learning communities, Grounded Theory

Jane Greenberg, PhD (http://drexel.edu/cci/contact/Faculty/Greenberg-Jan) (University of Pittsburgh) Alice B. Kroeger Professor. Metadata, ontological engineering, data science, knowledge organization, information retrieval

Peter Grillo, PhD (http://drexel.edu/cci/contact/Faculty/Grillo-Peter) (Temple University) Associate Teaching Professor. Strategic applications of technology within organizations

Tony H. Grubesic, PhD (http://drexel.edu/cci/contact/Faculty/Grubesic-Tony) (The Ohio State University) Professor (Joint appointment in the Department of Culture & Communication with the College of Arts and Sciences). Geographic information science, spatial analysis, development, telecommunication policy, location modeling

Xiaohua Tony Hu, PhD (http://drexel.edu/cci/contact/Faculty/Hu-Xiaohua-Tony) (University of Regina, Canada) Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics

Michael Khoo, PhD (http://drexel.edu/cci/contact/Faculty/Khoo-Michael) (University of Colorado at Boulder) Assistant Professor. The understandings and practices that users bring to their interactions with information systems, with a focus on the evaluation of digital libraries and educational technologies

Xia Lin, PhD (http://drexel.edu/cci/contact/Faculty/Lin-Xia) (University of Maryland) Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments

Alan T. Murray, PhD (http://drexel.edu/cci/contact/Faculty/Murray-Alan) (University of California, Santa Barbara) Professor. Geographic information science, urban, regional and natural resource planning; location modeling, spatial decision support systems, land use decision making

William Regli, PhD (http://drexel.edu/cci/contact/Faculty/Regli-William) (University of Maryland at College Park) Professor. Artificial intelligence, computer graphics, engineering design and Internet computing

Lorraine Richards, PhD (http://drexel.edu/cci/contact/Faculty/Richards-Lorraine) (University of North Carolina) Assistant Professor. Archives, digital curation, electronic records management, information technology and digital collections, cloud computing and record keeping, management of information organizations

Michelle L. Rogers, PhD (http://drexel.edu/cci/contact/Faculty/Rogers-Michelle) (University of Wisconsin-Madison) Associate Professor. Human-computer interaction, healthcare informatics, human factors engineering, socio-technical systems, health services research, patient safety

Erin Solovey, PhD (http://drexel.edu/cci/contact/Faculty/Solovey-Erin) (Tufts University) Assistant Professor. Human-computer interaction, brain-computer interfaces, tangible interaction, machine learning, human interaction with complex and autonomous systems

Il-Yeol Song, PhD (http://drexel.edu/cci/contact/Faculty/Song-II-Yeol) (Louisiana State University) PhD Program Director, Professor. Conceptual modeling, ontology and patterns, data warehouse and OLAP, object-oriented analysis and design with UML, medical and bioinformatics data modeling & integration
Julia Stoyanovich, PhD (http://drexel.edu/cci/contact/Faculty/Stoyanovich-Julia) (Columbia University) Assistant Professor. Data and knowledge management, software development, database management, data-intensive workflow, social context search and ranking, information discovery

Rosina Weber, PhD (http://drexel.edu/cci/contact/Faculty/Weber-Rosina) (Federal University of Santa Catarina) Associate Professor. Knowledge-based systems; case-based reasoning; textual case-based reasoning; computational intelligence; knowledge discovery; uncertainty, mainly targeting knowledge management goals in different domains, e.g., software engineering, military, finance, law, bioinformatics and health sciences

Erija Yan, PhD (http://drexel.edu/cci/contact/Faculty/Yan-Erijia) (Indiana University) Assistant Professor. Network Science, Information Analysis and Retrieval, Scholarly Communication Methods and Applications

Christopher C. Yang, PhD (http://drexel.edu/cci/contact/Faculty/Yang-Christopher) (University of Arizona, Tucson) Associate Professor. Web search and mining, security informatics, social media analytics, knowledge management, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, artificial intelligence, digital library and electronic commerce

**Information Systems**

*Major: Information Systems*

*Degree Awarded: Master of Science (MS)*

*Calendar Type: Quarter*

*Total Credit Hours: 45.0*

*Classification of Instructional Programs (CIP) code: 11.0401*

*Standard Occupational Classification (SOC) code: 11-3021*

**About the Program**

The College of Computing & Informatics’ Master of Science in Information Systems (MSIS) prepares students for both the technical and real-world aspects of creating and managing an information system. The program, which is offered both online and on campus, part-time and full-time, focuses on a systems engineering approach, evaluating client needs and technological advances in order to create solutions that take into account the latest advances and theories in the field.

**Learning Objectives**

Graduates of the MS in Information Systems program are prepared to assume leadership and management positions designing, developing, and delivering innovative technological solutions to information problems in a variety of contexts. Their preparation encompasses the knowledge and abilities required to:

- Use a human-centered approach to analyze information needs and design solutions to meet those needs.
- Lead or contribute substantially to a team in developing information technology products and services.
- Evaluate, compare, and select from alternative and emerging information technologies.
- Communicate with technical and non-technical audiences about information technology concepts and stakeholder needs.
- Contribute substantially to an information technology plan for an organization.
- Explain information technology uses, benefits, and ethical and global issues for individuals and organizations.

**Additional Information**

For more information about this program, visit the College of Computing & Informatics’ MS in Information Systems (http://drexel.edu/cci/programs/graduate-programs/ms-in-information-systems) web page.

**Degree Requirements**

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 530</td>
<td>Foundations of Information Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 532</td>
<td>Software Development</td>
<td>3.0</td>
</tr>
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<td>Introduction to Database Management</td>
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</tr>
<tr>
<td>INFO 638</td>
<td>Software Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 646</td>
<td>Information Systems Management</td>
<td>3.0</td>
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</tbody>
</table>

**Distribution Requirements**

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<tr>
<td>INFO 540 Perspectives on Information Systems</td>
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</tr>
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<td>3.0</td>
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<tr>
<td>INFO 616 Social and Collaborative Computing</td>
<td>3.0</td>
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<tr>
<td>INFO 617 Introduction to System Dynamics</td>
<td>3.0</td>
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<tr>
<td>INFO 622 Content Representation</td>
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<tr>
<td>INFO 626 Language Processing</td>
<td>3.0</td>
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<tr>
<td>INFO 627 Requirements Engineering and Management</td>
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<tr>
<td>INFO 628 Information Systems Implementation</td>
<td>3.0</td>
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<tr>
<td>INFO 629 Concepts in Artificial Intelligence</td>
<td>3.0</td>
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<tr>
<td>INFO 631 Information Technology Integration</td>
<td>3.0</td>
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<tr>
<td>INFO 633 Information Visualization</td>
<td>3.0</td>
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<tr>
<td>INFO 634 Data Mining</td>
<td>3.0</td>
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<tr>
<td>INFO 636 Software Engineering Process I</td>
<td>3.0</td>
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<tr>
<td>INFO 637 Software Engineering Process II</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 648 Healthcare Informatics</td>
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<tr>
<td>INFO 653 Digital Libraries</td>
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<tr>
<td>INFO 655 Intro to Web Programming</td>
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<tr>
<td>INFO 657 Digital Library Technologies</td>
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<tr>
<td>INFO 658 Information Architecture</td>
<td>3.0</td>
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<tr>
<td>INFO 710 Information Forensics</td>
<td>3.0</td>
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<tr>
<td>INFO 712 Information Assurance</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 714 Information Systems Auditing</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Courses in the distribution course set that students do not take to meet the distribution requirement may be taken as free electives. All other masters-level INFO courses may be taken as free electives. MSIS students may not take courses designated as doctoral-level courses.

**Dual MSIS and MSLIS Option** ([https://nextcatalog.drexel.edu/graduate/collegeofinformationscienceandtechnology/informationsystems](https://nextcatalog.drexel.edu/graduate/collegeofinformationscienceandtechnology/informationsystems))

*63.0 quarter credits*

**About the Program**

The dual master's degree program, consisting of a Master of Science in Library and Information Science MSLIS and a Master of Science in Information Systems (MSIS), combines the Library and Information Science program focus on selecting, organizing, managing and accessing information resources to meet user information needs with the MS in Information System program skills in creating and managing the databases, interfaces, and information systems that connect users with the information they are seeking. Graduate students already enrolled in a master's degree program at Drexel have the opportunity, through the dual master's program to work simultaneously on two master's degrees and to receive both upon graduation. To be eligible, graduate students must be currently working on their first degree when requesting admission to the second.

**Learning Objectives**

Graduates of the dual program are prepared to assume leadership and management positions designing, developing, and delivering innovative technological solutions to information problems in a variety of contexts; evaluating information services and products; and managing organizations that facilitate access to recorded knowledge. Students who pursue this path greatly increase their ability to compete in today's cutting-edge information marketplace, where the importance of digitized information resources and the needs of organizations and companies to provide networked access to these resources via intranet gateways and knowledge management systems is steadily increasing. Their preparation encompasses the knowledge and abilities required to:

- Explain the foundational principles, professional ethics and values, and social context within which various information professionals work.
- Design and deliver library and information services and/or products using appropriate resources in libraries, archives and/or other information organizations.
- Analyze the structure, description, and bibliographic control of literatures.
- Develop appropriate information-seeking strategies to select information resources for given audiences.
- Use a human-centered approach to analyze information needs and design solutions to meet those needs.
- Lead or contribute substantially to a team in developing information technology products and services.
- Evaluate, compare, and select from alternative and emerging information technologies.
- Communicate with technical and non-technical audiences about information technology concepts and stakeholder needs.
- Contribute substantially to an information technology plan for an organization.
- Explain information technology uses, benefits, and ethical and global issues for individuals and organizations.
- Retrieve information in various formats and from various technologies/platforms.
- Communicate knowledge and skills related to accessing, evaluating and using information, information resources and/or information technology.
- Manage information organizations using appropriate strategies and approaches.
- Explain information technology uses, benefits, and ethical and global issues for individuals and organizations.

**Required Courses**

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<tr>
<td><strong>MS(LIS) Required Courses</strong></td>
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</tr>
<tr>
<td>INFO 515</td>
<td>Introduction to Research in Information Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 520</td>
<td>Social Context of Information Professions</td>
<td>3.0</td>
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<td>INFO 522</td>
<td>Information Access &amp; Resources</td>
<td>3.0</td>
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<td>INFO 521</td>
<td>Information Users and Services</td>
<td>3.0</td>
</tr>
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<td>INFO 640</td>
<td>Managing Information Organizations</td>
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**Distribution Requirements**

Completion of at least four of the following courses is required for the degree. Additional courses from this list may be taken as electives.

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</table>
There is a fully equipped conference room for student use with a 42" television screen and multiple audio-visual presentation equipment. The room is also equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming, and database-related projects.

The Cyber Learning Center, located in University Crossings, provides consulting and other learning resources for students taking computer science classes. It is staffed by graduate and undergraduate computer science students in the College of Computing & Informatics.

Research Laboratories

The College houses multiple research labs, led by CCI faculty, across Drexel’s main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GICL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Laboratory, and more.

**Facilities**

**Drexel University Libraries**

Drexel University Libraries (http://www.library.drexel.edu) is a learning enterprise, advancing the University’s academic mission through serving as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, systems engineering, health informatics, information systems, and technology. Resources are available online at library.drexel.edu or in-person at W. W. Hagerty Library (http://www.library.drexel.edu/about/w-w-hagerty).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

**iCommons**

Located in Room 106 of the Rush Building, the College’s iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42" television screen and multiple audio-visual presentation equipment. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as “DreamSpark” which allows students free access to a wide array of Microsoft software titles and operating systems.

CCI students can access Drexel’s mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University’s network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

**Rush Building**

The Rush Building houses on campus classes, CCI administrative offices (academic advising, admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

In 2013, CCI redesigned its Information Technology Laboratory, located in the Rush Building, in support of the undergraduate degree program in information technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports. In addition a special system has been built into the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

**Cyber Learning Center**

The Cyber Learning Center, located in University Crossings, provides consulting and other learning resources for students taking computer science classes. It is staffed by graduate and undergraduate computer science students in the College of Computing & Informatics.
Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College’s research web page.

Alumni Garden

The Rush Building’s Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx) may be reserved for Drexel events.

University Crossings

CCI also has on campus classrooms, administrative offices and faculty offices at University Crossings 100, located at the corner of JFK and Market Streets. The building houses a student computer lab (featuring workstations and laptop plug-in stations, arranged in pods, to encourage collaboration among CCI students), as well as several classrooms with video-conference enabled technology and media projection capabilities. Its Cyber Learning Center provides consulting and other learning resources for students taking computer science classes within the College. University Crossings is also home to several of the College’s research groups and laboratories (http://cci.drexel.edu/research).

3401 Market Street

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such as the Applied Informatics Group (http://cci.drexel.edu/about/our-facilities/other-cci-facilities.aspx), and University initiatives such as the Drexel University Cybersecurity Institute (http://cci.drexel.edu/cybersecurity). The Institute’s newly opened Auerbach and Berger Families Cybersecurity Laboratory serves as University’s first training facility dedicated to identifying challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

One Drexel Plaza

One Drexel Plaza at 30th and Market Streets houses CCI faculty offices and on campus classes via the Computing & Security Technology program.

Information Systems Faculty

Larry Alexander, PhD (http://drexel.edu/cci/contact/Faculty/Alexander-Larry) (University of Pennsylvania) Research Professor & Interim Senior Associate Dean for CCI Research and Scholarly Activities. Large scale modeling and simulation, pattern recognition, future of information technology

Yuan An, PhD (http://drexel.edu/cci/contact/Faculty/An-Yuan) (University of Toronto, Canada) Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web

Marcello Balduccini, PhD (http://drexel.edu/cci/contact/Faculty/Balduccini-Marcello) (Texas Tech University) Senior Research Scientist, Assistant Research Professor, Applied Informatics Group. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

Ellen Bass, PhD (http://drexel.edu/cci/contact/Faculty/Bass-Ellen) (Georgia Institute of Technology) Professor (Joint Appointment with the College of Nursing and Health Professions). Human-centered systems engineering research and design, biomedical informatics, healthcare, quantitative modeling, human-automation interaction, computational modeling

Jennifer Booker, PhD (http://drexel.edu/cci/contact/Faculty/Booker-Jennifer) (Drexel University) Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems

David Breen, PhD (http://drexel.edu/cci/contact/Faculty/Breen-David) (Rensselaer Polytechnic Institute) Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Yuanfang Cai, PhD (http://drexel.edu/cci/contact/Faculty/Cai-Yuanfang) (University of Virginia) Associate Professor. Formal software design modeling and analysis, software economics, software evolution and modularity

Bruce Char, PhD (http://drexel.edu/cci/contact/Faculty/Char-Bruce) (University of California, Berkeley) Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments, parallel and distributed computation

Chaomei Chen, PhD (http://drexel.edu/cci/contact/Faculty/Chen-Chaomei) (University of Liverpool) Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction

Prudence W. Dairymple, PhD (http://drexel.edu/cci/contact/Faculty/Dairymple-Prudence) (University of Wisconsin-Madison) Director, Institute for Healthcare Informatics, Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice

M. Carl Drott, PhD (http://drexel.edu/cci/contact/Faculty/Drott-Carl) (University of Michigan) Associate Professor. Systems analysis techniques, Web usage, competitive intelligence

Andrea Forte, PhD (http://drexel.edu/cci/contact/Faculty/Forte-Andrea) (Georgia Institute of Technology) Assistant Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy

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Tony H. Grubesci, PhD (http://drexel.edu/cci/contact/Faculty/Grubesci-Tony) (The Ohio State University) Professor (Joint appointment in
the Department of Culture & Communication with the College of Arts and Sciences). Geographic information science, spatial analysis, development, telecommunication policy, location modeling

Xiaohua Tony Hu, PhD (http://drexel.edu/cci/contact/Faculty/Hu-Xiaohua-Tony) (University of Regina, Canada) Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics

Gregory W. Hislop, PhD (http://drexel.edu/cci/contact/Faculty/Hislop-Gregory) (Drexel University) Senior Associate Dean for Informatics and CCI Academic Affairs, Professor. Information technology for teaching and learning, online education, structure and organization of the information disciplines, computing education research, software evaluation and characterization

Jeremy Johnson, PhD (http://drexel.edu/cci/contact/Faculty/Johnson-Jeremy) (Ohio State University) Professor. Computer algebra, parallel computations, algebraic algorithms, scientific computing

Michael Khoo, PhD (http://drexel.edu/cci/contact/Faculty/Khoo-Michael) (University of Colorado at Boulder) Assistant Professor. The understandings and practices that users bring to their interactions with information systems, with a focus on the evaluation of digital libraries and educational technologies

Xia Lin, PhD (http://drexel.edu/cci/contact/Faculty/Lin-Xia) (University of Maryland) Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments

Spiros Mancoridis, PhD (http://drexel.edu/cci/contact/Faculty/M ancoridis-Spiros) (University of Toronto) Senior Associate Dean of Computing & Academic Affairs, Professor. Software engineering, software security, code analysis, evolutionary computation

Alan T. Murray, PhD (http://drexel.edu/cci/contact/Faculty/Murray-Alan) (University of California, Santa Barbara) Professor. Geographic information science, urban, regional and natural resource planning; location modeling, spatial decision support systems, land use decision making

William Regli, PhD (http://drexel.edu/cci/contact/Faculty/Regli-William) (University of Maryland at College Park) Professor. Artificial intelligence, computer graphics, engineering design and Internet computing

Lorraine Richards, PhD (http://drexel.edu/cci/contact/Faculty/Richards-Lorraine) (University of North Carolina) Assistant Professor. Archives, digital curation, electronic records management, information technology and digital collections, cloud computing and record keeping, management of information organizations

Michelle L. Rogers, PhD (http://drexel.edu/cci/contact/Faculty/Rogers-Michelle) (University of Wisconsin-Madison) Associate Professor. Human-computer interaction, healthcare informatics, human factors engineering, socio-technical systems, health services research, patient safety

Kurt Schmidt, MS (http://drexel.edu/cci/contact/Faculty/Schmidt-Kurt) (Drexel University) Associate Teaching Professor. Data structures, math foundation for computer science, programming tools, programming languages

Erin Solovey, PhD (http://drexel.edu/cci/contact/Faculty/Solovey-Erin) (Tufts University) Assistant Professor. Human-computer interaction, brain-computer interfaces, tangible interaction, machine learning, human interaction with complex and autonomous systems

Il-Yeol Song, PhD (http://drexel.edu/cci/contact/Faculty/Song-Ilyeol) (Louisiana State University) PhD Program Director, Professor. Conceptual modeling, ontology and patterns, data warehouse and OLAP, object-oriented analysis and design with UML, medical and bioinformatics data modeling & integration

Julia Stoyanovich, PhD (http://drexel.edu/cci/contact/Faculty/Stoyanovich-Julia) (Columbia University) Assistant Professor. Data and knowledge management, software development, database management, data-intensive workflow, social context search and ranking, information discovery

Brian Stuart, PhD (http://drexel.edu/cci/contact/Faculty/Stuart-Brian) (Purdue University) Associate Teaching Professor. Machine learning, networking, robotics, image processing, simulation, interpreters, data storage, operating systems, computer science, data communications, distributed/operating systems, accelerated computer programming, computer graphics

Filippos Vokolos, PhD (http://drexel.edu/cci/contact/Faculty/Vokolos-Filippos) (Polytechnic University) Associate Teaching Professor. System architecture, principles of software design and construction, verification and validation methods for the development of large software systems, foundations of software engineering, software verification & validation, software design, programming languages, dependable software systems

Rosina Weber, PhD (http://drexel.edu/cci/contact/Faculty/Weber-Rosina) (Federal University of Santa Catarina) Associate Professor. Knowledge-based systems; case-based reasoning; textual case-based reasoning; computational intelligence; knowledge discovery; uncertainty, mainly targeting knowledge management goals in different domains, e.g., software engineering, military, finance, law, bioinformatics and health sciences

Erija Yan, PhD (http://drexel.edu/cci/contact/Faculty/Yan-Erija) (Indiana University) Assistant Professor. Network Science, Information Analysis and Retrieval, Scholarly Communication Methods and Applications

Christopher C. Yang, PhD (http://drexel.edu/cci/contact/Faculty/Yang-Christopher) (University of Arizona, Tucson) Associate Professor. Web search and mining, security informatics, social media analytics, knowledge management, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, artificial intelligence, digital library and electronic commerce

Library and Information Science

Major: Library and Information Science
Degree Awarded: Master of Science in Library and Information Science (MSLIS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 25.0101
Standard Occupational Classification (SOC) code: 25-4021

About the Program

NOTE: Effective Fall 2015, students are no longer being accepted into the School Library Media Concentration.
The College of Computing & Informatics’ Master of Science in Library and Information Science (MSLIS) provides students with a foundation in a wide variety of information professions. The program addresses the contexts in which librarians and other information professionals work, the systems and services they provide, and the uses of new and emerging technologies in the field.

**Learning Objectives**

Graduates of the MSLIS program are prepared to assume leadership positions in designing, executing, and evaluating information services and products and in managing organizations that facilitate access to recorded knowledge. Their preparation enables them to gain the knowledge and abilities required to:

- Explain the foundational principles, professional ethics and values, and social context within which various information professionals work.
- Design and deliver library and information services and/or products using appropriate resources in libraries, archives and/or other information organizations.
- Analyze the structure, description, and bibliographic control of literatures.
- Develop appropriate information-seeking strategies to select information resources for given audiences.
- Retrieve information in various formats and from various technologies/platforms.
- Communicate knowledge and skills related to accessing, evaluating and using information, information resources and/or information technology.
- Manage information organizations using appropriate strategies and approaches.

**Accreditation**

The College of Computing & Informatics is a member of the Association for Library and Information Science Education, and its MS program in Library and Information Science is accredited by the American Library Association.

**Professional Affiliation for MS Students**

Student groups include student chapters of the American Library Association, the Association for Information Science & Technology, the Progressive Librarians Guild, the Society of American Archivists, and the Special Libraries Association.

**Additional Information**

For more information about this program, visit the College of Computing & Informatics’ MS in Library and Information Science (http://drexel.edu/cci/programs/graduate-programs/ms-in-library-and-information-science) web page.

**Degree Requirements**

The library and information science program assures students of a solid introduction to the field, a logical progression of coursework, and a wide variety of electives. All students are required to complete the six core courses, totaling 18.0 credits. Completion of the MSLIS program requires a total of 45.0 credits. Students may take any available INFO subject electives to complete their required number of credits in the program.

Students may declare a concentration in one of six areas: archival studies, competitive intelligence and knowledge management, digital curation, digital libraries, library and information services, school library media* and youth services. These concentrations are optional and will appear on the student’s transcript. Except for the school library media concentration, the concentrations consist of 5 courses, 3-4 required and 1-2 chosen from a limited list of courses relevant to the topic area. The remaining 12.0 credits are free electives, in which students can elect to take any other INFO courses that have not been taken as a concentration elective course.

In exceptional cases, a student with previous coursework in an ALA-accredited program or in an information science program may petition for exemption from one to three required courses. This petition should be made at the time of application to the College and should include both a detailed statement of the reasons for seeking exemption and a copy of the official transcript, including course descriptions.

*NOTE: Effective Fall 2015, students are no longer being accepted into the School Library Media Concentration.

**Concentrations**

**Archival Studies**

The concentration in archival studies focuses on the practice and theory of managing collections of records and papers in a variety of archival settings, including governmental agencies, libraries, historical societies, corporations, not-for-profit organizations, museums, and religious institutions. The course content within this concentration provides the educational component required for post-graduate certification by the Academy of Certified Archivists. This concentration may also be of interest to students planning careers in academic and special libraries.

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 560</td>
<td>Introduction to Archives I</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 561</td>
<td>Introduction to Archives II</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 750</td>
<td>Archival Access Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>Select two of the following courses:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>INFO 751</td>
<td>Archival Appraisal</td>
<td></td>
</tr>
<tr>
<td>INFO 755</td>
<td>Electronic Records Management</td>
<td></td>
</tr>
<tr>
<td>INFO 756</td>
<td>Digital Preservation</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits**

15.0

**Competitive Intelligence and Knowledge Management**

This concentration focuses on information needs and knowledge management in special library, corporate, and other organizational settings.
Required Courses

- INFO 643 Information Services In Organizations 3.0
- INFO 644 Knowledge Assets Management in Organizations 3.0
- INFO 678 Competitive Intelligence 3.0

CI & KM Concentration Electives

Select two of the following courses: 6.0

- INFO 605 Introduction to Database Management
- INFO 677 Resources in Business
- INFO 680 US Government Information
- INFO 681 Legal Research
- INFO 755 Electronic Records Management

Total Credits 15.0

Digital Curation

Digital Curation focuses on the active management and preservation of digital resources throughout the lifecycle, supporting the needs of current and future researchers. The rapid expansion of digital information in all disciplines has created a growing need for information professionals who can plan and implement projects to create, select, maintain, preserve, provide access, and add value to digital resources in a variety of institutional settings.

This concentration meets the needs of students planning careers in a wide range of settings and complements the concentrations in Digital Libraries and Archival Studies. The concentration addresses the growing importance of digital information in all environments.

Core Required Courses

- INFO 560 Introduction to Archives I 3.0
- INFO 753 Introduction to Digital Curation 3.0
- INFO 756 Digital Preservation 3.0

Select one from the following (Technology courses): 3.0

- INFO 605 Introduction to Database Management
- INFO 633 Information Visualization
- INFO 653 Digital Libraries
- INFO 658 Information Architecture
- INFO 755 Electronic Records Management

Select one from the following (Content add-value courses): 3.0

- INFO 555 Introduction to Geographic Information Systems
- INFO 622 Content Representation
- INFO 661 Cataloging Special Materials
- INFO 662 Metadata and Resource Description

Total Credits 15.0

Digital Libraries

This concentration covers a range of topics in digital resources, collections and services. It can serve as a bridging concentration accessible to MSIS students; several courses are part of the MSIS curriculum.

Required Courses

- INFO 552 Introduction to Web Design for Information Organizations 3.0
- INFO 653 Digital Libraries 3.0
- INFO 657 Digital Library Technologies 3.0

Select two of the following courses: 6.0

- INFO 555 Introduction to Geographic Information Systems
- INFO 605 Introduction to Database Management
- INFO 608 Human-Computer Interaction
- INFO 622 Content Representation
- INFO 624 Information Retrieval Systems
- INFO 633 Information Visualization
- INFO 658 Information Architecture
- INFO 740 Digital Reference Services
- INFO 753 Introduction to Digital Curation
- INFO 755 Electronic Records Management
- INFO 756 Digital Preservation

Total Credits 15.0

Library and Information Services

This is a generalist concentration that includes key professional skills and an orientation to both a work setting and a relevant elective.

Required Courses

- INFO 552 Introduction to Web Design for Information Organizations 3.0
- INFO 660 Cataloging and Classification 3.0
- INFO 665 Collection Management 3.0

Library and Information Services Concentration electives 6.0

Students select one Work Setting course (and) either one Public Services course (or) one Technical Services course

Work Settings

- INFO 650 Public Library Service
- INFO 651 Academic Library Service
- INFO 745 Special Libraries and Information Centers

Public Services

- INFO 649 Library Programming
- INFO 682 Storytelling
- INFO 740 Digital Reference Services

Technical Services

- INFO 622 Content Representation
- INFO 662 Metadata and Resource Description
- INFO 663 Library Technical Services
- INFO 664 Library Automation

Total Credits 15.0

School Library Media (SLiM)

The School Library Media concentration is designed for students who wish to work in K-12 school library programs in both public and private schools. Designed to prepare graduates to be eligible for certification as school librarians by the Pennsylvania Department of Education (PDE), the program meets the requirements of the State of Pennsylvania and
provides a strong basis for seeking certification in other states as well. In most instances, students will be required to complete a supervised field study to be eligible for certification.

Three course sequences are available within the concentration: one for students who have no prior teaching certification from PDE; one for students who have had prior teaching certification from PDE and wish to add school librarian certification to their credentials; and one for students with ALA-accredited master's degrees who wish to seek school librarian certification from PDE.

A grade of B or higher in each course is required to maintain eligibility for PDE Certification. For PDE Certification, students also submit relevant PRAXIS scores to the University. All courses in the School Library Media concentration, with the exception of INFO 891 and INFO 892, are offered online; INFO 891 and INFO 892 include both field experience and an online component. Sites may be arranged across the United States.

Students seeking certification outside of Pennsylvania should check on requirements in their own jurisdictions. Only students (1) who hold current certification as teachers from the Pennsylvania Department of Education (POE) or (2) who earn PDE Certification as part of the Drexel program can be formally endorsed by the University as completers of Drexel's state approved program.

For full course sequences, visit http://drexel.edu/~media/ccis/cslis_handbookv4.ashx?la=en

### School Library Media (SLiM) concentration (For students without PDE certification or other teaching certification)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 515</td>
<td>Introduction to Research in Information Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 520</td>
<td>Social Context of Information Professions</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 521</td>
<td>Information Users and Services</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 522</td>
<td>Information Access &amp; Resources</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 525</td>
<td>School Library Programs &amp; Services</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 530</td>
<td>Foundations of Information Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 552</td>
<td>Introduction to Web Design for Information Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 640</td>
<td>Managing Information Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 660</td>
<td>Cataloging and Classification</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 665</td>
<td>Collection Management</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 683</td>
<td>Resources for Children</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 684</td>
<td>Resources for Young Adults</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 688</td>
<td>Instructional Role for the Information Specialist</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 891</td>
<td>Twelve-Week School Library and Media Center Field Study</td>
<td>6.0</td>
</tr>
<tr>
<td>EDEX 542</td>
<td>Fundamentals of Special Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 544</td>
<td>The Inclusive Classroom</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 546</td>
<td>Literacy and Content Skill Development PreK-8</td>
<td>3.0</td>
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<tr>
<td>or EDEX 566</td>
<td>Literacy and Content Skill Development 7-12</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 565</td>
<td>Foundations in Instructing English Language Learners</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 515</td>
<td>Adolescent Learners in Secondary Schools</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits** 60.0

### School Library Media (SLiM) concentration (For students who already have PDE certification or other teaching certification)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 515</td>
<td>Introduction to Research in Information Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 520</td>
<td>Social Context of Information Professions</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 521</td>
<td>Information Users and Services</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 522</td>
<td>Information Access &amp; Resources</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 525</td>
<td>School Library Programs &amp; Services</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 530</td>
<td>Foundations of Information Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 552</td>
<td>Introduction to Web Design for Information Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 640</td>
<td>Managing Information Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 660</td>
<td>Cataloging and Classification</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 665</td>
<td>Collection Management</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 683</td>
<td>Resources for Children</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 684</td>
<td>Resources for Young Adults</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 688</td>
<td>Instructional Role for the Information Specialist</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 892</td>
<td>Six-Week School Library and Media Center Field Study</td>
<td>3.0</td>
</tr>
<tr>
<td>Free elective</td>
<td></td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits** 15.0

### Dual MSIS and MSLIS Option

(http://catalog.drexel.edu/graduate/collegeofinformationscienceandtechnology/informationsystems)

63.0 quarter credits

### About the Program

The dual master's degree program, consisting of a Master of Science in Library and Information Science MSLIS and a Master of Science in Information Systems (MSIS), combines the Library and Information Science program focus on selecting, organizing, managing and accessing information resources to meet user information needs with the MS in Information System program skills in creating and managing the databases, interfaces, and information systems that connect users with the information they are seeking. Graduate students already enrolled in a master's degree program at Drexel have the opportunity, through the dual master's program to work simultaneously on two master's degrees and to receive both upon graduation. To be eligible, graduate students must be
currently working on their first degree when requesting admission to the second.

**Learning Objectives**

Graduates of the dual program are prepared to assume leadership and management positions designing, developing, and delivering innovative technological solutions to information problems in a variety of contexts; evaluating information services and products; and managing organizations that facilitate access to recorded knowledge. Students who pursue this path greatly increase their ability to compete in today's cutting-edge information marketplace, where the importance of digitized information resources and the needs of organizations and companies to provide networked access to these resources via intranet gateways and knowledge management systems is steadily increasing. Their preparation encompasses the knowledge and abilities required to:

- Explain the foundational principles, professional ethics and values, and social context within which various information professionals work.
- Design and deliver library and information services and/or products using appropriate resources in libraries, archives and/or other information organizations.
- Analyze the structure, description, and bibliographic control of literatures.
- Develop appropriate information-seeking strategies to select information resources for given audiences.
- Retrieve information in various formats and from various technologies/platforms.
- Communicate knowledge and skills related to accessing, evaluating and using information, information resources and/or information technology.
- Manage information organizations using appropriate strategies and approaches.
- Use a human-centered approach to analyze information needs and design solutions to meet those needs.
- Lead or contribute substantially to a team in developing information technology products and services.
- Evaluate, compare, and select from alternative and emerging information technologies.
- Communicate with technical and non-technical audiences about information technology concepts and stakeholder needs.
- Contribute substantially to an information technology plan for an organization.
- Explain information technology uses, benefits, and ethical and global issues for individuals and organizations.

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 530</td>
<td>Foundations of Information Systems</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**MS(LIS) Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 515</td>
<td>Introduction to Research in Information Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 520</td>
<td>Social Context of Information Professions</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 522</td>
<td>Information Access &amp; Resources</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 521</td>
<td>Information Users and Services</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 640</td>
<td>Managing Information Organizations</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**MSIS Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 532</td>
<td>Software Development</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 605</td>
<td>Introduction to Database Management</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**INFO 608** Human-Computer Interaction 3.0
**INFO 614** Distributed Computing and Networking 3.0
**INFO 620** Information Systems Analysis and Design 3.0
**INFO 630** Evaluation of Information Systems 3.0
**INFO 638** Software Project Management 3.0
**INFO 646** Information Systems Management 3.0

**Distribution Requirements**

Completion of at least four of the following courses is required for the degree. Additional courses from this list may be taken as electives.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 540</td>
<td>Perspectives on Information Systems</td>
</tr>
<tr>
<td>INFO 606</td>
<td>Advanced Database Management</td>
</tr>
<tr>
<td>INFO 607</td>
<td>Applied Database Technologies</td>
</tr>
<tr>
<td>INFO 610</td>
<td>Analysis of Interactive Systems</td>
</tr>
<tr>
<td>INFO 611</td>
<td>Design of Interactive Systems</td>
</tr>
<tr>
<td>INFO 612</td>
<td>Knowledge Base Systems</td>
</tr>
<tr>
<td>INFO 613</td>
<td>XML and Databases</td>
</tr>
<tr>
<td>INFO 616</td>
<td>Social and Collaborative Computing</td>
</tr>
<tr>
<td>INFO 622</td>
<td>Content Representation</td>
</tr>
<tr>
<td>INFO 624</td>
<td>Information Retrieval Systems</td>
</tr>
<tr>
<td>INFO 625</td>
<td>Cognition and Information Retrieval</td>
</tr>
<tr>
<td>INFO 627</td>
<td>Requirements Engineering and Management</td>
</tr>
<tr>
<td>INFO 628</td>
<td>Information Systems Implementation</td>
</tr>
<tr>
<td>INFO 631</td>
<td>Information Technology Integration</td>
</tr>
<tr>
<td>INFO 633</td>
<td>Information Visualization</td>
</tr>
<tr>
<td>INFO 634</td>
<td>Data Mining</td>
</tr>
<tr>
<td>INFO 636</td>
<td>Software Engineering Process I</td>
</tr>
<tr>
<td>INFO 637</td>
<td>Software Engineering Process II</td>
</tr>
<tr>
<td>INFO 648</td>
<td>Healthcare Informatics</td>
</tr>
<tr>
<td>INFO 653</td>
<td>Digital Libraries</td>
</tr>
<tr>
<td>INFO 655</td>
<td>Intro to Web Programming</td>
</tr>
<tr>
<td>INFO 657</td>
<td>Digital Library Technologies</td>
</tr>
<tr>
<td>INFO 658</td>
<td>Information Architecture</td>
</tr>
<tr>
<td>INFO 710</td>
<td>Information Forensics</td>
</tr>
<tr>
<td>INFO 712</td>
<td>Information Assurance</td>
</tr>
<tr>
<td>INFO 714</td>
<td>Information Systems Auditing</td>
</tr>
<tr>
<td>INFO 731</td>
<td>Organization &amp; Social Issues in Healthcare Informatics</td>
</tr>
<tr>
<td>INFO 755</td>
<td>Electronic Records Management</td>
</tr>
<tr>
<td>INFO 782</td>
<td>Issues in Informatics</td>
</tr>
</tbody>
</table>

**Free Electives** 9.0

**Total Credits** 63.0

* Courses in the distribution course set that students do not take to meet the distribution requirement may be taken as free electives. All other master's level INFO courses may be taken as free electives. MS/MS(LIS) students may not take courses designated as doctoral level or courses INFO 861, INFO 863, or INFO 998.

**Facilities**

**Drexel University Libraries**

Drexel University Libraries (http://www.library.drexel.edu) is a learning enterprise, advancing the University’s academic mission through serving as educators, supporting education and research, collaborating with...
The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

**iCommons**

Located in Room 106 of the Rush Building, the College’s iCommons is an open lab and collaborative work environment for students. It features desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42” display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as “DreamSpark” which allows students free access to a wide array of Microsoft software titles and operating systems.

CCI students can access Drexel’s mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University’s network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

**Rush Building**

The Rush Building houses on campus classes, CCI administrative offices (academic advising, admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

In 2013, CCI redesigned its Information Technology Laboratory, located in the Rush Building, in support of the undergraduate degree program in information technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports. In addition a special system has been built into the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

**Cyber Learning Center**

The Cyber Learning Center, located in University Crossings, provides consulting and other learning resources for students taking computer science classes. It is staffed by graduate and undergraduate computer science students in the College of Computing & Informatics.

**Research Laboratories**

The College houses multiple research labs, led by CCI faculty, across Drexel’s main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Computing Laboratory (GiCL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College’s research web page.

**Alumni Garden**

The Rush Building’s Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx) may be reserved for Drexel events.

**University Crossings**

CCI also has on campus classrooms, administrative offices and faculty offices at University Crossings 100, located at the corner of JFK and Market Streets. The building houses a student computer lab (featuring workstations and laptop plug-in stations, arranged in pods, to encourage collaboration among CCI students), as well as several classrooms with video-conference enabled technology and media projection capabilities. Its Cyber Learning Center provides consulting and other learning resources for students taking computer science classes within the College. University Crossings is also home to several of the College’s research groups and laboratories (http://cci.drexel.edu/research).

**3401 Market Street**

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such as the Applied Informatics Group (http://cci.drexel.edu/about/our-facilities/other-cci-facilities.aspx), and University initiatives such as the Drexel University Cybersecurity Institute (http://cci.drexel.edu/cybersecurity). The Institute’s newly opened Auerbach and Berger Families Cybersecurity Laboratory serves as University’s first training facility dedicated to identifying researchers, and fostering intentional learning outside of the classroom.
challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

**One Drexel Plaza**

One Drexel Plaza at 30th and Market Streets houses CCI faculty offices and on campus classes via the Computing & Security Technology program.

**Library & Information Science Faculty**

Denise E. Agosto, PhD (http://drexel.edu/cci/contact/Faculty/Agosto-Denise) *(Rutgers University)* Associate Professor. Information behavior, public libraries, social networks, gender, children and teens

Chaomei Chen, PhD (http://drexel.edu/cci/contact/Faculty/Chen-Chaomei) *(University of Liverpool)* Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction

Catherine D. Collins, PhD (http://drexel.edu/cci/contact/Faculty/Collins-Catherine) *(Indiana University)* Associate Teaching Professor. Knowledge management, collection development, management of information organizations, information sources and services, international development

Prudence W. Dalrymple, PhD (http://drexel.edu/cci/contact/Faculty/Dalrymple-Prudence) *(University of Wisconsin-Madison)* Director, Institute for Healthcare Informatics, Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice

Susan E. Davis, PhD (http://drexel.edu/cci/contact/Faculty/Davis-Susan) *(University of Wisconsin-Madison)* Associate Teaching Professor. Archives and special collections management, organization of and access to archival records, archival education, leadership in professions

M. Carl Drott, PhD (http://drexel.edu/cci/contact/Faculty/Drott-Carl) *(University of Michigan)* Associate Professor. Systems analysis techniques, Web usage, competitive intelligence

Susan Gasson, PhD (http://drexel.edu/cci/contact/Faculty/Gasson-Susan) *(University of Warwick)* Associate Professor. The co-design of business and IT-systems, distributed cognition & knowledge management in boundary-spanning groups, human-centered design, social informatics, online learning communities, Grounded Theory

Jane Greenberg, PhD (http://drexel.edu/cci/contact/Faculty/Greenberg-Jane) *(University of Pittsburgh)* Alice B. Kroeger Professor. Metadata, ontological engineering, data science, knowledge organization, information retrieval

Tony H. Grubesci, PhD (http://drexel.edu/cci/contact/Faculty/Grubesci-Tony) *(The Ohio State University)* Professor (Joint appointment in the Department of Culture & Communication with the College of Arts and Sciences). Geographic information science, spatial analysis, development, telecommunication policy, location modeling

Michael Khoo, PhD (http://drexel.edu/cci/contact/Faculty/Khoo-Michael) *(University of Colorado at Boulder)* Assistant Professor. The understandings and practices that users bring to their interactions with information systems, with a focus on the evaluation of digital libraries and educational technologies

Alison M. Lewis, PhD (http://drexel.edu/cci/contact/Faculty/Lewis-Alison) *(Temple University)* Associate Teaching Professor. Ethics of librarianship, collection development and services to humanists and social scientists

Xia Lin, PhD (http://drexel.edu/cci/contact/Faculty/Lin-Xia) *(University of Maryland)* Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments

Gabriela Marcu, PhD (http://drexel.edu/cci/contact/Faculty/Marcu-Gabriela) *(Carnegie Mellon University)* Assistant Professor. Human-computer interaction, health informatics, action research, ethnography, user experience design, designing for social change, organizational information systems, ubiquitous computing, knowledge management

Linda S. Marion, PhD (http://drexel.edu/cci/contact/Faculty/Marion-Linda) *(Drexel University)* Associate Teaching Professor. Formal and informal communication, bibliometric studies of scholarly communication, diffusion of information, information use in the social sciences, academic and public libraries, information science education

Alan Murray, PhD (http://drexel.edu/cci/contact/Faculty/Murray-Alan) *(University of California, Santa Barbara)* Professor. Geographic information science, urban, regional and natural resource planning; location modeling, spatial decision support systems, land use decision making

Delia Neuman, PhD (http://drexel.edu/cci/contact/Faculty/Neuman-Delia) *(The Ohio State University)* Director of the School Library Media Program, Professor. Learning in information-rich environments, instructional systems design, the use of media for learning, and school library media

Jung-ran Park, PhD (http://drexel.edu/cci/contact/Faculty/Park-Jung-ran) *(University of Hawaii at Manoa)* Associate Professor. Knowledge organization and representation (cataloging and classification, metadata computer-mediated communication, cross-cultural communication, multilingual information access, discourse, and pragmatics

Lorraine Richards, PhD (http://drexel.edu/cci/contact/Faculty/Richards-Lorraine) *(University of North Carolina)* Assistant Professor. Archives, digital curation, electronic records management, information technology and digital collections, cloud computing and record keeping, management of information organizations

Deborah Turner, PhD (http://drexel.edu/cci/contact/Faculty/Turner-Deborah) *(University of Washington)* Assistant Professor. Information behavior/interaction, management of information institutions, orality and information

Kristene Unsworth, PhD (http://drexel.edu/cci/contact/Faculty/Unsworth-Kristene) *(University of Washington)* Assistant Professor. Information policy, ethics, government information

Erija Yan, PhD (http://drexel.edu/cci/contact/Faculty/Yan-Erjia) *(Indiana University)* Assistant Professor. Network Science, Information Analysis and Retrieval, Scholarly Communication Methods and Applications

Valerie Ann Yonker, PhD (http://drexel.edu/cci/contact/Faculty/Yonker-Valerie-Ann) *(Drexel University)* Associate Teaching Professor. Human
service information systems, systems analysis and design, measurement in software evaluation, knowledge engineering

Howard D. White, PhD (http://drexel.edu/cci/contact/Emeritus-Faculty/White-Howard) (University of California, Berkeley) Visiting Research Professor, Professor Emeritus. Literature information systems, bibliometrics, research methods, collection development, online searching

Emeritus

Katherine W. McCain, PhD (http://drexel.edu/cci/contact/Emeritus-Faculty/McCain-Katherine) (Drexel University) Professor Emeritus. Scholarly communication, information production and use in the research process, development and structure of scientific specialties, diffusion of innovation, bibliometrics, evaluation of information retrieval systems

National Security Management

Major: National Security Management
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 43.0301
Standard Occupational Classification (SOC) code: 11-9161

About the Program

The College of Computing & Informatics’ (CCI) Master of Science in National Security Management (MSNSM) involves an understanding of national and homeland security, policy, law, social, and technological environments. As such, modern national security management is an interdisciplinary field built upon the expertise of a wide variety of disciplines. The online MS in National Security Management uses a multidisciplinary approach to targeting advanced topics in security management, emergency management, information technology, risk management, law and policy.

National Security Management Student Outcomes

Specific learning outcomes for students in the MSNSM program include the following:

• To provide students with the methodological skills and competence required for the integration of a wide range of information and insights that make up the complex national security environment.
• To equip students with a comprehensive understanding of national, corporate and cybersecurity theories and practice, enabling them to remain integrally involved in national security issues.
• To provide students with the knowledge to enable them to understand and critique the choices of decision makers and eventually play a productive role in that process in governmental, quasi-governmental and private sectors.
• To acquaint students with the various academic perspectives in the field of national security and enhance their analytical abilities to deal with the questions, problems, challenges and dilemmas of modern national security affairs, including the ethical aspects of dealing with the challenges of crime, terrorism and other kinds of asymmetric warfare, such as cyber-attacks in democratic societies.
• To develop professionals and future leaders with the ability to help their organizations make sound decisions on dealing with national security, corporate security, risk, cybersecurity, law and policy.
• To provide the basis, in particular through the undertaking of a capstone project, but also through the undertaking of coursework, for the development of critical analytical skills and application of academic knowledge, for further research within the area of National Security Management.

Certificates in National Security Management

Students not wishing to complete the full MS in National Security Management may take any of the following certificates:

• Homeland Security Certificate (p. 22)
• Intelligence Certificate (p. 23)
• Certificate in Cybersecurity, Law & Policy (p. 22)
• Continuity Management Certificate (p. 22)

Additional Information

Scott J. White, PhD
Associate Clinical Professor
(Tel) 215-895-0910
(Fax) 215-895-0962
sjw@drexel.edu

For additional information about this program, visit the College of Computing & Informatics’ MS in National Security Management (http://drexel.edu/cci/programs/graduate-programs/ms-in-national-security-management) web page.

Degree Requirements

The MSNSM offers students the opportunity to develop and engage in a piece of systematic research in a selected area of national security management. The MSNSM is uniquely designed to be completed as a part-time program or as a full-time program.

With the successful completion of the Applied (Capstone) Project, the student will be granted the MSNSM (45.0 credit hours).

Students have 5 years to complete the MSNSM.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSM 544</td>
<td>Introduction to Homeland Security</td>
<td>3.0</td>
</tr>
<tr>
<td>CST 604</td>
<td>Technology for Homeland Security</td>
<td>3.0</td>
</tr>
<tr>
<td>HSM 549</td>
<td>Terrorism and Homeland Security</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 719</td>
<td>Introduction to National Security Enterprise</td>
<td>3.0</td>
</tr>
<tr>
<td>CST 609</td>
<td>National Security Intelligence</td>
<td>3.0</td>
</tr>
<tr>
<td>CST 614</td>
<td>Counterintelligence</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 517</td>
<td>Principles of Cybersecurity</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 717</td>
<td>Cyber-Computer Crime Law</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 718</td>
<td>Cybersecurity, Law and Policy</td>
<td>3.0</td>
</tr>
<tr>
<td>HSM 644</td>
<td>Public Management in Crisis</td>
<td>3.0</td>
</tr>
<tr>
<td>HSM 645</td>
<td>Emergency Incident Risk Management</td>
<td>3.0</td>
</tr>
<tr>
<td>HSM 646</td>
<td>Infrastructure Disaster Recovery</td>
<td>3.0</td>
</tr>
<tr>
<td>NSM 710</td>
<td>Applied Project I</td>
<td>3.0</td>
</tr>
<tr>
<td>NSM 711</td>
<td>Applied Project II</td>
<td>3.0</td>
</tr>
<tr>
<td>NSM 712</td>
<td>Applied Project III</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits: 45.0

National Security Management Faculty

Larry Alexander, PhD (http://drexel.edu/cci/contact/Faculty/Alexander-Larry) (University of Pennsylvania) Research Professor & Interim Senior
Associate Dean for CCI Research and Scholarly Activities. Large scale modeling and simulation, pattern recognition, future of information technology

Yuan An, PhD (http://drexel.edu/cci/contact/Faculty/An-Yuan) (University of Toronto, Canada) Associate Professor. Conceptual modeling, schema and ontology mapping, information integration, knowledge representation, requirements engineering, healthcare information systems, semantic web

Marcello Balducci, PhD (http://drexel.edu/cci/contact/Faculty/Balducci-Marcello) (Texas Tech University) Senior Research Scientist, Assistant Research Professor. Applied Informatics Group. Logic programming, declarative programming, answer set programming, knowledge representation, various types of reasoning

Ellen Bass, PhD (http://drexel.edu/cci/contact/Faculty/Bass-Ellen) (Georgia Institute of Technology) Professor (Joint Appointment with the College of Nursing and Health Professions). Human-centered systems engineering research and design, biomedical informatics, healthcare, quantitative modeling, human-automation interaction, computational modeling

Jennifer Booker, PhD (http://drexel.edu/cci/contact/Faculty/Booker-Jennifer) (Drexel University) Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems

David Breen, PhD (http://drexel.edu/cci/contact/Faculty/Breen-David) (Rensselaer Polytechnic Institute) Associate Professor. Self-organization, biomedical image/video analysis, biological simulation, geometric modeling and visualization

Christopher Carroll, MS (http://drexel.edu/cci/contact/Faculty/Carroll-Chris) (Drexel University) Assistant Teaching Professor. Information security, computer networking and design, IT Infrastructure, server technology, information technology management

Chaomei Chen, PhD (http://drexel.edu/cci/contact/Faculty/Chen-Chaomei) (University of Liverpool) Professor. Information visualization, visual analytics, knowledge domain visualization, network analysis and modeling, scientific discovery, science mapping, scientometrics, citation analysis, human-computer interaction

Prudence W. Dalrymple, PhD (http://drexel.edu/cci/contact/Faculty/Dalrymple-Prudence) (University of Wisconsin-Madison) Director, Institute for Healthcare Informatics, Research and Teaching Professor. User-centered information behaviors, particularly in the health arena, health informatics, evidence based practice, education for the information professions and evaluation, and translation of research into practice

M. Carl Drott, PhD (http://drexel.edu/cci/contact/Faculty/Drott-Carl) (University of Michigan) Associate Professor. Systems analysis techniques, Web usage, competitive intelligence

Andrea Forte, PhD (http://drexel.edu/cci/contact/Faculty/Forte-Andrea) (Georgia Institute of Technology) Assistant Professor. Social computing, human-computer interaction, computer-supported cooperative work, computer-supported collaborative learning, information literacy

Susan Gasson, PhD (http://drexel.edu/cci/contact/Faculty/Gasson-Susan) (University of Warwick) Associate Professor. The co-design of business and IT-systems, distributed cognition & knowledge management in boundary-spanning groups, human-centered design, social informatics, online learning communities, Grounded Theory

Christopher Geib, PhD (http://drexel.edu/cci/contact/Faculty/Geib-Christopher) (University of Pennsylvania) Associate Professor. Decision making and reasoning under conditions of uncertainty, planning, scheduling, constraint, based reasoning, human computer and robot interaction, probabilistic reasoning, computer network security, large scale process control, user interfaces

Jane Greenberg, PhD (http://drexel.edu/cci/contact/Faculty/Greenberg-Jan) (University of Pittsburgh) Alice B. Kroeger Professor. Metadata, ontological engineering, data science, knowledge organization, information retrieval

Rachel Greenstadt, PhD (http://drexel.edu/cci/contact/Faculty/Greenstadt-Rachel) (Harvard University) Associate Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security

Peter Grillo, PhD (http://drexel.edu/cci/contact/Faculty/Grillo-Peter) (Temple University) Associate Teaching Professor. Strategic applications of technology within organizations

Tony H. Grubesci, PhD (http://drexel.edu/cci/contact/Faculty/Grubesci-Tony) (The Ohio State University) Professor (Joint appointment in the Department of Culture & Communication with the College of Arts and Sciences). Geographic information science, spatial analysis, development, telecommunication policy, location modeling

Xiaohua Tony Hu, PhD (http://drexel.edu/cci/contact/Faculty/Hu-Xiaohua-Tony) (University of Regina, Canada) Professor. Data mining, text mining, Web searching and mining, information retrieval, bioinformatics and healthcare informatics

Jeremy Johnson, PhD (http://drexel.edu/cci/contact/Faculty/Johnson-Jeremy) (Ohio State University) Professor. Computer algebra, parallel computations, algebraic algorithms, scientific computing

Constantine Katsinis, PhD (http://drexel.edu/cci/contact/Faculty/Katsinis-Constantine) (University of Rhode Island) Associate Teaching Professor. Computer Security, network security, parallel computer architectures, mobile computing, information assurance, fault tolerant systems, image processing and pattern recognition

Michael Khoo, PhD (http://drexel.edu/cci/contact/Faculty/Khoo-Michael) (University of Colorado at Boulder) Assistant Professor. The understandings and practices that users bring to their interactions with information systems, with a focus on the evaluation of digital libraries and educational technologies

Xia Lin, PhD (http://drexel.edu/cci/contact/Faculty/Lin-Xia) (University of Maryland) Professor. Digital libraries, information visualization, visual interface design, knowledge mapping, human-computer interaction, object-oriented programming, information retrieval, information architecture, information-seeking behaviors in digital environments

Spirios Mancoridis, PhD (http://drexel.edu/cci/contact/Faculty/Mancoridis-Spiros) (University of Toronto) Senior Associate Dean of Computing & Academic Affairs. Professor. Software engineering, software security, code analysis, evolutionary computation

Alan T. Murray, PhD (http://drexel.edu/cci/contact/Faculty/Murray-Alan) (University of California, Santa Barbara) Professor (Joint appointment in the School of Public Health). Geographic information science, urban,
Software Engineering

Major: Software Engineering
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 14.0903
Standard Occupational Classification (SOC) code: 15-1132; 15-1133

About the Program

The College of Computing and Informatics' Master of Science in Software Engineering (MSSE) program was created in response to the growing importance of software to the national infrastructure and the rapid rise in demand for professional software engineers.

The multidisciplinary MS in Software Engineering program draws on the strengths of Drexel programs in computer science, engineering, and information science and technology, provides a curriculum that encompasses behavioral, managerial, and technical aspects of software engineering and attempts to synthesize—rather than differentiate—disciplinary paradigms and themes. The program is appropriate for students interested in a wide range of application domains.

All students in the program take a core curriculum that spans the scope of disciplinary areas relevant to the degree, thereby providing a common foundation for all students in the program. Students also elect an area of concentration, or track — a cohesive, more specialized set of courses that builds on the core to support each student's particular career interest. Three tracks are available: information science and technology, computer science, and engineering.

Additional Information

For more information about this program, please visit the College of Computing & Informatics' MS in Software Engineering (http://drexel.edu/cci/programs/graduate-programs/ms-in-software-engineering) web page.

Degree Requirements

Degree requirements vary by track. All students take the required six core courses (18.0 quarter credits).

Core Courses

Core courses cover topics that are essential for the practicing software engineer.

Computer Science Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 575</td>
<td>Software Design</td>
<td>3.0</td>
</tr>
<tr>
<td>CS 576</td>
<td>Dependable Software Systems</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Electrical and Computer Engineering Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECEC 500</td>
<td>Fundamentals Of Computer Hardware</td>
<td>3.0</td>
</tr>
<tr>
<td>ECEC 600</td>
<td>Fundamentals of Computer Networks</td>
<td>3.0</td>
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</table>

Information Science and Technology Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 627</td>
<td>Requirements Engineering and Management</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 638</td>
<td>Software Project Management</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits | 18.0 |
tracks

Students in each track follow the policies determined by the respective College.

Information Science and Technology Track

This track supports students interested in applying software engineering to information systems problems in commercial organizations and other settings. The principal focus is the process by which user and system requirements are converted into cost-effective, maintainable software systems. This is complemented by a concern for defining, creating, understanding, and evaluating the full range of software life-cycle products. The track places particular emphasis on information systems methodologies such as human-computer interaction, requirements analysis, modeling, and validation, along with the use of off-the-shelf tools and components to assist in software processes.

Students in the information science and technology track take a total of nine track courses: four required track courses, three courses selected from the track distribution courses, and two courses selected from the distribution courses or other approved electives. This track requires a total of 45.0 credits, 18.0 of which are from the required core.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>INFO 608</td>
<td>Human-Computer Interaction</td>
</tr>
<tr>
<td>INFO 630</td>
<td>Evaluation of Information Systems</td>
</tr>
<tr>
<td>INFO 636</td>
<td>Software Engineering Process I</td>
</tr>
<tr>
<td>INFO 637</td>
<td>Software Engineering Process II</td>
</tr>
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</table>

Distribution Courses

Select three of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>INFO 606</td>
<td>Advanced Database Management</td>
</tr>
<tr>
<td>INFO 607</td>
<td>Applied Database Technologies</td>
</tr>
<tr>
<td>INFO 610</td>
<td>Analysis of Interactive Systems</td>
</tr>
<tr>
<td>INFO 611</td>
<td>Design of Interactive Systems</td>
</tr>
<tr>
<td>INFO 620</td>
<td>Information Systems Analysis and Design</td>
</tr>
<tr>
<td>INFO 631</td>
<td>Information Technology Integration</td>
</tr>
<tr>
<td>INFO 646</td>
<td>Information Systems Management</td>
</tr>
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</table>

Two Elective Courses

Select two of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>INFO 612</td>
<td>Knowledge Base Systems</td>
</tr>
<tr>
<td>INFO 613</td>
<td>XML and Databases</td>
</tr>
<tr>
<td>INFO 616</td>
<td>Social and Collaborative Computing</td>
</tr>
<tr>
<td>INFO 617</td>
<td>Introduction to System Dynamics</td>
</tr>
<tr>
<td>INFO 634</td>
<td>Data Mining</td>
</tr>
</tbody>
</table>

Total Credits 27.0

Computer Science Track

Track Coordinator: Dr. Spiros Mancoridis, 215-895-6824, spiros@drexel.edu

The computer science track welcomes students who are interested in a variety of technical topics pertaining to the development of software systems such as databases, networks, operating systems, graphics and animation systems, compilers, expert systems, and systems for scientific computing. Students will use languages and apply techniques to specify, design, implement, test, and maintain software systems.

Students in the computer science track take nine courses in addition to the six core courses listed above (for a total of 15 courses). Of the nine additional courses, four courses must be from one of the five concentration areas, plus five electives must be graduate level CS courses and two may be fulfilled by any graduate level CS or INFO courses, except for INFO 605 and INFO 530.

Students in their final 3 quarters of study who have a 3.5 GPA or better may take a 9-credit project instead of 3 elective courses. To register for a project, the student must select a project advisor (a member of the CS faculty who is willing to supervise). The project is a large-scale software development effort in which students specify, design, implement, and test a significant software system.

Concentration Courses

Select four of the following:

Computing Systems Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 500</td>
<td>Database Theory</td>
</tr>
<tr>
<td>CS 540</td>
<td>High Performance Computing</td>
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<td>CS 543</td>
<td>Operating Systems</td>
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<tr>
<td>CS 544</td>
<td>Computer Networks</td>
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<tr>
<td>CS 643</td>
<td>Advanced Operating Systems</td>
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<tr>
<td>CS 645</td>
<td>Network Security</td>
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<tr>
<td>CS 647</td>
<td>Distributed Systems Software</td>
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<tr>
<td>CS 675</td>
<td>Reverse Software Engineering</td>
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<tr>
<td>CS 676</td>
<td>Parallel Programming</td>
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<tr>
<td>CS 741</td>
<td>Computer Networks II</td>
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<tr>
<td>CS 680</td>
<td>Special Topics in Computer Science (Computer Systems)</td>
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Programming Languages Concentration

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<tr>
<td>CS 525</td>
<td>Theory of Computation</td>
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<tr>
<td>CS 550</td>
<td>Programming Languages</td>
</tr>
<tr>
<td>CS 551</td>
<td>Compiler Construction I</td>
</tr>
<tr>
<td>CS 552</td>
<td>Compiler Construction II</td>
</tr>
<tr>
<td>CS 650</td>
<td>Program Generation and Optimization</td>
</tr>
<tr>
<td>CS 675</td>
<td>Reverse Software Engineering</td>
</tr>
<tr>
<td>CS 676</td>
<td>Parallel Programming</td>
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<tr>
<td>CS 680</td>
<td>Special Topics in Computer Science (Programming Languages)</td>
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User Interface Software Concentration

<table>
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<th>Course Title</th>
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<tr>
<td>CS 530</td>
<td>Developing User Interfaces</td>
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<td>CS 536</td>
<td>Computer Graphics</td>
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<td>CS 630</td>
<td>Cognitive Systems</td>
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<tr>
<td>CS 636</td>
<td>Advanced Computer Graphics</td>
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<td>CS 680</td>
<td>Special Topics in Computer Science (User Interface Software)</td>
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Artificial Intelligence Concentration

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<th>Course Code</th>
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<tbody>
<tr>
<td>CS 510</td>
<td>Introduction to Artificial Intelligence</td>
</tr>
<tr>
<td>CS 511</td>
<td>Robot Laboratory</td>
</tr>
<tr>
<td>CS 610</td>
<td>Advanced Artificial Intelligence</td>
</tr>
<tr>
<td>CS 612</td>
<td>Knowledge-based Agents</td>
</tr>
<tr>
<td>CS 613</td>
<td>Machine Learning</td>
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</tbody>
</table>
For additional information on the Computer Science Track, visit the College of Computing & Informatics’ Master of Science in Software Engineering (https://www.cs.drexel.edu/graduate/msse) web page.

Engineering Track

Track Coordinator: Dr. Kapil Dandekar, 215-895-2228, dandekar@coe.drexel.edu

Students in this track pursue techniques to model engineering problems and offer software solutions. The courses in this track emphasize problems facing engineering industries including electrical, mechanical, environmental, chemical, and others. Systems modeling and simulation techniques will be used to solve these problems.

Students in this track take 27.0 or more credits of track courses in addition to the 18.0 credits of required core courses. Three computer engineering courses are required; the other courses are from one of five concentrations. A total of 45.0 approved graduate credits are required for the MSSE, including the 18.0 credits of core courses. Students opting for the Graduate Co-op Program (GCP) option are required to complete 51.0 approved credits, including 6.0 GCP credits.

For more information on curriculum requirements, visit the Department of Electrical and Computer Engineering’s Graduate Student Guide (http://www.ece.drexel.edu/MSSE.html).

Sample Track Courses

Select nine of the following:

**Chemical Engineering Concentration**

CHE 554 Process Systems Engineering
CHE 658 Advanced Process Design

**Civil and Architectural Engineering Concentration**

CIVE 501 Model Analysis of Structures
CIVE 605 Advanced Mechanics Of Material
CIVE 701 Structural Analysis I
CIVE 702 Structural Analysis II
CIVE 703 Structural Analysis III
CIVE 704 Behavior and Stability of Structural Members I

**Electrical and Computer Engineering Concentration**

ECEC 511 Combinational Circuit Design
ECEC 512 Sequential Circuit Design
ECEC 513 Design for Testability

ECEC 621 High Performance Computer Architecture
ECEC 622 Parallel Computer Architecture
ECEC 623 Advanced Topics in Computer Architecture

Total Credits 27.0

* Any other ECE 500-level or above course may be eligible for credit for the Electrical and Computer Engineering concentration.

**Dual MS Degree Opportunities**

Graduate students already enrolled in a master’s degree program at Drexel have the opportunity, through the dual master’s program, to work simultaneously on two CCI master's degrees and to receive both upon graduation. To be eligible, graduate students must be currently working on their first CCI master's degree when requesting admission to the second CCI master's degree. They must obtain approval from the graduate advisors of both programs and work out a plan of study encompassing coursework and/or research (thesis) credits for both degrees. Please contact your advisor (http://drexel.edu/cci/resources/current-students/graduate-professional-development/advising) for more information on program requirements as some CCI master's degree combinations may require additional pre-requisites.

The dual master’s student must complete the Change of Curriculum and Status form (http://www.drexel.edu/cci/resources/current-students/graduate-professional-development/advising/forms/Change_of_Curriculum_and_Status.ashx?la=en) and obtain approvals from both graduate advisors. Final approval is granted by the Office of Graduate Studies. The student is then registered in both majors simultaneously. Upon graduation, the student must file two Application for Degree (http://drexel.edu/drexelcentral/graduation/information/applying-for-degree) forms.

**Facilities**

**Drexel University Libraries**

Drexel University Libraries (http://www.library.drexel.edu) is a learning enterprise, advancing the University’s academic mission through serving as educators, supporting education and research, collaborating with researchers, and fostering intentional learning outside of the classroom. Drexel University Libraries engages with Drexel communities through four physical locations, including W. W. Hagerty Library, Hahnemann Library, Queen Lane Library and the Library Learning Terrace, as well as a vibrant online presence which sees, on average, over 8,000 visits per day. In the W.W. Hagerty Library location, College of Computing & Informatics students have access to private study rooms and nearly half a million books, periodicals, DVDs, videos and University Archives. All fields of inquiry are covered, including: library and information science, computer science, systems engineering, health informatics, information systems, and technology. Resources are available online at library.drexel.edu or in-person at W. W. Hagerty Library (http://www.library.drexel.edu/about/w-w-hagerty).

The Libraries also make available laptop and desktop PC and Mac computers, printers and scanners, spaces for quiet work or group projects and designated 24/7 spaces. Librarians and library staff—including a liaison librarian for computing and informatics—are available for individual research consultations and to answer questions about materials or services.

**iCommons**

Located in Room 106 of the Rush Building, the College’s iCommons is an open lab and collaborative work environment for students. It features...
desktop computers, a wireless/laptop area, free black and white printing, more collaborative space for its students and a furnished common area. There is a fully equipped conference room for student use with a 42” display and videoconferencing capabilities. The iCommons provides technical support to students, faculty, and administrative staff. In addition, the staff provides audio-visual support for all presentation classrooms within the Rush Building. Use of the iCommons is reserved for all students taking CCI courses.

The computers for general use are Microsoft Windows and Macintosh OSX machines with appropriate applications which include the Microsoft Office suite, various database management systems, modeling tools, and statistical analysis software. Library related resources may be accessed at the iCommons and through the W.W. Hagerty Library. The College is a member of the Rational SEED Program which provides cutting-edge CASE and project management software for usage in the iCommons and CCI classrooms. The College is also a member of the Microsoft Academic Alliance known also as "DreamSpark" which allows students free access to a wide array of Microsoft software titles and operating systems.

CCI students can access Drexel’s mail server from within the iCommons. The iCommons, student labs, and classrooms have access to networked databases, print and file resources within the College, and the Internet via the University’s network. Email accounts, Internet and BannerWeb access are available through the Office of Information Resources and Technology.

**Rush Building**

The Rush Building houses on campus classes, CCI administrative offices (academic advising, admissions, faculty, etc.) and the iCommons computer lab (open to all CCI students). The building holds 6 classrooms equipped for audio-visual presentation. These rooms typically contain a networked PC, HD video player, ceiling mounted projectors, and other equipment for presentations and demonstrations. Four of these classrooms are fully equipped to function as laptop computing labs for networking, programming and database-related projects.

In 2013, CCI redesigned its Information Technology Laboratory, located in the Rush Building, in support of the undergraduate degree program in information technology. This lab consists of enterprise class information technology hardware that students would encounter in industry positions. The hardware includes 20 high powered workstations that are available to students and specialized networking lab simulation software. The hardware is networked and reconfigurable utilizing multiple virtual technologies as needed for the various classes the laboratory supports. In addition a special system has been built into the classroom to allow for conversion into a standard laptop computing lab utilizing motorized monitor lifts that allow the monitors and keyboards to recess into the desk.

**Cyber Learning Center**

The Cyber Learning Center, located in University Crossings, provides consulting and other learning resources for students taking computer science classes. It is staffed by graduate and undergraduate computer science students in the College of Computing & Informatics.

**Research Laboratories**

The College houses multiple research labs, led by CCI faculty, across Drexel's main campus including: the Auerbach and Berger Families Cybersecurity Laboratory, Drexel Health and Risk Communication Lab, Socio-Technical Studies Group, Intelligent Information & Knowledge Computing Research Lab, Evidence-based Decision Making Lab, Applied Symbolic Computation Laboratory (ASYM), Geometric and Intelligent Information & Knowledge Computing Laboratory (GICL), High Performance Computing Laboratory (SPIRAL), Privacy, Security and Automation Laboratory (PSAL), Drexel Research on Play (RePlay) Laboratory, Software Engineering Research Group (SERG), Vision and Cognition Laboratory (VisCog) and the Vision and Graphics Laboratory. For more information on these laboratories, please visit the College’s research web page.

**Alumni Garden**

The Rush Building’s Alumni Garden provides additional collaborative space for students, faculty, professional staff and alumni. The Garden features wireless networking, tables with built-in power outlets, accessible covered patio and balconies and a bicycle rack. The Alumni Garden (http://cci.drexel.edu/about/our-facilities/rush-building/rush-alumni-garden-request-for-use.aspx) may be reserved for Drexel events.

**University Crossings**

CCI also has on campus classrooms, administrative offices and faculty offices at University Crossings 100, located at the corner of JFK and Market Streets. The building houses a student computer lab (featuring workstations and laptop plug-in stations, arranged in pods, to encourage collaboration among CCI students), as well as several classrooms with video-conference enabled technology and media projection capabilities. Its Cyber Learning Center provides consulting and other learning resources for students taking computer science classes within the College. University Crossings is also home to several of the College’s research groups and laboratories (http://cci.drexel.edu/research/labs-and-institutes.aspx).

**3401 Market Street**

3401 Market Street houses faculty offices and doctoral student workspaces. It also is home to College research groups such as the Applied Informatics Group (http://cci.drexel.edu/about/our-facilities/other-cci-facilities.aspx), and University initiatives such as the Drexel University Cybersecurity Institute (http://cci.drexel.edu/cybersecurity). The Institute’s newly opened Auerbach and Berger Families Cybersecurity Laboratory serves as University’s first training facility dedicated to identifying challenges and discovering solutions in the areas of cyber infrastructure protection and incident response.

**One Drexel Plaza**

One Drexel Plaza at 30th and Market Streets houses CCI faculty offices and on campus classes via the Computing & Security Technology program.

**Software Engineering Faculty**

Ellen Bass, PhD (http://drexel.edu/cci/contact/Faculty/Bass-Ellen) (Georgia Institute of Technology) Professor (Joint Appointment with the College of Nursing and Health Professions). Human-centered systems engineering research and design, biomedical informatics, healthcare, quantitative modeling, human-automation interaction, computational modeling

Jennifer Booker, PhD (http://drexel.edu/cci/contact/Faculty/Booker-Jennifer) (Drexel University) Associate Teaching Professor. Software engineering, systems analysis and design, networking, statistics and measurement, process improvement, object-oriented analysis and design, bioinformatics, and modeling of biological systems

Yuanfang Cai, PhD (http://drexel.edu/cci/contact/Faculty/Cai-Yuanfang) (University of Virginia) Associate Professor. Formal software design
modeling and analysis, software economics, software evolution and modularity

Bruce Char, PhD (http://drexel.edu/cci/contact/Faculty/Char-Bruce) (University of California, Berkeley) Professor. Symbolic mathematical computation, algorithms and systems for computer algebra, problem-solving environments, parallel and distributed computation

Gregory W. Hislop, PhD (http://drexel.edu/cci/contact/Faculty/Hislop-Gregory) (Drexel University) Senior Associate Dean for Informatics and CCI Academic Affairs, Professor. Information technology for teaching and learning, online education, structure and organization of the information disciplines, computing education research, software evaluation and characterization

Jeremy Johnson, PhD (http://drexel.edu/cci/contact/Faculty/Johnson-Jeremy) (Ohio State University) Professor. Computer algebra, parallel computations, algebraic algorithms, scientific computing

Spiros Mancoridis, PhD (http://drexel.edu/cci/contact/Faculty/Mancoridis-Spiros) (University of Toronto) Senior Associate Dean of Computing & Academic Affairs, Professor. Software engineering, software security, code analysis, evolutionary computation

William Regli, PhD (http://drexel.edu/cci/contact/Faculty/Regli-William) (University of Maryland at College Park) Professor. Artificial intelligence, computer graphics, engineering design and Internet computing

Kurt Schmidt, MS (http://drexel.edu/cci/contact/Faculty/Schmidt-Kurt) (Drexel University) Associate Teaching Professor. Data structures, math foundation for computer science, programming tools, programming languages

Brian Stuart, PhD (http://drexel.edu/cci/contact/Faculty/Stuart-Brian) (Purdue University) Associate Teaching Professor. Machine learning, networking, robotics, image processing, simulation, interpreters, data storage, operating systems, computer science, data communications, distributed/operating systems, accelerated computer programming, computer graphics

Filippos Vokolos, PhD (http://drexel.edu/cci/contact/Faculty/Vokolos-Filippos) (Polytechnic University) Associate Teaching Professor. System architecture, principles of software design and construction, verification and validation methods for the development of large software systems, foundations of software engineering, software verification & validation, software design, programming languages, dependable software systems

Rosina Weber, PhD (http://drexel.edu/cci/contact/Faculty/Weber-Rosina) (Federal University of Santa Catarina) Associate Professor. Knowledge-based systems; case-based reasoning; textual case-based reasoning; computational intelligence; knowledge discovery; uncertainty, mainly targeting knowledge management goals in different domains, e.g., software engineering, military, finance, law, bioinformatics and health sciences

Christopher C. Yang, PhD (http://drexel.edu/cci/contact/Faculty/Yang-Christopher) (University of Arizona, Tucson) Associate Professor. Web search and mining, security informatics, social media analytics, knowledge management, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, artificial intelligence, digital library and electronic commerce

Youth Services Specialist Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion 3 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 25.9999
Standard Occupational Classification (SOC) Code: 25-4021

This certificate is designed for professionals already holding a master's degree from an ALA-accredited program or a graduate degree closely related to this specialization. This program meets the interests of students planning public library careers with a focus on youth populations

The program must be completed within five years.

Additional Information

For more information about this certificate program, please visit the College of Computing & Informatics' website (http://drexel.edu/cci/programs/professional-development-programs/post-masters-specialist-program).

Required Courses

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<td>Public Library Service</td>
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<td>INFO 683</td>
<td>Resources for Children</td>
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<td>INFO 684</td>
<td>Resources for Young Adults</td>
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<td>Library Programming</td>
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<td>INFO 552</td>
<td>Introduction to Web Design for Information Organizations</td>
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<td>INFO 665</td>
<td>Collection Management</td>
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<tr>
<td>INFO 688</td>
<td>Instructional Role for the Information Specialist</td>
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Total Credits 15.0
College of Medicine: School of Biomedical Sciences and Professional Studies

Overview
Renowned for its innovative, student-centered educational programs, the Graduate School of Biomedical Sciences and Professional Studies in the College of Medicine at Drexel University provides regionally unique PhD and Master's level academic offerings that attract the brightest, most ambitious and entrepreneurial applicants. With a strong emphasis on job placement in different scientific and health-related career fields as well as academic rigor to prepare students for medical and health-related professional schools, Drexel students are at the forefront of their selected disciplines and emerge as graduates as the next generation of leaders.

Today, there are more than 950 students pursuing doctoral or master's degrees within the Graduate School in the College of Medicine.

The collaborative nature of the new Graduate School with other Drexel schools (Engineering and College of Arts and Sciences, among others) provides students with a multidisciplinary advantage. Coupled with the solid foundation afforded by a Drexel education, innovation-driven programming offers students a unique experience to launch their careers in the chosen field of study.

The Graduate School of Biomedical Sciences and Professional Studies is committed to supporting and promoting an academic "success-network" that propels the transition from training in different disciplines to becoming leaders in solving global problems.

More information is available on the Graduate School of Biomedical Sciences and Professional Studies (http://www.drexel.edu/medicine/ Academics/Graduate-School) website.

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- Biochemistry (MS, PhD) (p. 55)
- Biological Science (MS) (p. 79)
- Biomedicine and Business (MS) (p. 57)
- Biomedicine and Digital Media (MS) (p. 60)
- Biomedicine and Entrepreneurship (MS) (p. 64)
- Biomedicine and Law (MS) (p. 67)
- Biotechnology (MS) (p. 74)
- Cancer Biology (MS) (p. 80)
- Clinical Research for Health Professionals (MS) (p. 82)
- Clinical Research Organization & Management (MS) (p. 81)
- Criminalistic Science (MS) (p. 83)
- Drexel Pathway to Medical School (MS) (p. 84)
- Drug Discovery and Development (MS) (p. 85)
- Forensic Science (MS) (p. 86)
- Histotechnology (MS) (p. 87)
- Immunology (MS) (p. 88)
- Infectious Disease (MS) (p. 90)
- Interdepartmental Medical Science (MS) (p. 74)
- Interdisciplinary Health Sciences (MS) (p. 91)
- Laboratory Animal Science (MLAS) (p. 76)
- Medical and Healthcare Simulation (MS) (p. 75)
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- Medical Science Preparatory Program (p. 70)
- Pre-Medical, Evening Program (p. 73)
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- Veterinary Medical Science (p. 71)

Mission Statement
Drexel University College of Medicine excels and innovates in education, research, and delivery of compassionate care in our culture of diversity, spirited inquiry, collaboration, and opportunity.

About the College
The College of Medicine's main campus, Queen Lane, is in a suburban-like setting in the East Falls section of Philadelphia. Additional facilities are located at the Center City campus, next to Hahnemann University Hospital. Our Pediatrics Department is at St. Christopher’s Hospital for Children, and the Psychiatry Department is based at Friends Hospital. Students can receive clinical education at more than 20 affiliated hospitals and ambulatory sites chosen for their commitment to teaching as well as medical excellence. The College of Medicine is renowned for its innovative educational programs, enhanced by the use of technology that permeates all components of the curriculum.

The College’s medical practice, Drexel Medicine®, is a patient-focused practice emphasizing quality, innovation and community service, and enhanced by physician involvement in the research and educational programs.

Collaborative projects leveraging Drexel University’s technological expertise continue to push the frontiers of nanomedicine and neuroengineering. The College of Medicine is a major regional center for spinal cord research, and has developed one of the leading centers for malaria study in the nation. Additionally, the College is home to a memory disorders center dedicated to ground-breaking research in Alzheimer’s and related dementias.

Drexel University College of Medicine houses one of eight National Institute on Drug Abuse (NIDA) Centers of Excellence for Physician Information, one of 21 National Centers of Excellence in Women’s Health designated by the Department of Health & Human Services, the Executive Leadership in Academic Medicine (ELAM) program, and the Archives and Special Collections on Women in Medicine. It has developed the largest HIV/AIDS primary care practice in the Mid-Atlantic region, with extensive
NIH-funded research in prevention and therapeutic intervention. Faculty clinicians are highly respected in numerous other specialties, including cardiology and pain management.

Facilities

Drexel University College of Medicine (http://www.drexel.edu/medicine) is a living laboratory, giving students a broad variety of hands-on experience, enhanced by clinical rotations in hospitals, practicums, and external research opportunities, depending on their program of study. Students in all programs benefit from the College’s physical plant, which offers some of the most advanced facilities in biomedical, health sciences, and healthcare education. The Queen Lane campus is designed for the purpose of teaching basic sciences and clinical skills in lecture halls, classrooms, small group rooms and a variety of laboratories.

The College of Medicine provides wireless Internet access to curricular resources from anywhere on campus. Computers, multimedia technology, and the Internet augment the information and skills students learn from classes, print materials, and on clinical rotations. College of Medicine faculty members have been leaders in developing interactive computer-based learning tools, ranging from biochemical exercises to simulated patients presenting ethical dilemmas. Comprehensive curriculum websites, streaming videos of lectures, and online slide atlases for histology and pathology are all available.

Some of the College’s key facilities and their features include:

Queen Lane Student Activities Center
A 17,700-square-foot student activity center was completed in 2006 at the Queen Lane Campus. The Student Activities Center occupies 2 floors and houses a full line of exercise equipment, a bookstore, student government offices and flexible space for events and lectures. The facility is available to students, staff and groups.

Queen Lane Medical Simulation Center
The College opened a state-of-the-art simulation center for medical education in 2010. Part of a new 25,000-square-foot addition, the center allows students to learn in simulated operating room and patient room settings.

Clinical Education Assessment Center
Ten examination rooms with digital capture that simulate physicians’ offices are linked to control and observation rooms for faculty. Students work with standardized patients to enhance their abilities in medical interviewing, physical examination skills, and patient counseling.

Multidisciplinary Laboratories

- Forty-two tables with microscopes for teaching neuroanatomy, microbiology, and pathology are available.
- Microscopes are equipped with a networked video system so that all students in a class can look at a single slide under the microscope through monitors on their lab tables or on a projection screen and can retrieve microscopic images via computer.

New College Building
The New College Building at the Center City Hahnemann campus is designed for the purpose of teaching basic and clinical sciences, with auditoriums, classrooms, laboratories and offices. The lecture halls are designed to accommodate a variety of educational methodologies, spanning from the basic lecture format to the enriched laboratory setting where courses such as Anatomy, Pathology, Microbiology, Histology and Applied Anatomic Pathology can be taught.

Libraries

Drexel University has four libraries (http://www.drexel.edu/medicine/About/Libraries) to serve the needs of students, faculty and staff. The collections of two libraries – one at Queen Lane and one at Center City – emphasize subjects relevant to the health sciences, with print resources distributed to meet the needs of the programs and departments at each campus, and free document delivery service between the locations.

Computers in the reference areas of each library, and the Microcomputer Centers, provide access to the Libraries’ online catalog; to databases (indexes) including MEDLINE, CINAHL, and PsycINFO; to more than 2000 full-text electronic journals, and to online reference resources such as MD Consult and Harrison’s Online. Full Internet access is provided for reference and research purposes.

All online resources (databases, electronic journals, etc.) are available to students, staff and faculty who are registered Library users, and can be accessed from off-campus locations. In addition to Internet access, computers in the Microcomputer Centers also provide a broad range of software including word processing, spreadsheet, communications, graphics, and statistics. Computer-assisted instruction and tutorials are available for many curricula-related topics. A plotter and scanner are also available at some locations.

The Library staff is dedicated to providing assistance to students and other library users through on-the-spot reference help, mediated literature searches, and instructional sessions. Guides are available online to help with the use of Library services and resources.

Videoconferencing

Drexel University College of Medicine makes extensive use of videoconferencing between Philadelphia campuses and clinical teaching sites, and the Sacramento campus. There are videoconferencing classrooms with split screen to allow for speakers in different locations.

Web-Based Instruction

Uses of web-based instruction range from providing a supplement to classroom instruction to teaching a whole course remotely. Many instructors post their syllabi on the web, distribute supplementary readings via the web, and set up electronic discussion lists for their students. Having students submit assignments electronically is common practice.

Unique faculty-developed tools, including doc.com, a web-based set of video encounters between physician and patient, help medical students improve their communication skills. DxR, a web-based patient simulation program, trains students in clinical reasoning; and MedEthEx provides an online series of exercises in medical ethics and communication. The recently implemented Web-OSCE, closely linked to doc.com, allows medical trainees to interview standardized patients remotely and receive performance feedback.

Biochemistry

Major: Biochemistry

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Semester

Total Credit Hours: 36.0 - 48.0 (MS) or 96.0 (PhD)

Classification of Instructional Programs (CIP) code: 26.0202

Standard Occupational Classification (SOC) code: 19-1021
About the Program

The graduate program in biochemistry offers a challenging and broad-based graduate program of research and coursework leading to the MS or PhD degree. The aim of the graduate program is to train scientists to identify, address, and solve biomedical problems at the molecular level. The themes of molecular structure, molecular mechanisms, and molecular regulation are recurrent throughout the diverse research areas represented by the biochemistry faculty.

MS in Biochemistry

A minimum of two years of full-time study is required for an MS degree. Master's graduates typically look forward to careers in clinical biochemistry, in pharmaceuticals and medical research equipment sales, or as research technicians in university and industrial laboratories.

PhD in Biochemistry

The average duration of study for a PhD degree is 5-6 years. Graduates are well-rounded, independent scientists qualified to pursue careers in research in universities, the pharmaceutical and biotech industries, and government. In addition, PhD scientists may choose to focus on college teaching, research administration, science policy, or patent law.

About the Curriculum

Background courses in biochemistry, molecular and cell biology, and integrative biology are taken during the first academic year. In addition, every student carries out short research projects in three different laboratories chosen by the student. This exposure to research not only gives the student broad research training, but also helps the student to select a thesis advisor at the end of the first academic year. In the second year, the student begins thesis research and takes several advanced courses, tailored to the student’s individual interests. All students participate in student seminars and are encouraged to attend seminars in the department and University.

Courses Repeatable for Credit

As well as taking all required courses, MS and PhD students may re-enroll in courses having the status “repeatable for credit” (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

For more information about this program, including scheduling a plan of study, visit the College of Medicine's Biomedical Graduate Studies (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx) programs.

MS Degree Requirements Non-Thesis Option

MS without Thesis: 36.0 semester credits

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<thead>
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<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOC 502S</td>
<td>Biochemistry 1st Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>BIOC 503S</td>
<td>Biochemistry 2nd Lab Rotation</td>
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</tr>
<tr>
<td>BIOC 506S</td>
<td>Biochemistry Journal Club</td>
<td>1.0</td>
</tr>
<tr>
<td>BIOC 507S</td>
<td>Biochemistry Seminar Series</td>
<td>1.0</td>
</tr>
<tr>
<td>MCBG 506S</td>
<td>ADVANCED CELL BIOLOGY</td>
<td>2.0</td>
</tr>
<tr>
<td>BIOC 508S</td>
<td>Experimental Approaches to Biochemical Problems</td>
<td>3.0</td>
</tr>
<tr>
<td>BIOC 603S</td>
<td>Advanced Topics in Biochemistry and Molecular Biology</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
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</table>

Suggested Electives *

Select one of the following: 2.0-4.0

<table>
<thead>
<tr>
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<th>Course Name</th>
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<tr>
<td>BIOC 503S</td>
<td>Biochemistry 2nd Lab Rotation</td>
</tr>
<tr>
<td>BIOC 504S</td>
<td>Biochemistry 3rd Lab Rotation</td>
</tr>
<tr>
<td>BIOC 510S</td>
<td>Cancer Biology</td>
</tr>
<tr>
<td>MCBG 507S</td>
<td>MACROMOLECULAR STRUCT &amp; FUNCTI</td>
</tr>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
</tr>
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</table>

MS Degree Requirements Thesis Option

MS with thesis: 48.0 semester credits

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC 502S</td>
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<td>BIOC 506S</td>
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<td>BIOC 507S</td>
<td>Biochemistry Seminar Series</td>
<td>1.0</td>
</tr>
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<td>MCBG 506S</td>
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<td>2.0</td>
</tr>
<tr>
<td>BIOC 508S</td>
<td>Experimental Approaches to Biochemical Problems</td>
<td>3.0</td>
</tr>
<tr>
<td>BIOC 600S</td>
<td>Biochemistry Thesis Research</td>
<td>9.0</td>
</tr>
<tr>
<td>BIOC 603S</td>
<td>Advanced Topics in Biochemistry and Molecular Biology</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 501S</td>
<td>Biostatistics I</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S</td>
<td>Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>BIOC 511S</td>
<td>Writing for Researchers: Grants and Papers</td>
<td>1.0</td>
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<tr>
<td>IDPT 526S</td>
<td>Cells to Systems</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 600S</td>
<td>Thesis Defense</td>
<td>9.0</td>
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<tr>
<td>MCBG 507S</td>
<td>MACROMOLECULAR STRUCT &amp; FUNCTI</td>
<td>2.0</td>
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Suggested Electives *

Select one of the following: 2.0-4.0

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<tr>
<td>IDPT 600S</td>
<td>Thesis Defense</td>
</tr>
</tbody>
</table>

* Additional courses from the Biomedical Graduate programs may be taken as electives. Students should check with the College of Medicine’s Biomedical Graduate Studies (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx) programs.
The program requires the completion 96.0 semester credits. During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student’s Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After concluding their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

### Required Courses
- **BIOC 502S** Biochemistry 1st Lab Rotation 4.0
- **BIOC 503S** Biochemistry 2nd Lab Rotation 4.0
- **BIOC 504S** Biochemistry 3rd Lab Rotation 4.0
- **BIOC 506S** Biochemistry Journal Club 1.0
- **BIOC 507S** Biochemistry Seminar Series 1.0
- **MCBG 506S** ADVANCED CELL BIOLOGY 2.0
- **BIOC 508S** Experimental Approaches to Biochemical Problems 3.0
- **BIOC 511S** Writing for Researchers: Grants and Papers 1.0
- **BIOC 600S** Biochemistry Thesis Research 9.0
- **BIOC 603S** Advanced Topics in Biochemistry and Molecular Biology 2.0
- **IDPT 500S** Responsible Conduct of Research 2.0
- **IDPT 501S** Biostatistics I 2.0
- **IDPT 521S** Molecular Structure and Metabolism 5.0
- **IDPT 526S** Cells to Systems 5.0
- **IDPT 600S** Thesis Defense 9.0
- **MCBG 507S** MACROMOLECULAR STRUCT & FUNCTI 2.0

### Suggested Electives

Students are required to take a minimum of one of the courses from the following list:

- **BIOC 510S** Cancer Biology 2.0-4.0
- **MIIM 555S** Molec. Mech. Of Micro. Path
- **MIIM 630S** Advanced Molecular Biology
- **NEUR 609S** Graduate Neuroscience II
- **PATH 601S** CELL MOL PATHBIO CANCER ANGIOG
- **PHGY 503S** GRADUATE PHYSIOLOGY
- **PHRM 512S** Graduate Pharmacology
- **PHRM 525S** Drug Discovery and Development I

* Additional courses from the Biomedical Graduate programs may be taken as electives. Students should check with the College of Medicine’s Biomedical Graduate Studies (http://www.drexelmed.edu/ Home/AcademicPrograms/BiomedicalGraduateStudies.aspx) programs.

### Biomedicine and Business

**Major: Biomedicine and Business**

**Degree Awarded:** Master of Science (MS)

**Calendar Type:** Semester

**Total Credit Hours:** 36.0

**Classification of Instructional Programs (CIP) code:** 52.0201

**Standard Occupational Classification (SOC) code:** 11-1021; 13-1111; 19-1020; 19-1042; 25-1042

### About the Program

**Mission Statement**

The MS in Biomedicine and Business degree program provides comprehensive training in fundamental aspects of scientific discovery, technology commercialization and business. This degree will enhance the academic credentials of individuals already positioned in biotechnology, biomedical or related industries that are seeking advancement in their careers. It may also serve as an entrée degree for individuals who aspire management and leadership careers within the biotechnology, life sciences and/or biomedical sciences industries.

Graduates of this program will be prepared to continue in more advanced graduate studies in science or business and/or careers in scientifically oriented management jobs in the public or private sector (e.g., biotechnology and pharmaceutical industry, academics, government, nonprofit organizations).

**Curriculum**

This 2-year non-thesis program consists of required and elective courses in science and business (at least 30.0 semester credits) and an experiential learning component (2.0 - 6.0 semester credits). The program’s "flex-credit" option allows students to customize their plan of study depending on each individual’s academic and professional aspirations.

"Flex-credit" can be used to select from a list of advanced elective courses. Students will choose electives based on their career interests and the option they choose to fulfill their experiential learning component. There are several ways to customize the experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student’s own personal situation. The duration of the internship may vary. Shorter rotations may require that the student enroll in elective courses to meet the semester credit requirements for degree. The student must complete a minimum total of 36.0 semester credits to graduate.

**Traditional (Face-to-Face), Hybrid and Online Learning Options**

Select courses in this program are offered in a traditional (face-to-face), hybrid and/or online formats. This allows students maximum scheduling flexibility that fits with each individual’s schedules and learning styles. Students can also maintain the education continuum by mixing and
matching traditional and online courses as best works for each student. The first year courses are foundation courses in science and business.

Interdisciplinary Features

Faculty from Drexel University College of Medicine’s Department of Microbiology and Immunology (http://www.drexelmed.edu/Home/AboutTheCollege/DepartmentsCentersandInstitutes/BasicScienceDepts/MicrobiologyandImmunology.aspx), Institute for Molecular Medicine and Infectious Disease (http://www.drexelmed.edu/Home/AboutTheCollege/DepartmentsCentersandInstitutes/Institutes/MolecularMedicineandInfectiousDisease.aspx) teach the science courses in this program. These courses are taught in semester terms (fall and spring) and are available in a traditional (face-to-face), hybrid, and/or online formats. Some of the traditional courses and hybrid courses are offered in the evenings at either the Center City Campus or the Queen Lane Campus (http://www.drexel.edu/about/directions).

Faculty from Drexel University’s LeBow College of Business (http://www.lebow.drexel.edu) teach the business courses. These courses are taught face-to-face in quarter terms (fall, winter, spring and summer) at the University City Campus (Building No. 61 in the University City Campus map (http://drexel.edu/about/directions/university-city-map)). The University City campus is a 10-minute walk from Center City, the core of Philadelphia’s (http://www.drexel.edu/about/philadelphia) commercial and business district. Shuttle service is available between campuses.

Semesters and quarters at Drexel overlap (view calendar (http://www.drexelmed.edu/drexel-pdf/program-biomedicine-4/Drexel_Biomedicine_Semester_Quarter_Calendar_Overlap_2.pdf) [PDF]) sufficiently to allow students to meet the degree requirements for this program in 2 years. Three credit (3.0) quarter courses confer the equivalent of 2.0 semester credits. Students must enroll in at least one science course each semester.

Full-time and Part-Time Options

Students may meet the degree requirements in either a full-time (at least 9.0 credits per semester) or part-time basis. At least 4.5 semester credits are required to qualify for financial aid. For information regarding financial aid, please visit Drexel Central (http://www.drexel.edu/drexelcentral).

Program Contact Information

For questions about the curriculum and program goals, please contact:
Sandra Urdaneta-Hartmann, MD, PhD, MBA
Program Director
Email: slu22@drexel.edu

For questions about how to apply to the program, please contact:
Stephanie Schleidt
Academic Administrator
Graduate School of Biomedical Sciences and Professional Studies
245 North 15th Street, Mail Stop 344sds
Philadelphia, PA 1910
Email: stephanie.schleidt@drexelmed.edu

Additional information can be found in the College of Medicine’s website (http://www.drexelmed.edu/Home/AcademicPrograms/GraduateSchoolofBiomedSciencesProfStudies/BiomedicineandBusiness.aspx).

Admission Requirements

For acceptance into the MS in Biomedicine and Business program, post-college applicants must have completed a four-year degree program in business, biology, chemistry-based bachelor’s degree program, or equivalent, with at least a 3.0 GPA.

Applicants must also fulfill the following requirements for consideration as defined by the Program Advisory Committee and the Graduate Program Committee (Curriculum & Evaluation Subcommittee) within the Graduate School of Biomedical Sciences and Professional Studies at the College of Medicine:

- Official transcripts from all colleges and universities attended;
- Official test scores from graduate and professional admission exams are highly desirable, such as the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), Law School Admission Test (LSAT), or Medical College Admission Test (MCAT); and
- References from at least three instructors or professionals.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL). IELTS scores may be submitted in lieu of TOEFL scores. An evaluation by World Education Services (WES) is required for transcripts from institutions outside the United States.

Online applications (https://banner.drexel.edu/pls/duprod/bwskalog.P_disploginnon) are accepted all year round, but all admitted students initiate their studies in the following fall semester. Students are encouraged to apply no later than July 1 for consideration for admission the following fall semester. Students may defer admission by one year.

Program Contact Information

For questions about how to apply to the program, please contact:
Stephanie Schleidt
Academic Administrator
Graduate School of Biomedical Sciences and Professional Studies
245 North 15th Street, Mail Stop 344sds
Philadelphia, PA 1910
Email: stephanie.schleidt@drexelmed.edu

Degree Requirements

Courses with the MIIM or IDPT designation are offered by Drexel University College of Medicine and are taught in semester terms (fall and spring). These courses are available in a traditional (face-to-face), hybrid, and/or online formats. Some of these traditional courses and hybrid courses are offered in the evenings at either the Center City Campus or the Queen Lane Campus (http://www.drexel.edu/about/directions).

Courses offered by LeBow College of Business are designated as BUSN. They are taught face-to-face in quarter terms (fall, winter, spring and summer) at the University City Campus (Building No. 61 in the University City Campus map (http://drexel.edu/about/directions/university-city-map)). The University City campus is a 10-minute walk from Center City, the core
of Philadelphia's (http://www.drexel.edu/about/philadelphia) commercial
and business district. Shuttle service is available between campuses.

There are several ways to customize the experiential learning component
(2.0 - 6.0 semester credits) so that it satisfies both the degree
requirements and, especially, the student’s own personal situation.
The duration of the internship may vary. Shorter rotations may require
that the student enroll in elective courses to meet the semester credit
requirements for degree.

Please note that the credits for the BUSN courses shown below are
shown in quarter credits. Three (3.0) credit quarter courses confer
the equivalent of 2.0 semester credits. The program required the
completion of 36.0 semester credits for graduation. Semesters and
quarters overlap sufficiently to allow full-time students to meet the
degree requirements for this program in two years.

Required Courses

Science Requirements
IDPT 500S Responsible Conduct of Research 2.0
IDPT 501S Biostatistics I 2.0
MIIM 515S Concepts in Biomedicine I 3.0
MIIM 516S Concepts in Biomedicine II 2.0
MIIM 535S Biomedical Technology Commercialization I 1.0
MIIM 536S Biomedical Technology Commercialization II 1.0
MIIM 550S Biomedicine Seminar 2.0
MIIM 605S Experiential Learning 4.0
MIIM 631S Biomedical Innovation Development and
Management 4.0
MIIM 645S Biomedical Career Explorations 1.0

Business Requirements
BUSN 501 Measuring and Maximizing Financial Performance * 3.0
BUSN 502 Essentials of Economics * 3.0
MGMT 601 Managing the Total Enterprise * 3.0

Electives
Select a minimum of 8 credits from the following electives: 8.0
- MIIM 521S Biotechniques I
- MIIM 530S Fundamentals of Molecular Medicine I
- MIIM 531S Fundamentals of Molecular Medicine II
- MIIM 533S Fundamentals in Molecular Medicine V
- MIIM 534S Fund. Molecular Med. VI
- MIIM 540S Viruses and Viral Infections
- MIIM 541S Bacteria and Bacterial Infections
- MIIM 542S Mycology, Fungal Infections and Antibiotics
- MIIM 543S Parasitology and Parasitic Diseases
- MIIM 545S Introduction to Infectious Diseases
- MIIM 546S Introduction to Immunology
- MIIM 606S Micro & Immuno Seminar
- MIIM 613S Emerging Infectious Diseases
- MIIM 653S Clinical Correlations in Infectious Disease
- ORGB 625 Leadership and Professional Development *
- ORGB 631 Leading Effective Organizations *

* Science courses are offered on a semester basis, and business
courses are offered on a quarter basis. Semesters and quarters
overlap sufficiently to allow students to meet the degree requirements
in 2 years. The formula to convert quarter credit hours to semester
credit hours is: Number of quarter credit hours x 0.6667 = Number
of semester credit hours. Therefore a 3.0 quarter credit course will
convert to 2.0 semester credits. This program requires a minimum of
36.0 semester credits to meet the degree requirements.

Sample Plan of Study

Below is a sample full-time plan of study that can be completed in two
years. Students may also opt to enroll part-time. Part-time students
must complete the program within four years. To learn more about part-
time options, please contact the Program Director, Sandra Urdaneta-
Hartmann, MD, PhD, MBA at slu@drexel.edu for more information.

First Year

Fall Credits
MIIM 515S Concepts in Biomedicine I 3.0
MIIM 550S Biomedicine Seminar 2.0
IDPT 500S Responsible Conduct of Research 2.0
BUSN 501 Measuring and Maximizing Financial Performance 3.0

Term Credits 10.0

Total Credit: 10.0

* Business requirements are listed in quarter credits. However, 2.0
semester credits will be awarded for 3.0 quarter credits. Total
semester credits for first year, fall semester = 9.0

First Year

Spring Credits
MIIM 516S Concepts in Biomedicine II 2.0
MIIM 535S Biomedical Technology Commercialization I 1.0
IDPT 501S Biostatistics I 2.0
BUSN 502 Essentials of Economics 3.0
MGMT 601 Managing the Total Enterprise 3.0

Term Credits 11.0

Total Credit: 11.0

* Business requirements are listed in quarter credits. However, 2.0
semester credits will be awarded for 3.0 quarter credits. Total
semester credits for first year, spring semester = 9.0

Second Year

Fall Credits
MIIM 536S Biomedical Technology Commercialization II 1.0
MIIM 605S Experiential Learning 4.0
ORGB 625 Leadership and Professional Development 3.0
MIIM 540S Viruses and Viral Infections (or other elective) 2.0

Term Credits 10.0

Total Credit: 10.0

ORGB 631 Leading Effective Organizations *
* Business requirements are listed in quarter credits. However, 2.0 semester credits will be awarded for 3.0 quarter credits. Total semester credits for second year, spring semester = 9.0
** Other electives are as follows: MIIM 521S, MIIM 530S, MIIM 531S, MIIM 533S, MIIM 534S, MIIM 541S, MIIM 542S, MIIM 543S, MIIM 545S, MIIM 546S, MIIM 606S, MIIM 613S, MIIM 653S, ORGB 625, ORGB 631

Second Year

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<td>MIIM 631S</td>
<td>Biomedical Innovation Development and Management</td>
</tr>
<tr>
<td>MIIM 645S</td>
<td>Biomedical Career Explorations</td>
</tr>
<tr>
<td>ORGB 631*</td>
<td>Leading Effective Organizations</td>
</tr>
<tr>
<td>MIIM 521S**</td>
<td>Biotechniques I (or other elective)</td>
</tr>
</tbody>
</table>

| Term Credits | 10.0 |

Total Credit: 10.0

* Business requirements are listed in quarter credits. However, 2.0 semester credits will be awarded for 3.0 quarter credits. Total semester credits for second year, spring semester = 9.0
** Other electives are as follows: MIIM 530S, MIIM 531S, MIIM 533S, MIIM 534S, MIIM 541S, MIIM 542S, MIIM 543S, MIIM 545S, MIIM 546S, MIIM 606S, MIIM 613S, MIIM 653S, ORGB 625, ORGB 631

Program Goals

Upon completion of the degree requirements of this program students would have achieved the following program-level goals:

1. **Develop broad core knowledge in biological sciences, business and biomedical technology development**
   - Be proficient at conducting primary research
   - Be proficient in collecting data from electronic databases, the World Wide Web, the library, and other sources
   - Be able to interpret data

2. **Develop professional ethics**
   - Be able to identify and evaluate professional ethical dilemmas, and discuss appropriate resolutions
   - Apply professional ethical standards such as appropriate attribution of ideas, good recordkeeping, and truthful presentation of data/facts and conclusions
   - Be able to identify and evaluate the economic and social impact of strategic decisions

3. **Develop communication and leadership skills**
   - Be proficient at developing oral and/or written comprehensive reports, presenting facts, analysis, and conclusions
   - Be proficient at using appropriate technologies for communication
   - Be able to interact and work effectively with others in work settings involving cultural and demographic diversity

4. **Develop other “work readiness” soft skills (e.g., teamwork, problem-solving, knowledge of career opportunities, networking)**
   - Be knowledgeable of career opportunities in their desired field
   - Be proficient at presenting a professional profile of oneself
   - Be proficient at time-management
   - Be able to work in teams
   - Begin to develop problem-solving skills for use in the workplace
   - Begin to develop a professional network

Drexel Student Learning Priorities (DSLPs)

In the course of meeting these program-level goals, students would have also made progress in all of Drexel’s Student Learning Priorities (DSLPs) (http://www.drexel.edu/provost/irae/assessment/outcomes/dslp) to help them build their future:

**Core Intellectual and Practical Skills:**
- Communication
- Creative and critical thinking
- Ethical reasoning
- Information literacy
- Self-directed learning

**Experiential and Applied Learning:**
- Global competence
- Leadership
- Professional practice
- Research, scholarship and creative expression
- Responsible citizenship

Biomedicine and Digital Media

Major: Biomedicine and Business
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 36.0
Classification of Instructional Programs (CIP) code: 26; 50.0401; 51.2703
About the Program

The MS in Biomedicine and Digital Media program is a graduate degree program that intersects science, technology, art and entrepreneurship. This skills-based program is for individuals interested in media design and production careers with an emphasis in health and science.

Graduates of this program will be prepared to progress into more advanced graduate studies in science or digital media and/or careers in scientifically oriented media/communication jobs in the public or private sector (e.g., academic, scientific publishing and media companies), or lead their new ventures in digital imaging.

Curriculum

This 2-year non-thesis program consists of required and elective courses in science and digital media (at least 30.0 semester credits) and an experiential learning component (2.0-6.0 semester credits). The program's "flex-credit" option allows students to customize their plan of study depending on each individual's academic and professional aspirations.

"Flex-credit" can be used to select from a list of advanced elective courses. Students will choose electives based on their career interests and the option they choose to fulfill their experiential learning component. There are several ways to customize the experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student's own personal situation. The duration of the internship may vary. Shorter rotations may require that the student enroll in elective courses to meet the semester credit requirements for degree. The student must complete a minimum total of 36.0 semester credits to graduate.

Traditional (Face-to-Face), Hybrid and Online Learning Options

Select courses in this program are offered in a traditional (face-to-face), hybrid and/or online formats. This allows students maximum scheduling flexibility that fits with each individual's schedules and learning styles. Students can also maintain the education continuum by mixing and matching traditional and online courses as best works for each student. The first year courses are foundation courses in science and business.

Interdisciplinary Features

Faculty from Drexel University College of Medicine's Department of Microbiology and Immunology (http://www.drexelmed.edu/Home/AboutTheCollege/DepartmentsCentersandInstitutes/BasicScienceDepts/MicrobiologyandImmunology.aspx), Institute for Molecular Medicine and Infectious Disease (http://www.drexelmed.edu/Home/AboutTheCollege/DepartmentsCentersandInstitutes/Institutes/MolecularMedicineandInfectiousDisease.aspx) teach the science courses in this program. These courses are taught in semester terms (fall and spring) and are available in a traditional (face-to-face), hybrid, and/or online formats. Some of the traditional courses and hybrid courses are offered in the evenings at either the Center City Campus or the Queen Lane Campus (http://www.drexel.edu/about/directions/university-city-map)). The University City campus is a 10-minute walk from Center City, the core of Philadelphia's commercial and business district. Shuttle service is available between campuses.

Semesters and quarters at Drexel overlap (view calendar (http://www.drexelmed.edu/drexel-pdf/program-biomedicine-4/Drexel_Biomedicine_Semester_Quarter_Calendar_Overlap_2.pdf) sufficiently to allow students to meet the degree requirements for this program in 2 years. Three credit (3.0) quarter courses confer the equivalent of 2.0 semester credits. Students must enroll in at least one science course each semester.

Full-time and Part-Time Options

Students may meet the degree requirements in either a full-time (at least 9.0 credits per semester) or part-time basis. At least 4.5 semester credits are required to qualify for financial aid. For information regarding financial aid, please visit Drexel Central (http://www.drexel.edu/drexelcentral).

Program Contact Information

For questions about the curriculum and program goals, please contact:

Sandra Urdaneta-Hartmann, MD, PhD, MBA
Program Director
Email: slu22@drexel.edu

For questions about how to apply to the program, please contact:

Stephanie Schleidt
Academic Administrator
Graduate School of Biomedical Sciences and Professional Studies
245 North 15th Street, Mail Stop 344sds
Philadelphia, PA 1910
Email: stephanie.schleidt@drexelmed.edu

Additional information can be found of the College of Medicine's website (http://www.drexelmed.edu/Home/AcademicPrograms/GraduateSchoolofBiomedSciencesProfStudies/BiomedicineAndDigitalMedia.aspx).

Admission Requirements

For acceptance into the MS in Biomedicine and Digital Media program, post-college applicants must have completed a four-year degree program in business, biology, chemistry-based bachelor's degree program, or equivalent, with at least a 3.0 GPA.

Applicants must also fulfill the following requirements for consideration as defined by the Program Advisory Committee and the Graduate Program Committee (Curriculum & Evaluation Subcommittee) within the Graduate School of Biomedical Sciences and Professional Studies at the College of Medicine:

- Official transcripts from all colleges and universities attended;
- Official test scores from graduate and professional admission exams are highly desirable, such as the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), Law School Admission Test (LSAT), or Medical College Admission Test (MCAT); and
• References from at least three instructors or professionals.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL). IELTS scores may be submitted in lieu of TOEFL scores. An evaluation by World Education Services (WES) is required for transcripts from institutions outside the United States.

Online applications (https://banner.drexel.edu/pls/duprod/bwskalog_P_displognon) are accepted all year round, but all admitted students initiate their studies in the following fall semester. Students are encouraged to apply no later than July 1 for consideration for admission the following fall semester. Students may defer admission by one year.

**Program Contact Information**

For questions about how to apply to the program, please contact:

Stephanie Schleidt  
Academic Administrator  
Graduate School of Biomedical Sciences and Professional Studies  
245 North 15th Street, Mail Stop 344sds  
Philadelphia, PA 1910  
Email: stephanie.schleidt@drexelmed.edu

**Degree Requirements**

Courses with the MIIM or IDPT designation are offered by Drexel University College of Medicine and are taught in semester terms (fall and spring). These courses are available in a traditional (face-to-face), hybrid, and/or online formats. Some of these traditional courses and hybrid courses are offered in the evenings at either the Center City Campus or the Queen Lane Campus (http://www.drexel.edu/about/directions). Courses offered by Westphal College of Media Arts and Design are designated as DIGM. They are taught face-to-face in quarter terms (fall, winter, spring and summer) at the University City Campus (Building No. 71 in the University City Campus map (http://drexel.edu/about/directions/university-city-map)). The University City campus is a 10-minute walk from Center City, the core of Philadelphia’s (http://www.drexel.edu/about/philadelphia) commercial and business district. Shuttle service is available between campuses.

There are several ways to customize the experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student’s own personal situation. The duration of the internship may vary. Shorter rotations may require that the student enroll in elective courses to meet the semester credit requirements for degree.

Please note that the credits for the DIGM courses shown below are shown in quarter credits. Three (3.0) credit quarter courses confer the equivalent of 2.0 semester credits. The program required the completion of 36.0 semester credits for graduation. Semesters and quarters overlap sufficiently to allow full-time students to meet the degree requirements for this program in two years.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 515S</td>
<td>Concepts in Biomedicine I</td>
<td>3.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIIM 516S</td>
<td>Concepts in Biomedicine II</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 535S</td>
<td>Biomedical Technology Commercialization I</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 536S</td>
<td>Biomedical Technology Commercialization II</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 550S</td>
<td>Biomedicine Seminar</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 605S</td>
<td>Experiential Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 631S</td>
<td>Biomedical Innovation Development and Management</td>
<td>4.0</td>
</tr>
<tr>
<td>MIIM 645S</td>
<td>Biomedical Career Explorations</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Digital Media Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DIGM 505</td>
<td>Design and Interactivity</td>
<td>3.0</td>
</tr>
<tr>
<td>DIGM 506</td>
<td>Animation and Game Design</td>
<td>3.0</td>
</tr>
<tr>
<td>DIGM 520</td>
<td>Advanced Interactivity I</td>
<td>3.0</td>
</tr>
<tr>
<td>DIGM 521</td>
<td>Advanced Interactivity II</td>
<td>3.0</td>
</tr>
<tr>
<td>DIGM 525</td>
<td>Advanced Animation I</td>
<td>3.0</td>
</tr>
<tr>
<td>DIGM 530</td>
<td>Advanced Game Design I</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Electives**

Students must select a minimum of 5 credits from the following:

- IDPT 501S Biostatistics I  
- MIIM 521S Biotechniques I  
- MIIM 530S Fundamentals of Molecular Medicine I  
- MIIM 531S Fundamentals of Molecular Medicine II  
- MIIM 533S Fundamentals in Molecular Medicine V  
- MIIM 534S Fund. Molecular Med. VI  
- MIIM 540S Viruses and Viral Infections  
- MIIM 541S Bacteria and Bacterial Infections  
- MIIM 542S Mycology, Fungal Infections and Antibiotics  
- MIIM 543S Parasitology and Parasitic Diseases  
- MIIM 545S Introduction to Infectious Diseases  
- MIIM 546S Introduction to Immunology  
- MIIM 606S Micro & Immuno Seminar  
- MIIM 613S Emerging Infectious Diseases  
- MIIM 653S Clinical Correlations in Infectious Disease  
- DIGM 526 Advanced Animation II  
- DIGM 531 Advanced Game Design II

**Total Credits:** 42.0

* Science courses are offered on a semester basis, and digital media courses are offered on a quarter basis. Semesters and quarters overlap sufficiently to allow students to meet the degree requirements in 2.5 years. The formula to convert quarter credit hours to semester credit hours is: Number of quarter credit hours x 0.6667 = Number of semester credit hours. Therefore a 3.0 quarter credit course will convert to 2.0 semester credits. This program requires a minimum of 36.0 semester credits to meet the degree requirements.

**Sample Plan of Study**

Below is a sample full-time plan of study that can be completed in two years. Students may also opt to enroll part-time. Part-time students must complete the program within four years. To learn more about part-time options, please contact the Program Director, Sandra Urdaneta-Hartmann, MD, PhD, MBA at slu@drexel.edu for more information.
### First Year

#### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIIM 515S</td>
<td>Concepts in Biomedicine I</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 550S</td>
<td>Biomedicine Seminar</td>
<td>2.0</td>
</tr>
<tr>
<td>DIGM 525</td>
<td>Advanced Animation I</td>
<td>3.0</td>
</tr>
<tr>
<td>DIGM 520</td>
<td>Advanced Interactivity I</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits:** 11.0

* Digital Media courses are listed in quarter credits. However, 2.0 semester credits will be awarded for 3.0 quarter credits. Total semester credits for first year, fall semester = 9.0

#### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIIM 516S</td>
<td>Concepts in Biomedicine II</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 535S</td>
<td>Biomedical Technology Commercialization I</td>
<td>1.0</td>
</tr>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>DIGM 530</td>
<td>Advanced Game Design I</td>
<td>3.0</td>
</tr>
<tr>
<td>DIGM 521</td>
<td>Advanced Interactivity II</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits:** 11.0

* Digital Media courses are listed in quarter credits. However, 2.0 semester credits will be awarded for 3.0 quarter credits. Total semester credits for first year, spring semester = 9.0

### Second Year

#### Fall

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIIM 536S</td>
<td>Biomedical Technology Commercialization II</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 605S</td>
<td>Experiential Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 540S</td>
<td>Viruses and Viral Infections (or other elective)</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 653S</td>
<td>Clinical Correlations in Infectious Disease (or other elective)</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits:** 9.0

** Other electives are as follows: IDPT 500S, IDPT 501S, MIIM 521S, MIIM 530S, MIIM 531S, MIIM 533S, MIIM 540S, MIIM 541S, MIIM 542S, MIIM 543S, MIIM 545S, MIIM 606S, MIIM 613S, DIGM 526, DIGM 531

#### Spring

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIIM 631S</td>
<td>Biomedical Innovation Development and Management</td>
<td>4.0</td>
</tr>
<tr>
<td>MIIM 645S</td>
<td>Biomedical Career Explorations</td>
<td>1.0</td>
</tr>
<tr>
<td>DIGM 526</td>
<td>Advanced Animation II (or other elective)</td>
<td>3.0</td>
</tr>
<tr>
<td>DIGM 531</td>
<td>Advanced Game Design II (or other elective)</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits:** 11.0

### Program Goals

Upon completion of the degree requirements of this program students would have achieved the following program-level goals:

1. **Develop broad core knowledge in digital media development for biomedical science applications**
   - Be proficient in fundamental concepts in molecular and cellular biology, and other major areas within the biological sciences
   - Be proficient in animation and game design
   - Be proficient in the process of biomedical innovation development and commercialization

2. **Develop analytical and critical thinking skills**
   - Be able to critically analyze the ideas and concepts related to science and digital media presented written or orally by others (e.g., textbooks, journals, mass media, presentations by peers and subject matter experts)
   - Be able to identify, analyze, and evaluate the need for innovative solutions to problems or challenges in biomedicine and innovation management
   - Be able to identify and analyze challenges faced in biomedical innovation development and management, including in the field of digital media
   - Be able to discuss the commercial viability of innovative biomedical products
   - Be able to draft and analyze strategic and tactical plans to deliver a biomedical product to the market
   - Be able to articulate and defend their analysis

3. **Develop research skills**
   - Be proficient at conducting primary research
   - Be proficient in collecting data from electronic databases, the World Wide Web, the library, and other sources
   - Be able to interpret data

4. **Develop professional ethics**
   - Be able to identify and evaluate professional ethical dilemmas, and discuss appropriate resolutions
   - Apply professional ethical standards such as appropriate attribution of ideas, good recordkeeping, and truthful presentation of data/facts and conclusions
   - Be able identify and evaluate the economic and social impact of strategic decisions

5. **Develop communication and leadership skills**
   - Be proficient at developing oral and/or written comprehensive reports, presenting facts, analysis, and conclusions
   - Be proficient at using appropriate technologies for communication
   - Be able to interact and work effectively with others in work settings involving cultural and demographic diversity

6. **Develop other “work readiness” soft skills (e.g., teamwork, problem-solving, knowledge of career opportunities, networking)**
• Be knowledgeable of career opportunities in their desired field
• Be proficient at presenting a professional profile of oneself
• Be proficient at time-management
• Be able to work in teams
• Begin to develop problem-solving skills for use in the workplace
• Begin to develop a professional network

Drexel Student Learning Priorities (DSLPs)

In the course of meeting these program-level goals, students would have also made progress in all of (https://www.drexel.edu/provost/learningpriorities) Drexel’s Student Learning Priorities (DSLPs) (http://www.drexel.edu/provost/irae/assessment/outcomes/dsip) to help them build their future:

Core Intellectual and Practical Skills:
• Communication
• Creative and critical thinking
• Ethical reasoning
• Information literacy
• Self-directed learning

Experiential and Applied Learning:
• Global competence
• Leadership
• Professional practice
• Research, scholarship and creative expression
• Responsible citizenship

Biomedicine and Entrepreneurship

Major: Biomedicine and Entrepreneurship
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 36.0
Classification of Instructional Programs (CIP) code: 26; 52.0701
Standard Occupational Classification (SOC) code: 19-1020; 19-1042; 11-1011

About the Program

Mission Statement

The MS in Biomedicine and Entrepreneurship program integrates training in technical and practical aspects of science, research and entrepreneurship for individuals interested in pursuing innovation-driven careers in the life sciences. The program helps develop individual initiative and entrepreneurial thinking around scientific discoveries and innovation. The program is designed to facilitate not only new venture creation but also individual initiative and entrepreneurial thinking.

Graduates of the program will be prepared to progress into more advanced graduate studies in science or entrepreneurship and/or careers in scientifically oriented management jobs in the public or private sector. These graduates will especially be equipped to lead or have top management roles in new biomedical or life sciences ventures.

Curriculum

This 2-year non-thesis program consists of required and elective courses in science and business (at least 30.0 semester credits) and an experiential learning component (2.0 - 6.0 semester credits). The program’s "flex-credit" option allows students to customize their plan of study depending on each individual’s academic and professional aspirations.

"Flex-credit" can be used to select from a list of advanced elective courses. Students will choose electives based on their career interests and the option they choose to fulfill their experiential learning component. There are several ways to customize the experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student’s own personal situation. The duration of the internship may vary. Shorter rotations may require that the student enroll in elective courses to meet the semester credit requirements for degree. The student must complete a minimum total of 36.0 semester credits to graduate.

Traditional (Face-to-Face), Hybrid and Online Learning Options

Most courses in this program are offered as online only. Select courses in this program are offered in a traditional (face-to-face), hybrid and/or online formats. This allows students maximum scheduling flexibility that fits with each individual’s schedules and learning styles. Students can also maintain the education continuum by mixing and matching traditional and online courses as best works for each student. The first year courses are foundation courses in science and business.

Interdisciplinary Features

Faculty from Drexel University College of Medicine’s Department of Microbiology and Immunology (http://www.drexelmed.edu/Home/AboutTheCollege/DepartmentsCentersandInstitutes/BasicScienceDepts/MicrobiologyandImmunology.aspx), Institute for Molecular Medicine and Infectious Disease (http://www.drexelmed.edu/Home/AboutTheCollege/DepartmentsCentersandInstitutes/Institutes/MolecularMedicineandInfectiousDisease.aspx) teach the science courses in this program. These courses are taught in semester terms (fall and spring) and are available in a traditional (face-to-face), hybrid, and/or online formats. Some of the traditional courses and hybrid courses are offered in the evenings at either the Center City Campus or the Queen Lane Campus (http://www.drexel.edu/about/directions).

Faculty from Drexel University's Drexel University's Close School of Entrepreneurship (http://www.drexel.edu/close), teach the entrepreneurship courses. These courses are taught online in quarter terms (fall, winter, spring and summer). The Close School is located in the University City Campus (Building No. 61 in the University City Campus map (http://drexel.edu/about/directions/university-city-map)). The University City campus is a 10-minute walk from Center City, the core of Philadelphia’s (http://www.drexel.edu/about/philadelphia) commercial and business district. Shuttle service is available between campuses.

Semesters and quarters at Drexel overlap (view calendar (http://www.drexelmed.edu/drexel-pdf/program-biomedicine-4/Drexel_Biomedicine_Semester_Quarter_Calendar_Overlap_2.pdf) (PDF) sufficiently to allow students to meet the degree requirements for this program in 2 years. Three credit (3.0) quarter courses confer the equivalent of 2.0 semester credits. Students must enroll in at least one science course each semester.
Full-time and Part-Time Options
Students may meet the degree requirements in either a full-time (at least 9.0 credits per semester) or part-time basis. At least 4.5 semester credits are required to qualify for financial aid. For information regarding financial aid, please visit Drexel Central (http://drexel.edu/drexelcentral).

Program Contact Information
For questions about the curriculum and program goals, please contact:  
Sandra Urdaneta-Hartmann, MD, PhD, MBA  
Program Director  
Email: slu22@drexel.edu

For questions about how to apply to the program, please contact:  
Stephanie Schleidt  
Academic Administrator  
Graduate School of Biomedical Sciences and Professional Studies  
245 North 15th Street, Mail Stop 344sds  
Philadelphia, PA 1910  
Email: stephanie.schleidt@drexelmed.edu

Additional information can be found of the College of Medicine's website (http://www.drexelmed.edu/Home/AcademicPrograms/GraduateSchoolofBiomedSciencesProfStudies/BiomedicineandEntrepreneurship.aspx).

Admission Requirements
For acceptance into the MS in Biomedicine and Entrepreneurship program, post-college applicants must have completed a four-year degree program in business, biology, chemistry-based bachelor’s degree program, or equivalent, with at least a 3.0 GPA.

Applicants must also fulfill the following requirements for consideration as defined by the Program Advisory Committee and the Graduate Program Committee (Curriculum & Evaluation Subcommittee) within the Graduate School of Biomedical Sciences and Professional Studies at the College of Medicine:

• Official transcripts from all colleges and universities attended;
• Official test scores from graduate and professional admission exams are highly desirable, such as the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), Law School Admission Test (LSAT), or Medical College Admission Test (MCAT); and
• References from at least three instructors or professionals.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL). IELTS scores may be submitted in lieu of TOEFL scores. An evaluation by World Education Services (WES) is required for transcripts from institutions outside the United States.

Online applications (https://banner.drexel.edu/pls/duprod/bwskalog.P_displuginnon) are accepted all year round, but all admitted students initiate their studies in the following fall semester. Students are encouraged to apply no later than July 1 for consideration for admission the following fall semester. Students may defer admission by one year.

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Stephanie Schleidt  
Academic Administrator  
Graduate School of Biomedical Sciences and Professional Studies  
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Philadelphia, PA 1910  
Email: stephanie.schleidt@drexelmed.edu

Degree Requirements
Courses with the MIIM or IDPT designation are offered by Drexel University College of Medicine and are taught in semester terms (fall and spring). These courses are available in a traditional (face-to-face), hybrid, and/or online formats. Some of these traditional courses and hybrid courses are offered in the evenings at either the Center City Campus or the Queen Lane Campus (http://www.drexel.edu/about/directions).

Courses offered by the Close School of Entrepreneurship are designated as ENTP. They are taught mostly online in quarter terms (fall, winter, spring and summer).

There are several ways to customize the experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student’s own personal situation. The duration of the internship may vary. Shorter rotations may require that the student enroll in elective courses to meet the semester credit requirements for degree.

Please note that the credits for the ENTP courses shown below are shown in quarter credits. Three (3.0) credit quarter courses confer the equivalent of 2.0 semester credits. The program required the completion of 36.0 semester credits for graduation. Semesters and quarters overlap sufficiently to allow full-time students to meet the degree requirements for this program in 2 years.

Required Courses

Science Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 501S</td>
<td>Biostatistics I</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 515S</td>
<td>Concepts in Biomedicine I</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 516S</td>
<td>Concepts in Biomedicine II</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 535S</td>
<td>Biomedical Technology Commercialization I</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 536S</td>
<td>Biomedical Technology Commercialization II</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 550S</td>
<td>Biomedicine Seminar</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 605S</td>
<td>Experiential Learning</td>
<td>4.0</td>
</tr>
<tr>
<td>MIIM 631S</td>
<td>Biomedical Innovation Development and</td>
<td>4.0</td>
</tr>
<tr>
<td></td>
<td>Management</td>
<td></td>
</tr>
<tr>
<td>MIIM 645S</td>
<td>Biomedical Career Explorations</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Entrepreneurship Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENTP 501</td>
<td>Entrepreneurship Essentials</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 610</td>
<td>Leading New Ventures</td>
<td>3.0</td>
</tr>
<tr>
<td>ENTP 640</td>
<td>Methods of Entrepreneurship</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Electives

Select a minimum of 8 credits from the following electives: 8.0
### Sample Plan of Study

Below is a sample full-time plan of study that can be completed in two years. Students may also opt to enroll part-time. Part-time students must complete the program within four years. To learn more about part-time options, please contact the Program Director, Sandra Urdaneta-Hartmann, MD, PhD, MBA at slu@drexel.edu for more information.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>MIIM 515S</td>
<td>Concepts in Biomedicine I 3.0</td>
</tr>
<tr>
<td>MIIM 550S</td>
<td>Biomedicine Seminar 2.0</td>
</tr>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research 2.0</td>
</tr>
<tr>
<td>ENTP 501+</td>
<td>Entrepreneurship Essentials 3.0</td>
</tr>
<tr>
<td><strong>Total Credit</strong></td>
<td><strong>10.0</strong></td>
</tr>
</tbody>
</table>

- Science courses are offered on a semester basis, and entrepreneurship courses are offered on a quarter basis. Semesters and quarters overlap sufficiently to allow students to meet the degree requirements in 2 years. The formula to convert quarter credit hours to semester credit hours is: Number of quarter credit hours x 0.6667 = Number of semester credit hours. Therefore a 3.0 quarter credit course will convert to 2.0 semester credits. This program requires a minimum of 36.0 semester credits to meet the degree requirements.

<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>MIIM 535S</td>
<td>Biomedical Technology Commercialization I 1.0</td>
</tr>
<tr>
<td>MIIM 605S</td>
<td>Experiential Learning 4.0</td>
</tr>
<tr>
<td>ENTP 640+</td>
<td>Methods of Entrepreneurship 3.0</td>
</tr>
<tr>
<td>MIIM 540S</td>
<td>Viruses and Viral Infections (or other elective) 2.0</td>
</tr>
<tr>
<td><strong>Total Credit</strong></td>
<td><strong>10.0</strong></td>
</tr>
</tbody>
</table>

- Entrepreneurship requirements are listed in quarter credits. However, 2.0 semester credits will be awarded for 3.0 quarter credits. Total semester credits for first year, spring semester = 9.0

**Other electives are as follows:** MIIM 521S, MIIM 530S, MIIM 531S, MIIM 533S, MIIM 534S, MIIM 540S, MIIM 541S, MIIM 542S, MIIM 543S, MIIM 545S, MIIM 546S, MIIM 606S, MIIM 613S, MIIM 653S, ENTP 535

### Program Goals

Upon completion of the degree requirements for this MS program, students would have achieved the following program-level goals:

1. **Develop broad core knowledge in biological sciences, entrepreneurship and biomedical innovation**
   - Be proficient in fundamental concepts in molecular and cellular biology, and other major areas within the biological sciences
   - Be proficient in fundamental concepts in entrepreneurship
   - Be proficient in the process of biomedical innovation development and commercialization

2. **Develop analytical and critical thinking skills**
• Be able to critically analyze the ideas and concepts related to science and entrepreneurship presented written or orally by others (e.g., textbooks, journals, mass media, presentations by peers and subject matter experts)
• Be able to identify, analyze, and evaluate the need for innovative solutions to problems or challenges in biomedicine and innovation management
• Be able to identify and analyze challenges faced in biomedical innovation development and management
• Be able to discuss the commercial viability of innovative biomedical products (e.g., drugs, devices, diagnostics, digital media content)
• Be able to draft and analyze strategic and tactical plans to deliver a biomedical product to the market
• Be able to articulate and defend their analysis

3. Develop research skills
• Be proficient at conducting primary research
• Be proficient in collecting data from electronic databases, the World Wide Web, the library, and other sources
• Be able to interpret data

4. Develop professional ethics
• Be able to identify and evaluate professional ethical dilemmas, and discuss appropriate resolutions
• Apply professional ethical standards such as appropriate attribution of ideas, good recordkeeping, and truthful presentation of data/facts and conclusions
• Be able identify and evaluate the economic and social impact of strategic decisions

5. Develop communication and leadership skills
• Be proficient at developing oral and/or written comprehensive reports, presenting facts, analysis, and conclusions
• Be proficient at using appropriate technologies for communication
• Be able to interact and work effectively with others in work settings involving cultural and demographic diversity

6. Develop other “work readiness” soft skills (e.g., teamwork, problem-solving, knowledge of career opportunities, networking)
• Be knowledgeable of career opportunities in their desired field
• Be proficient at presenting a professional profile of oneself
• Be proficient at time-management
• Be able to work in teams
• Begin to develop problem-solving skills for use in the workplace
• Begin to develop a professional network

Drexel Student Learning Priorities (DSLPs)

In the course of meeting these program-level goals, students would have also made progress in all of (https://www.drexel.edu/provost/learningpriorities) Drexel’s Student Learning Priorities (DSLPs) (http://www.drexel.edu/provost/rae/assessment/outcomes/dslp) to help them build their future:

Core Intellectual and Practical Skills:
• Communication
• Creative and critical thinking
• Ethical reasoning
• Information literacy

• Self-directed learning

Experiential and Applied Learning:
• Global competence
• Leadership
• Professional practice
• Research, scholarship and creative expression
• Responsible citizenship

Biomedicine and Law

Major: Biomedicine and Law
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 36.0
Classification of Instructional Programs (CIP) code: 26; 22.0000
Standard Occupational Classification (SOC) code: 19-1020; 19-1042; 23-2000

About the Program

The Masters of Science in Biomedicine and Law degree program provides interactive and comprehensive training in technical and practical aspects of science and research, as well as in the legal aspects related to new biomedical product development, entrepreneurship and regulatory compliance. This program is geared to individuals interested in careers focused in technology development.

Graduates of this program will be prepared to progress into more advanced graduate studies in science and/or careers in scientifically oriented management jobs in the public or private sector (e.g., technology commercialization offices, patent agencies). These individuals will also be competitive Law School applicants, if they so chose to continue their professional studies, even though credits for their legal coursework in this program will not be transferable for Law School credits.

Curriculum

This 2-year non-thesis program consists of required and elective courses in science and digital media (at least 30.0 semester credits) and an experiential learning component (2.0 - 6.0 semester credits). The program’s "flex-credit" option allows students to customize their plan of study depending on each individual’s academic and professional aspirations.

"Flex-credit" can be used to select from a list of advanced elective courses. Students will choose electives based on their career interests and the option they choose to fulfill their experiential learning component. There are several ways to customize the experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student’s own personal situation. The duration of the internship may vary. Shorter rotations may require that the student enroll in elective courses to meet the semester credit requirements for degree. The student must complete a minimum total of 36.0 semester credits to graduate.

Traditional (Face-to-Face), Hybrid and Online Learning Options

Most courses in this program are offered as online only. Select courses in this program are offered in a traditional (face-to-face), hybrid and/or online formats. This allows students maximum scheduling flexibility that
fits with each individual’s schedules and learning styles. Students can also maintain the education continuum by mixing and matching traditional and online courses as best works for each student. The first year courses are foundation courses in science and business.

**Interdisciplinary Features**

Faculty from Drexel University’s College of Medicine’s Department of Microbiology and Immunology (http://www.drexelmed.edu/Home/AboutTheCollege/DepartmentsCentersandInstitutes/BasicScienceDepts/MicrobiologyandImmunology.aspx), Institute for Molecular Medicine and Infectious Disease (http://www.drexelmed.edu/Home/AboutTheCollege/DepartmentsCentersandInstitutes/Institutes/MolecularMedicineandInfectiousDisease.aspx) teach the science courses in this program. These courses are taught in semester terms (fall and spring) and are available in a traditional (face-to-face), hybrid, and/or online formats. Some of the traditional courses and hybrid courses are offered in the evenings at either the Center City Campus or the Queen Lane Campus (http://www.drexel.edu/about/directions).

Faculty from Drexel University’s Drexel University’s K (http://www.drexel.edu/college) line School of Law (http://drexel.edu/law), teach the law courses in semester terms as well (fall and spring). Most courses offered by the Kline School of Law are taught online, but some are offered face-to-face only at the University City Campus (Building No. 90 in the University City Campus map (http://drexel.edu/about/directions/university-city-map)). The University City campus is a 10-minute walk from Center City, the core of Philadelphia’s (http://www.drexel.edu/about/philadelphia) commercial and business district. Shuttle service is available between campuses.

**Full-time and Part-Time Options**

Students may meet the degree requirements in either a full-time (at least 9.0 credits per semester) or part-time basis. At least 4.5 semester credits are required to qualify for financial aid. For information regarding financial aid, please visit Drexel Central (http://drexel.edu/drexelcentral).

**Program Contact Information**

For questions about how to apply to the program, please contact:

Sandra Urdaneta-Hartmann, MD, PhD, MBA
Program Director
Email: slu22@drexel.edu

For questions about the curriculum and program goals, please contact:

Stephanie Schleidt
Academic Administrator
Graduate School of Biomedical Sciences and Professional Studies
245 North 15th Street, Mail Stop 344sds
Philadelphia, PA 1910
Email: stephanie.schleidt@drexelmed.edu

Additional information can be found of the College of Medicine’s website (http://www.drexelmed.edu/Home/AcademicPrograms/GraduateSchoolofBiomedSciencesProfStudies/BiomedicineandLaw.aspx).

**Admission Requirements**

For acceptance into the MS in Biomedicine and Law program, post-college applicants must have completed a four-year degree program in business, biology, chemistry-based bachelor’s degree program, or equivalent, with at least a 3.0 GPA.

Applicants must also fulfill the following requirements for consideration as defined by the Program Advisory Committee and the Graduate Program Committee (Curriculum & Evaluation Subcommittee) within the Graduate School of Biomedical Sciences and Professional Studies at the College of Medicine:

- Official transcripts from all colleges and universities attended;
- Official test scores from graduate and professional admission exams are highly desirable, such as the Graduate Record Examination (GRE), Graduate Management Admission Test (GMAT), Law School Admission Test (LSAT), or Medical College Admission Test (MCAT);
- References from at least three instructors or professionals.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL). IELTS scores may be submitted in lieu of TOEFL scores. An evaluation by World Education Services (WES) is required for transcripts from institutions outside the United States.

Online applications (https://banner.drexel.edu/pls/duprod/bwskalog.P_disploginnon) are accepted all year round, but all admitted students initiate their studies in the following fall semester. Students are encouraged to apply no later than July 1 for consideration for admission the following fall semester. Students may defer admission by one year.

**Program Contact Information**

For questions about how to apply to the program, please contact:

Stephanie Schleidt
Academic Administrator
Graduate School of Biomedical Sciences and Professional Studies
245 North 15th Street, Mail Stop 344sds
Philadelphia, PA 1910
Email: stephanie.schleidt@drexelmed.edu

**Degree Requirements**

Courses with the MIIM or IDPT designation are offered by Drexel University College of Medicine and are taught in semester terms (fall and spring). These courses are available in a traditional (face-to-face), hybrid, and/or online formats. Some of these traditional courses and hybrid courses are offered in the evenings at either the Center City Campus or the Queen Lane Campus (http://www.drexel.edu/about/directions).

Courses offered by the Kline School of Law are designated as LSTU. They are taught mostly online in semester terms (fall and spring).

There are several ways to customize the experiential learning component (2.0 - 6.0 semester credits) so that it satisfies both the degree requirements and, especially, the student’s own personal situation. The duration of the internship may vary. Shorter rotations may require
that the student enroll in elective courses to meet the semester credit requirements for degree.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIIM 515S</td>
<td>Concepts in Biomedicine I</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 516S</td>
<td>Concepts in Biomedicine II</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 535S</td>
<td>Biomedical Technology Commercialization I</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 536S</td>
<td>Biomedical Technology Commercialization II</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 550S</td>
<td>Biomedicine Seminar</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 605S</td>
<td>Experiential Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 631S</td>
<td>Biomedical Innovation Development and Management</td>
<td>4.0</td>
</tr>
<tr>
<td>MIIM 645S</td>
<td>Biomedical Career Explorations</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Science Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
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</tr>
<tr>
<td>MIIM 645S</td>
<td>Biomedical Career Explorations</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Electives**

**Science electives:**
- MIIM 521S Biotechniques I
- MIIM 530S Fundamentals of Molecular Medicine I
- MIIM 531S Fundamentals of Molecular Medicine II
- MIIM 533S Fundamentals in Molecular Medicine V
- MIIM 534S Fund. Molecular Med. VI
- MIIM 540S Viruses and Viral Infections
- MIIM 541S Bacteria and Bacterial Infections
- MIIM 542S Mycology, Fungal Infections and Antibiotics
- MIIM 543S Parasitology and Parasitic Diseases
- MIIM 544S Introduction to Infectious Diseases
- MIIM 546S Introduction to Immunology
- MIIM 606S Micro & Immuno Seminar
- MIIM 613S Emerging Infectious Diseases
- MIIM 653S Clinical Correlations in Infectious Disease

**Law electives:**
- LAW 674S Health Care Fraud and Abuse
- LAW 703S Law and Entrepreneurship
- LAW 792S Food and Drug Law
- LSTU 501S Compliance Skills: Auditing, Investigation & Reporting
- LSTU 504S Health Care Rules and Regulations
- LSTU 505S Health Care Quality, Patient Safety and Risk Management
- LSTU 507S Risk Assessment and Management

**Law Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
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</tr>
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<td>MIIM 550S</td>
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<td>2.0</td>
</tr>
<tr>
<td>LAW 783S</td>
<td>Bioethics</td>
<td>2.0</td>
</tr>
<tr>
<td>LSTU 500S</td>
<td>Introduction to the Legal System</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Total Credits**

**36.0**

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**Sample Plan of Study**

Below is a sample full-time plan of study that can be completed in two years. Students may also opt to enroll part-time. Part-time students must complete the program within four years. To learn more about part-time options, please contact the Program Director, Sandra Urdaneta-Hartmann, MD, PhD, MBA at slu@drexel.edu for more information.

**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
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<td>Introduction to the Legal System</td>
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</tr>
</tbody>
</table>

**Term Credits**

**9.0**

**Total Credit: 9.0**

**First Year**

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
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<td>2.0</td>
</tr>
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<td>MIIM 535S</td>
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<td>1.0</td>
</tr>
<tr>
<td>MIIM 645S</td>
<td>Biomedical Career Explorations</td>
<td>1.0</td>
</tr>
<tr>
<td>LSTU 503S</td>
<td>Legal Research and Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 506S</td>
<td>Patients and Privacy: HIPAA and Related Regulations</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Term Credits**

**9.0**

**Total Credit: 9.0**

**Second Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIIM 536S</td>
<td>Biomedical Technology Commercialization II</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 605S</td>
<td>Experiential Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 501S</td>
<td>Compliance Skills: Auditing, Investigation Reporting (or other law elective)</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 540S</td>
<td>Viruses and Viral Infections (or other science elective)</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Term Credits**

**9.0**

**Total Credit: 9.0**

* Other law electives are as follows: LAW 674S, LAW 703S, LAW 792S, LSTU 504S, LSTU 505S, LSTU 507S

**Other science electives are as follows:**
- MIIM 521S Biotechniques I
- MIIM 530S Fundamentals of Molecular Medicine I
- MIIM 531S Fundamentals of Molecular Medicine II
- MIIM 533S Fundamentals in Molecular Medicine V
- MIIM 534S Fund. Molecular Med. VI
- MIIM 540S Viruses and Viral Infections
- MIIM 541S Bacteria and Bacterial Infections
- MIIM 542S Mycology, Fungal Infections and Antibiotics
- MIIM 543S Parasitology and Parasitic Diseases
- MIIM 544S Introduction to Infectious Diseases
- MIIM 546S Introduction to Immunology
- MIIM 606S Micro & Immuno Seminar
- MIIM 613S Emerging Infectious Diseases
- MIIM 653S Clinical Correlations in Infectious Disease

**Second Year**

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
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<td>Biomedical Innovation Development and Management</td>
<td>4.0</td>
</tr>
<tr>
<td>LAW 792S</td>
<td>Food and Drug Law</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 521S</td>
<td>Biotechniques I</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Term Credits**

**9.0**

**Total Credit: 9.0**

* Other law electives are as follows: LAW 674S, LAW 703S, LSTU 501S, LSTU 504S, LSTU 505S, LSTU 507S
** Other science electives are as follows: MIIM 530S, MIIM 531S, MIIM 533S, MIIM 534S, MIIM 540S, MIIM 541S, MIIM 542S, MIIM 543S, MIIM 545S, MIIM 546S, MIIM 606S, MIIM 613S, MIIM 653S

Program Goals

Upon completion of the degree requirements for this MS program, students would have achieved the following program-level goals:

1. Develop broad core knowledge in biological sciences and legal aspects of biomedical innovation
   - Be proficient in fundamental concepts in molecular and cellular biology, and other major areas within the biological sciences
   - Be proficient in fundamental concepts in legal aspects in biomedical innovation
   - Be proficient in the process of biomedical innovation development and commercialization

2. Develop analytical and critical thinking skills
   - Be able to critically analyze the ideas and concepts related to science and legal aspects of biomedical research presented written or orally by others (e.g., textbooks, journals, mass media, presentations by peers and subject matter experts)
   - Be able to identify, analyze, and evaluate the need for innovative solutions to problems or challenges in biomedicine and innovation management
   - Be able to identify and analyze challenges faced in biomedical innovation development and management
   - Be able to discuss the commercial viability of innovative biomedical products (e.g., drugs, devices, diagnostics, digital media content)
   - Be able to draft and analyze strategic and tactical plans to deliver a biomedical product to the market
   - Be able to articulate and defend their analysis

3. Develop research skills
   - Be proficient at conducting primary research
   - Be proficient in collecting data from electronic databases, the World Wide Web, the library, and other sources
   - Be able to interpret data

4. Develop professional ethics
   - Be able to identify and evaluate professional ethical dilemmas, and discuss appropriate resolutions
   - Apply professional ethical standards such as appropriate attribution of ideas, good recordkeeping, and truthful presentation of data/facts and conclusions
   - Be able identify and evaluate the economic and social impact of strategic decisions

5. Develop communication and leadership skills
   - Be proficient at developing oral and/or written comprehensive reports, presenting facts, analysis, and conclusions
   - Be proficient at using appropriate technologies for communication
   - Be able to interact and work effectively with others in work settings involving cultural and demographic diversity

6. Develop other “work readiness” soft skills
   - Be knowledgeable of career opportunities in their desired field
   - Be proficient at presenting a professional profile of oneself
   - Be proficient at time-management
   - Be able to work in teams

Drexel Student Learning Priorities (DSLPs)

In the course of meeting these program-level goals, students would have also made progress in all of (https://www.drexel.edu/provost/learningpriorities) Drexel’s Student Learning Priorities (DSLPs) (http://www.drexel.edu/provost/irae/assessment/outcomes/dslp) to help them build their future:

Core Intellectual and Practical Skills:
- Communication
- Creative and critical thinking
- Ethical reasoning
- Information literacy
- Self-directed learning

Experiential and Applied Learning:
- Global competence
- Leadership
- Professional practice
- Research, scholarship and creative expression
- Responsible citizenship

Certificate in Medical Science Preparatory Program

Certificate Level: Graduate
Admissions Requirements: Bachelor's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 47.0
Instructional Delivery: Campus
Calendar Type: Semester
Expected Time to Completion: 3 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.1199
Standard Occupational Classification (SOC) Code:

Note: Effective Fall Semester 2015, no students will be accepted into this certificate program.

About the Program

The School of Biomedical Sciences and Professional Studies at Drexel University’s College of Medicine offers the Medical Science Preparatory (MSP) program. The MSP certificate is a one-year program designed to help students enhance their credentials for application to medical or other health professional schools by improving their science background and admissions test scores, in particular the MCAT. This structured program offers both undergraduate and graduate level coursework as well as a formal two-semester MCAT course. Those students who successfully complete the program will receive a Certificate of Program Completion. Students may be considered for linkage with the following medical school programs:

- Edward Via College of Osteopathic Medicine
- Philadelphia College of Osteopathic Medicine
- St. George’s, University of London
St. George's of Grenada School of Medicine  
Touro College of Osteopathic Medicine, New York  
Universidad Autonoma de Guadalajara School of Medicine  
University of Queensland School of Medicine

**Medical Science Preparatory Curriculum**

Students in the Medical Science Preparatory program are required to complete graduate level courses in anatomy, biochemistry, pharmacology, physiology, laboratory techniques and community outreach. Also included are undergraduate level courses in physics and chemistry and a formal MCAT preparation course.

For more information, visit Drexel's College of Medicine Medical Science Preparatory Program (http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/Programs/PreMedicalPrograms/MedicalSciencePreparatoryMSPProgram.aspx) web page.

**Master of Science Option**

Those MSP students who successfully complete the program may elect to continue on to earn a Master of Science degree through the Master of Biological Science or Master of Interdisciplinary Health Sciences programs. Working towards a master's degree will continue to enhance one's credentials for application to medical or other health professionals schools.

### Fall Credits

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MSPP 400S</td>
<td>Advanced Topics in Chemistry I</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPP 402S</td>
<td>Advanced Topics in Physics I</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPP 404S</td>
<td>Concepts in Science and Verbal Reasoning I</td>
<td>6.0</td>
</tr>
<tr>
<td>MSPP 505S</td>
<td>Lab Tech in Bioch Molec Biol</td>
<td>2.0</td>
</tr>
<tr>
<td>MSPP 511S</td>
<td>Concepts in Bioch Cell Biolo</td>
<td>4.0</td>
</tr>
<tr>
<td>PHRM 512S</td>
<td>Graduate Pharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPP 525S</td>
<td>Community Dimensions of Medi</td>
<td>2.0</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
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<td><strong>25.0</strong></td>
</tr>
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### Spring Credits

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<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MSPP 401S</td>
<td>Advanced Topics in Chemistry II</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPP 403S</td>
<td>Advanced Topics in Physics II</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPP 405S</td>
<td>Concepts in Science and Verbal Reasoning II</td>
<td>6.0</td>
</tr>
<tr>
<td>MSPP 513S</td>
<td>Special Topics in Anatomy</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPP 515S</td>
<td>Biological Function Regulation</td>
<td>4.0</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
<td></td>
<td><strong>22.0</strong></td>
</tr>
</tbody>
</table>

**Total Credit: 47.0**

For more information about continuing on to the Master's of Biological Science, visit Drexel's College of Medicine Master of Biological Science (http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/Programs/MasterOfBiologicalScienceMBSProgram.aspx) web page.

**Certificate in Quantitative Principles for Clinical Research**

**Certificate Level:** Graduate  
**Admissions Requirements:** Bachelor's degree or higher  
**Certificate Type:** Graduate  
**Number of Credits to Completion:** 9.0  
**Instructional Delivery:** Online  
**Calendar Type:** Semester  
**Expected Time to Completed:** 1.5 years  
**Financial Aid Eligibility:** Not aid eligible  
**Classification of Instructional Program (CIP) Code:** 51.0000; 51.0719  
**Standard Occupational Classification (SOC) Code:** 11-9111

This certificate of study addresses the needs of residents and fellows to attain knowledge in the basic principles of clinical research - analyzing data, understanding medical literature, and communicating results. All coursework is online, providing flexibility for the trainees and training programs.

Students completing this certificate can then apply to either the Clinical Research Organization and Management (http://drexel.com/crom) or the Clinical Research for Health Professionals (http://drexel.com/crhp) program to obtain an MS degree.

**ADDITIONAL INFORMATION**

Sara Perkel, MBA  
Director, Graduate Programs in Clinical Research  
sara.perkel@drexelmed.edu  
215-762-3812

Visit the Drexel University Online web site for additional information and to apply to the Quantitative Principles for Clinical Research (http://www.drexel.com/online-degrees/biomedical-degrees/qpcr) program.

### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 500S</td>
<td>Epidemiology</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 520S</td>
<td>Applications of Clinical Research Biostatistics</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 525S</td>
<td>Scientific Wriring and Medical Literature</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>9.0</strong></td>
</tr>
</tbody>
</table>

**Certificate in Veterinary Medical Science**

**Certificate Level:** Graduate  
**Admissions Requirements:** Bachelor's degree  
**Certificate Type:** Graduate Certificate
About the Program

The School of Biomedical Sciences and Professional Studies in the College of Medicine offers the Veterinary Medical Science (VMS) program. The VMS program is a one-year graduate level certificate program designed to help students enhance their credentials for veterinary medical school. It is intended for students who believe that their undergraduate performance did not fully reflect their academic abilities and who are now prepared to demonstrate they can excel.

Upon completion of the VMS certificate program, students have the option to continue their studies in the Master of Laboratory Animal Science (MLAS) program. In addition to further enhancing their academic credentials for veterinary medical school, earning the MLAS degree will allow students to pursue advanced careers in laboratory animal science or laboratory animal management.

Curriculum

The VMS curriculum consists of a unique combination of graduate level basic sciences courses, animal science courses, and medical school courses. VMS students are enrolled in several of the same first year medical school courses, as students from Drexel University College of Medicine (DUCOM). Success in this rigorous academic program can be viewed as an indicator of future potential in professional school.

Veterinary Medical School

Successful completion of the VMS program can significantly improve a student’s academic credentials for application to veterinary medical school. Please review our website (http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/AnimalSciencePrograms/VeterinaryMedicalScience.aspx) for a comprehensive list of veterinary medical schools that have been attended by VMS and MLAS alumni.

Career Opportunities

In addition to attending veterinary medical school, VMS graduates have the option to continue their studies within the MLAS program. MLAS graduates hold positions in laboratory animal facilities of universities, biotechnology companies, government agencies, and pharmaceutical companies. There they serve as veterinarians, supervisors, managers, IACUC administrators, trainers, educators, consultants, and sales representatives.

Additional Information

Erin.Vogelsong@DrexelMed.edu

<table>
<thead>
<tr>
<th>Fall</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSP 512S Medical Biochemistry</td>
<td>8.0</td>
</tr>
<tr>
<td>IMSP 520S Medical Physiology I</td>
<td>3.5</td>
</tr>
<tr>
<td>MLAS 525S Animal Anatomy</td>
<td>2.0</td>
</tr>
<tr>
<td>MLAS 606S Clinical Laboratory Techniques and Concepts</td>
<td>1.0</td>
</tr>
<tr>
<td>MSPA 580S Medical Microbiology I</td>
<td>4.0</td>
</tr>
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<table>
<thead>
<tr>
<th>Spring</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSP 521S Medical Physiology II</td>
<td>3.5</td>
</tr>
<tr>
<td>MLAS 529S Molecular Genetics</td>
<td>3.0</td>
</tr>
<tr>
<td>MLAS 530S Biostats In Vet Science</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPP 513S Special Topics in Anatomy</td>
<td>4.0</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
<td><strong>13.5</strong></td>
</tr>
</tbody>
</table>

**Total Credit: 32.0**

Admissions Requirements

Students will be selected on the basis of adequate educational background and veterinary/research/animal care experience.

Prerequisite coursework includes: chemistry, biology, organic chemistry, and physics.

Candidates for admission must provide the following credentials:

- Bachelor’s degree from an accredited U.S. college or university
- Cumulative GPA of 3.0 or higher
- General Graduate Record Exam (GRE) scores at or above the 60th percentile in all areas obtained within the last 5 years
- Official transcript from all post-secondary institutions attended
- Three letters of reference, two must be from science professors
- Personal statement stating the applicant’s academic and professional goals

The deadline for submission of applications is the second Friday in July of the year the student seeks admission.

Certificate of Study in Clinical Research

Certificate Level: Graduate
Admissions Requirements: Bachelor’s degree or higher
Certificate Type: Graduate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Semester
Expected Time to Completion: 1.5 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.0719
Standard Occupational Classification (SOC) Code: 11-9111

This part-time certificate program is a valuable professional resource for today’s busy physicians, physician assistants, nurses, clinical fellows, research coordinators, and other individuals working in the clinical arena who want in-depth exposure to the skills and knowledge needed in the evolving clinical research field without having to commit to an entire
master's program. All courses are conducted online to accommodate the needs of working professionals.

This program requires the successful completion of five graduate courses. Credits earned in the certificate program are recognized towards the Master of Science in Clinical Research Organization and Management (http://drexel.com/crom).

ADDITIONAL INFORMATION

Sara Perkel, MBA
Director, Graduate Programs in Clinical Research
sara.perkel@drexelmed.edu
215-762-3812

Visit the Drexel University Online site for additional program information and to apply to the certificate (http://drexel.com/cscr) program.

15.0 semester credits

Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>CR 515S</td>
<td>Intro to Clinical Trials</td>
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<td>CR 545S</td>
<td>Pharmaceutical Law</td>
<td>3.0</td>
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<tr>
<td>CR 612S</td>
<td>Fundamentals of Compliance</td>
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Electives

Select two of the following:

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<tr>
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<th>Credits</th>
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<tr>
<td>CR 565S</td>
<td>Contemporary Issues in Human Research Protection</td>
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<tr>
<td>CR 570S</td>
<td>Principles and Practice of Pharmacovigilance</td>
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<td>CR 525S</td>
<td>Scientific Writing and Medical Literature</td>
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<tr>
<td>CR 609S</td>
<td>Innovative Product Development</td>
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<tr>
<td>CR 620S</td>
<td>Biotech/Research</td>
<td></td>
</tr>
<tr>
<td>CR 625S</td>
<td>Health Policy and Economics</td>
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</tr>
</tbody>
</table>

Total Credits 15.0

Evening Post-Baccalaureate Pre-Medical Certificate Program

Certificate Level: Undergraduate
Admissions Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 32.0
Instructional Delivery: Campus
Calendar Type: Semester
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.1199
Standard Occupational Classification (SOC) Code: 11-9121

Effective Fall 2015, this certificate program is transitioning to a non-degree preparatory program with no certificate.

About the Program

The School of Biomedical Sciences and Professional Studies at Drexel University's College of Medicine offers the part-time Evening Post-Baccalaureate Pre-Medical certificate. This program gives individuals who hold a non-science baccalaureate degree the opportunity to continue working while they take courses in the evening to prepare themselves for medical, veterinary, dental, podiatric, chiropractic, or other allied health professional schools. This program also affords the individual who took science courses many years ago the opportunity to revisit the sciences. The structured program is the equivalent of five semesters completed in succession.

Linkage agreements have been established to allow students direct entry into medical school programs immediately after successful completion of the PMED program. These schools include Drexel University College of Medicine, Edward Via College of Osteopathic Medicine, Philadelphia College of Osteopathic Medicine, and the Robert Wood Johnson School of Medicine.

The curriculum offers the prerequisite science courses required by most health professional schools. During the first year, general chemistry and general physics with laboratories are offered. During the second year, students take organic chemistry and general biology in the summer and fall semesters. Outside of the program, the opportunity for students to take additional courses through Drexel University is available. Due to modifications being made to the MCAT in 2015, a biochemistry course will be made available through the PMED program.

For more information, visit Drexel's College of Medicine Evening Post-Baccalaureate Pre-Medical Certificate Program (http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PremedicalPrograms/EveningPostBaccalaureatePreMedical.aspx) web page.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>PMED 111S</td>
<td>General Chemistry I</td>
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<td>PMED 112S</td>
<td>General Chemistry I Lab</td>
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</tr>
<tr>
<td>PMED 121S</td>
<td>General Physics I</td>
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<tr>
<td>PMED 122S</td>
<td>General Physics I Lab</td>
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<tr>
<td>PMED 131S</td>
<td>General Chemistry II</td>
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<td>PMED 132S</td>
<td>General Chemistry II Lab</td>
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</tr>
<tr>
<td>PMED 141S</td>
<td>General Physics II</td>
<td>3.0</td>
</tr>
<tr>
<td>PMED 142S</td>
<td>General Physics II Lab</td>
<td>1.0</td>
</tr>
<tr>
<td>PMED 211S</td>
<td>General Biology I</td>
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</tr>
<tr>
<td>PMED 212S</td>
<td>General Biology I Lab</td>
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</tr>
<tr>
<td>PMED 222S</td>
<td>Organic Chemistry I Lab</td>
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<tr>
<td>PMED 231S</td>
<td>General Biology II</td>
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<tr>
<td>PMED 232S</td>
<td>General Biology II Lab</td>
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<td>PMED 241S</td>
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<td>Organic Chemistry II Lab</td>
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<td>PMED 999S</td>
<td>Special Topics in Pre-Medical (ST: Psychology/Sociology)</td>
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<td>PMED 999S</td>
<td>Special Topics in Pre-Medical (ST: Biochemistry)</td>
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<td>PMED 999S</td>
<td>Special Topics in Pre-Medical (ST: Scientific Writing)</td>
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<td>PMED 303S</td>
<td>Course PMED 303S Not Found</td>
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</tr>
<tr>
<td>PMED 302S</td>
<td>Biology of Cancer</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 41.0

Admission Requirements

Students applying to the program must have a bachelor's degree from an accredited institution in the United States. Admission into the program is competitive because of the limited number of seats. Applicants are accepted on a rolling admissions basis.
An applicant should have a minimum combined SAT score of 1000 or ACT score of 21 and a minimum undergraduate grade point average of 3.00. For those individuals far removed from the college years, additional factors, or other more recent coursework, will be considered.

Applicants to the program should have at least 6.0 semester credits of coursework in English literature and the behavioral sciences (psychology, sociology, or philosophy), as that is a requirement for admission into most health professional schools. The opportunity exists within the program to acquire these courses if a student without these courses is accepted. A strong understanding of algebra and trigonometry is a prerequisite for the program. Calculus will also be beneficial.

The program's application can be found on the College of Medicine's Evening Post-Baccalaureate Pre-Med Certificate Admissions (http://www.drexelmed.edu/Home/Admissions/ProfessionalStudiesintheHealthSciences/EveningPostBaccalaureatePremedical.aspx) web page.

Interdepartmental Medical Science

Major: Interdepartmental Medical Science
Degree Awarded: Master of Science
Calendar Type: Semester
Total Credit Hours: 72.0
Classification of Instructional Programs (CIP) code: 26.9999
Standard Occupational Classification (SOC) code: 11-9121

About the Program

The Interdepartmental Medical Science program is a one-year MS degree granting program designed to help premedical students enhance either academic credentials for application to medical or other health professional schools. Students with an undergraduate GPA of 3.0 or higher can be considered for this program. In addition, applicants must have a minimum MCAT score of 27 (with no section less than 8), under the old system. Specific standards are being developed for the new MCAT but at this time, it is expected that students should have a composite score at the 75 percentile or better in order to be considered admission to the program. Students may be advised to sit for the MCAT an additional time following successful completion of the program if their entering MCAT score is not at a competitive level.

Admission Requirements

Students with an undergraduate GPA of 3.0 or higher can be considered for this program. In addition, applicants must have a minimum MCAT score of 27 (with no section less than 8), under the old system. Specific standards are being developed for the new MCAT but at this time, it is expected that students should have a composite score at the 75 percentile or better in order to be considered admission to the program.

Degree Requirements

Interdepartmental Medical Science

Required Courses

<table>
<thead>
<tr>
<th>Fall Semester</th>
<th>Spring Semester</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSP 502S</td>
<td>Medicine and Society I</td>
</tr>
<tr>
<td>IMSP 512S</td>
<td>Medical Biochemistry</td>
</tr>
<tr>
<td>IMSP 520S</td>
<td>Medical Physiology I</td>
</tr>
<tr>
<td>IMSP 540S</td>
<td>Cell Biology &amp; Microanatomy I</td>
</tr>
<tr>
<td>IMSP 570S</td>
<td>Medical Immunology *</td>
</tr>
<tr>
<td>IMSP 550S</td>
<td>Medical Nutrition *</td>
</tr>
<tr>
<td>IMSP 571S</td>
<td>Medical Nutrition I</td>
</tr>
<tr>
<td>IMSP 573S</td>
<td>Medical Immunology I</td>
</tr>
<tr>
<td>IMSP 502S</td>
<td>Medicine and Society I</td>
</tr>
<tr>
<td>IMSP 521S</td>
<td>Medical Physiology II</td>
</tr>
<tr>
<td>IMSP 541S</td>
<td>Cell Biology and Microanatomy II</td>
</tr>
<tr>
<td>IMSP 572S</td>
<td>Medical Nutrition II</td>
</tr>
<tr>
<td>IMSP 574S</td>
<td>Medical Immunology II</td>
</tr>
<tr>
<td>IMSP 506S</td>
<td>Medical Professionalism and Leadership</td>
</tr>
<tr>
<td>IMSP 560S</td>
<td>Medical Neuroscience</td>
</tr>
</tbody>
</table>

Total Credits 34.0

About the Curriculum

The program consists of two parts:

Biotechnology

Major: Biotechnology
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 40.0
Classification of Instructional Programs (CIP) code: 26.1201
Standard Occupational Classification (SOC) code: 11-9121; 19-1029

About the Program

The MS in Biotechnology program is designed to train laboratory personnel in the theory and practice of state-of-the art technologies for biochemical analysis. The program is targeted to individuals who will be seeking employment in biotechnology/pharmaceutical firms or academic laboratories and is appropriate for recent college graduates or experienced technicians. Graduates of this program will possess a set of technical skills that will make them very competitive for laboratory jobs in the academic or industrial sectors, or, if they are already employed, enhance their potential for advancement.

The program length is three semesters plus one summer session and includes both classes and hands-on practica.

About the Curriculum

The program consists of two parts:
1. A set of required didactic courses designed to provide students with the theoretical underpinnings of modern Biochemistry and Biotechnology. This knowledge will form a foundation for the hands-on aspects of the second portion of the curriculum.

2. A set of four hands-on practica providing detailed exposure and experience in four different aspects of biochemistry/biotechnology. Each practicum will be conducted under the close supervision of a faculty member with expertise in the area, and will progress from an initial set of experiments in which the results are already known (allowing students to become familiar with techniques) then progressing to a project tightly associated with the ongoing research in the mentor's laboratory.

Practica during the fall and spring semesters will be 4.0 semester credit hours. The summer practicum will be 8.0 semester credit hours, and will include preparation of a scholarly paper that reviews a topic related to the techniques associated with that particular practicum. Possible practica themes include: protein expression and purification; crystallography; gene expression and manipulation; protein-protein and protein-ligand interaction with SPR; and imaging/microscopy.

### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BIOC 507S</td>
<td>Biochemistry Seminar Series *</td>
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</tr>
<tr>
<td>BIOC 508S</td>
<td>Experimental Approaches to Biochemical Problems</td>
<td>4.0</td>
</tr>
<tr>
<td>BIOC 603S</td>
<td>Advanced Topics in Biochemistry and Molecular Biology</td>
<td>1.0</td>
</tr>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S</td>
<td>Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 526S</td>
<td>Cells to Systems</td>
<td>5.0</td>
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### Required Practica

<table>
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<tbody>
<tr>
<td>BIOC 513S</td>
<td>Biotechnology Practicum I</td>
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<td>BIOC 514S</td>
<td>Biotechnology Practicum II</td>
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<td>BIOC 515S</td>
<td>Biotechnology Practicum III</td>
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<td>BIOC 516S</td>
<td>Biotechnology Practicum IV</td>
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** Total Credits **

<table>
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<tr>
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<tbody>
<tr>
<td>40.0</td>
</tr>
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</table>

* Taken for one credit each term in fall, spring and summer for a total of 3.0 credits.

** The 8.0 credit Practicum is taken in the summer.

### Admission Requirements

For acceptance to the program, the applicant must have completed a four-year biology or chemistry-based bachelor's degree program, or equivalent, with at least a 3.0 GPA. Students must fulfill all requirements for consideration as defined by the Drexel University College of Medicine Biomedical Graduate Education Committee:

- official transcripts from all colleges and universities attended;
- official copies of entrance test scores and official test scores from the Graduate Record Examination (GRE);
- references from at least three instructors or professionals;
- an application fee, made payable to Drexel University is required for application processing (online application is free);
- International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS.

Students applying to the program will be expected to have undergraduate experience in chemistry, cell biology, biochemistry, and mathematics--including, at a minimum--two semesters each of inorganic chemistry, organic chemistry, physics, calculus and biology.

Visit Drexel University's Graduate Admissions (http://www.drexel.edu/grad/programs/ducom) site for additional information regarding specific requirements for applying to the College of Medicine as well as important application dates.

### Medical and Healthcare Simulation

**Major:** Medical Healthcare Simulation

**Degree Awarded:** Master of Science (MS)

**Calendar Type:** Semester

**Total Credit Hours:** 39.0

**Classification of Instructional Programs (CIP) code:** 51.1199

**Standard Occupational Classification (SOC) code:** 11-9121

### About the Program

The goal of the MS in Medical Healthcare Simulation program is to educate healthcare professionals using simulation based methodology to bring a new level of standards and rigor in addition to creating new leaders to help shape the future of simulation education. The MS in Medical Healthcare Simulation program is a combination of both required and elective graduate courses, together with an intensive immersive educational experience. The majority of the educational experience will occur via an e-learning experience with a mandatory simulation laboratory experience.

### Program Delivery

The curriculum is planned for a two-year time frame with each group to complete the curriculum as a cohort. However, the program may be extended, if appropriate, to accommodate part-time students or potential conflicts that might arise. These decisions will be determined by the program directors and in consultation with the student’s mentor/advisor.

### Admission Requirements

For acceptance into the MS in Medical Healthcare Simulation program, the applicant must have, at a minimum, completed a four-year bachelor’s degree, nursing degree program or equivalent, with a preferred GPA of 3.0 and must also have fulfilled all of the requirements for consideration as defined by the program committee.

All students must submit three confidential letters of evaluation and all previous official educational transcripts. If you have taken any standardized test, such as GRE and MCAT, the scores must be submitted for review. No standardized test is required for admission at this time. Each student will be assessed holistically based on the requirements by the program's committee.

As the degree program is directed toward medical simulation the background in medical care is required. The applicant must have graduated from medical school, or have a nursing or Bachelor’s Degree or other health professional training (approved by the program director on individual basis) with an interest in simulation. A record of achievement in medical education, as provided by letters of reference, publications,
teaching evaluations, or prior specialized training or experience in medical education is desired, but not required.

### Degree Requirements

#### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSMS 501S</td>
<td>Simulation Curriculum and Design I</td>
<td>3.0</td>
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<tr>
<td>MSMS 503S</td>
<td>Biostatistics in Healthcare Literature</td>
<td>3.0</td>
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<tr>
<td>MSMS 504S</td>
<td>Principles of Assessment: Measurement Theory,</td>
<td>3.0</td>
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<tr>
<td></td>
<td>Assessment Principles &amp; Tools</td>
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<tr>
<td>MSMS 506S</td>
<td>Debriefing in Simulation</td>
<td>3.0</td>
</tr>
<tr>
<td>MSMS 701S</td>
<td>Simulation Laboratory Practicum I</td>
<td>4.0</td>
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<td>MSMS 702S</td>
<td>Simulation Laboratory Practicum II</td>
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<td>MSMS 703S</td>
<td>Simulation Laboratory Practicum III</td>
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<td>MSMS 801S</td>
<td>Capstone</td>
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#### Elective Courses

Students must select a minimum of 12 credits from the following:

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<tbody>
<tr>
<td>CR 510S</td>
<td>Sponsored Projects Finance</td>
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<tr>
<td>CR 525S</td>
<td>Scientific Writing and Medical Literature</td>
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<tr>
<td>CR 550S</td>
<td>Leadership Skills</td>
</tr>
<tr>
<td>CR 635S</td>
<td>Strategic Planning</td>
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<tr>
<td>MSMS 507S</td>
<td>High Fidelity, Low Fidelity and Task Trainers</td>
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<td>MSMS 508S</td>
<td>Interprofessional Education</td>
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<td>MSMS 511S</td>
<td>Patient Safety and Simulation</td>
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<td>MSMS 600S</td>
<td>Adult Learning in Healthcare</td>
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Total Credits: **39.0**

### Sample Plan of Study

**First Year**

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</tr>
</thead>
<tbody>
<tr>
<td>MSMS 501S</td>
<td>Simulation Curriculum and Design I</td>
<td>3.0</td>
</tr>
<tr>
<td>MSMS 506S</td>
<td>Debriefing in Simulation</td>
<td>3.0</td>
</tr>
<tr>
<td>MSMS 701S</td>
<td>Simulation Laboratory Practicum I</td>
<td>4.0</td>
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</tbody>
</table>

**Term Credits:** **10.0**

<table>
<thead>
<tr>
<th>Term</th>
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</thead>
<tbody>
<tr>
<td>2</td>
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<table>
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<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>MSMS 503S</td>
<td>Biostatistics in Healthcare Literature</td>
<td>3.0</td>
</tr>
<tr>
<td>Two Medical and Healthcare Simulation electives &amp;</td>
<td>6.0</td>
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**Second Year**

<table>
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<table>
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<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>MSMS 504S</td>
<td>Principles of Assessment: Measurement Theory,</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Assessment Principles &amp; Tools</td>
<td></td>
</tr>
<tr>
<td>MSMS 702S</td>
<td>Simulation Laboratory Practicum II</td>
<td>4.0</td>
</tr>
<tr>
<td>Medical and Healthcare Simulation elective &amp;</td>
<td>3.0</td>
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</table>

**Term Credits:** **10.0**

<table>
<thead>
<tr>
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</tr>
</thead>
<tbody>
<tr>
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<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MSMS 801S</td>
<td>Capstone</td>
</tr>
<tr>
<td>MSMS 703S</td>
<td>Simulation Laboratory Practicum III</td>
</tr>
</tbody>
</table>

Medical and Healthcare Simulation elective & 3.0

**Total Credit:** **39.0**

* For a list of Medical and Healthcare Simulation electives, view the program's degree requirements.

### Laboratory Animal Science

**Major:** Laboratory Animal Science  
**Degree Awarded:** Master of Laboratory Animal Science (MLAS)  
**Calendar Type:** Semester  
**Total Credit Hours:** 49.0  
**Classification of Instructional Programs (CIP) code:** 51.2509  
**Standard Occupational Classification (SOC) code:** 29-2056

### About the Program

The School of Biomedical Sciences and Professional Studies offers the Master of Laboratory Animal Science (MLAS) degree. The MLAS program is designed for individuals who have a bachelor's degree in animal science or a related field and who are seeking advanced career positions in laboratory animal science and laboratory animal facility management. Alternatively, the MLAS degree is also a powerful means to enhance students' credentials for admission to veterinary medical school.

The MLAS program is a full-time, two-year program that begins in August of each year. The first two years of the program consists primarily of classroom instruction, while the last semester is reserved for experiential learning. The program is flexible for traditional and non-traditional students alike due to the availability of evening courses.

### Available Online

For individuals who are currently working in the laboratory animal science field, the MLAS program is available online as well. Please review our website [http://www.drexel.edu/medicine/Academics/Graduate-School/Master-of-Laboratory-Animal-Science/Online-MLAScience](http://www.drexel.edu/medicine/Academics/Graduate-School/Master-of-Laboratory-Animal-Science/Online-MLAScience) for specific details about the online program.

### Curriculum

The MLAS curriculum consists of basic science courses, laboratory animal science courses, and a practicum. The basic science courses were designed to build a solid foundation required for a successful career in laboratory animal science. The laboratory animal science courses focus on all aspects of laboratory animal science, including facility management. The practicum provides the student with the opportunity to apply the theoretical knowledge they have learned to the field of Laboratory Animal Science. The outcome is a highly trained laboratory animal science professional with a solid foundation in the sciences.

### Practicum

MLAS faculty and administration assist the students in identifying and securing practicum sites at universities, biotechnology organizations, and pharmaceutical companies. Practicum sites are available in Pennsylvania, New Jersey, New York, Delaware, Virginia, Kentucky, North Carolina, and Texas. The list expands every year. In many instances, the practicum sites have offered our students a permanent position within their organization upon completion of the MLAS degree.
Career Opportunities
MLAS graduates hold positions in laboratory animal facilities of universities, biotechnology companies, government agencies, and pharmaceutical companies. There they serve as veterinarians, supervisors, managers, IACUC administrators, trainers, educators, consultants, and sales representatives.

Veterinary Medical School
Successful completion of the MLAS program can also significantly improve a student's academic credentials for application to veterinary medical school. Please review our website (http://www.drexel.edu/medicine/Academics/Graduate-School/Master-of-Laboratory-Animal-Science) for a comprehensive list of veterinary medical schools that have been attended by MLAS alumni.

Additional Information
Erin Vogelsong, MS
Academic Administrator, Assistant Professor
Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
245 N. 15th St., Room 15305
Philadelphia, PA 19102
215.762.7968
Erin.Vogelsong@DrexelMed.edu

Drexel College of Medicine also maintains a Master of Laboratory Animal Science (http://www.drexel.edu/medicine/Academics/Graduate-School/Master-of-Laboratory-Animal-Science) website.

Admission Requirements
Students will be selected on the basis of adequate educational background and veterinary/research/animal care experience.

Prerequisite coursework includes: chemistry, biology, organic chemistry, and physics.

Candidates for admission must provide the following credentials:

- Bachelor's degree from an accredited U.S. college or university
- Cumulative GPA of 2.7 or higher
- General Graduate Record Exam (GRE) scores at or above the 50th percentile in all areas obtained within the last 5 years
- Official transcript from all post-secondary institutions attended
- Three letters of reference, two must be from science professors
- Personal statement stating the applicant's academic and professional goals

The deadline for submission of applications is the second Friday in July of the year the student seeks admission.

Contact Information:
Erin Vogelsong, MS
Academic Administrator, Assistant Professor
Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
245 N. 15th St., Room 15305
Philadelphia, PA 19102
215.762.7968
Erin.Vogelsong@DrexelMed.edu

Degree Requirements

The MLAS degree can be completed full-time in two years and one summer practicum, or part-time in four or less years. Students must successfully complete a minimum of 49.0 credit hours for graduation. A minimum grade point average of 3.0 is required for graduation as well as grades of "C" or better.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLAS 501S</td>
<td>Laboratory Animal Seminar</td>
<td>2.0</td>
</tr>
<tr>
<td>MLAS 510S</td>
<td>Clinical Orientation In Laboratory Animal Facilities</td>
<td>1.0</td>
</tr>
<tr>
<td>MLAS 520S</td>
<td>Financial Mgmt In Lab Anim Sci</td>
<td>3.0</td>
</tr>
<tr>
<td>MLAS 521S</td>
<td>Arch Eng &amp; Plan For Anim Fac</td>
<td>4.0</td>
</tr>
<tr>
<td>MLAS 523S</td>
<td>Organizational Management</td>
<td>3.0</td>
</tr>
<tr>
<td>MLAS 525S</td>
<td>Animal Anatomy</td>
<td>2.0</td>
</tr>
<tr>
<td>MLAS 530S</td>
<td>Biostats In Vet Science</td>
<td>3.0</td>
</tr>
<tr>
<td>MLAS 535S</td>
<td>Biology &amp; Care Of Lab Animals</td>
<td>4.0</td>
</tr>
<tr>
<td>MLAS 536S</td>
<td>Animal Models for Biomedical Research</td>
<td>1.0</td>
</tr>
<tr>
<td>MLAS 606S</td>
<td>Clinical Laboratory Techniques and Concepts</td>
<td>1.0</td>
</tr>
<tr>
<td>MLAS 610S</td>
<td>Diseases of Laboratory Animals</td>
<td>3.0</td>
</tr>
<tr>
<td>MLAS 801S</td>
<td>Laboratory Animal Practicum</td>
<td>12.0</td>
</tr>
<tr>
<td>MSPA 580S</td>
<td>Medical Microbiology I</td>
<td>4.0</td>
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</table>

Electives
Students must select a minimum of 6.0 credits from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MLAS 500S</td>
<td>Animal Nutrition</td>
</tr>
<tr>
<td>MLAS 513S</td>
<td>Biochemical Basis of Disease (Upenn)</td>
</tr>
<tr>
<td>MLAS 514S</td>
<td>Hematopoiesis (Upenn)</td>
</tr>
<tr>
<td>MLAS 529S</td>
<td>Molecular Genetics</td>
</tr>
<tr>
<td>MLAS 531S</td>
<td>Embryology</td>
</tr>
<tr>
<td>MLAS 545S</td>
<td>Fundamentals of Histology</td>
</tr>
<tr>
<td>PHGY 503S</td>
<td>GRADUATE PHYSIOLOGY</td>
</tr>
<tr>
<td>PHRM 512S</td>
<td>Graduate Pharmacology</td>
</tr>
</tbody>
</table>

Total Credits: 49.0

Academic Medicine

Major: Academic Medicine
Degree Awarded: Master of Science
Calendar Type: Semester
Total Credit Hours: 36.0 + research based publication; Additional 25.0 credits for concentration in otolaryngology
Classification of Instructional Programs (CIP) code: 51.1199
Standard Occupational Classification (SOC) code: 25-1071

Note: This program is currently not accepting students.

About the Program

Exceptional residents often pursue scholarly activities in addition to fulfilling their other residency requirements. This program is designed for those residents who publish research and pursue scholarly activities in addition to their typical residency training, and who desire to pursue careers in clinical education in their field of interest.

Students pursuing an MS in Academic Medicine must designate a concentration. At this time the first available concentration is the field of otolaryngology.
The MS in Academic Medicine is designed to address topics of value to the academic physician, including training in leadership, education, ethics, professionalism, public health, health accreditation, statistics, bioepidemiology, research techniques, medical writing and editing, grant writing, research regulations, public speaking and academic health center management. These are topics typically important to educators, but not commonly covered in depth during residency training.

**Goals and Objectives**

The MS in academic medicine provides a structured pathway for physicians planning careers as clinical educators to acquire specialized knowledge and to demonstrate a special expertise in teaching. The objectives of the MS in Academic Medicine include:

- training young physicians to be skilled clinical educators;
- providing students with core knowledge about academic medicine that is not included systematically in residency training programs;
- encouraging research;
- exposing students to the process of supervising and mentoring research;
- encouraging life-long continued study of materials and methods for clinical education.

**Examinations**

All residents are required to take in-service training examinations annually. This is a national, standardized test provided for each clinical specialty. Performance at the 70th percentile or better in this examination is considered a passing grade for the MS. Alternatively, board certification would be sufficient to acknowledge that the student has mastered a body of knowledge suitable for the MS degree. Each clinical specialty has its own (very rigorous) requirements for board certification, supervised by the American Board of Medical Specialties.

**Admission Requirements**

Applications are reviewed by the department in which the degree is offered (for example: otolaryngology - head and neck surgery).

Recommendations for acceptance are presented to the Biomedical Graduate Education Committee of the College of Medicine for final approval. The requirements for admission include but are not limited to:

- enrollment in an ACGME approved residency program;
- satisfactory completion of at least one year of residency;
- a letter of recommendation from the applicant's Department Chair or Program Director;
- an interview in person;
- medical school transcript.

Visit the Office of Biomedical Graduate Studies Admissions website for more detailed information about applying to the program, including important application dates.

**Degree Requirements**

A minimum of thirty-six semester credits are required with a B average or better. Thus, the course of study for the MS in Academic Medicine will be in addition to the standard curriculum for residents plus the requirement of a research based, first authored publication.

**Research Requirements**

Each candidate for the MS will conduct a research project under the guidance of his/her advisory committee. In most cases this project will encompass clinical or bench research that will result in a first author publication in a peer-reviewed journal. (Case reports are not sufficient for fulfilling this requirement.) However if the student is involved in scholarly activity of another nature that is deemed sufficiently rigorous by the advisory committee, flexibility to recognize and accept other activities is intended. For example, such activities might include writing a book or developing the curriculum for a new academic program.

**Curriculum**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACM 600S</td>
<td>Academic Medicine: Core Knowledge I</td>
<td>3.0</td>
</tr>
<tr>
<td>ACM 601S</td>
<td>Academic Medicine: Core Knowledge II</td>
<td>3.0</td>
</tr>
<tr>
<td>ACM 602S</td>
<td>Academic Medicine Thesis Research</td>
<td>4.0</td>
</tr>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 600S</td>
<td>Thesis Defense</td>
<td>9.0</td>
</tr>
<tr>
<td></td>
<td><strong>Total Credits</strong></td>
<td><strong>21.0</strong></td>
</tr>
</tbody>
</table>

A minimum of eleven elective credits are required for completion of the MS in Academic Medicine. Additional electives are encouraged. Electives may be selected from among the following courses. Other courses may be used to fulfill this requirement, with the approval of the candidates' advisory committee.

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>FIN 301</td>
<td>Introduction to Finance</td>
</tr>
<tr>
<td>COM 270 [WI]</td>
<td>Business Communication (p. 77)</td>
</tr>
<tr>
<td>ORGB 300 [WI]</td>
<td>Organizational Behavior (p. 77)</td>
</tr>
<tr>
<td>CAT 302</td>
<td>Customer Service Theory and Practice</td>
</tr>
<tr>
<td>CT 230</td>
<td>Web Development I</td>
</tr>
<tr>
<td>CT 240</td>
<td>Web Development II</td>
</tr>
<tr>
<td>COM 340</td>
<td>Desktop Publishing</td>
</tr>
<tr>
<td>CR 500S</td>
<td>Epidemiology</td>
</tr>
<tr>
<td>CR 511S</td>
<td>The History of Misconduct in Biomedical Research</td>
</tr>
<tr>
<td>CR 515S</td>
<td>Intro to Clinical Trials</td>
</tr>
<tr>
<td>CR 520S</td>
<td>Applications of Clinical Research Biostatistics</td>
</tr>
<tr>
<td>CR 525S</td>
<td>Scientific Writing and Medical Literature</td>
</tr>
<tr>
<td>CR 535S</td>
<td>Current Federal Regulatory Issues in Biomedical Research</td>
</tr>
<tr>
<td>CR 545S</td>
<td>Pharmaceutical Law</td>
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<tr>
<td>CR 565S</td>
<td>Contemporary Issues in Human Research Protection</td>
</tr>
<tr>
<td>CR 600S</td>
<td>Designing the Clinical Trial</td>
</tr>
<tr>
<td>CR 609S</td>
<td>Innovative Product Development</td>
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<tr>
<td>CR 625S</td>
<td>Health Policy and Economics</td>
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<tr>
<td>PHRM 525S</td>
<td>Drug Discovery and Development</td>
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<td>PBHL 520</td>
<td>Principles of Biostatistics</td>
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<tr>
<td>PBHL 530</td>
<td>Principles of Epidemiology</td>
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<tr>
<td>PBHL 540</td>
<td>Prevention Principles and Practices</td>
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<tr>
<td>PBHL 600</td>
<td>Management, Leadership, Assurance and Health Services</td>
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</table>
PBHL 601 Management of Healthcare Outcomes 3.0
PBHL 605 Change Management in Public Health 3.0
PBHL 607 Evolution of United States Health Policy 3.0
PBHL 609 Issues in United States Health Policy 3.0
PBHL 622 Statistical Inference I 3.0
PBHL 650 Public Policy and Advocacy 3.0
PBHL 629 Design & Analysis of Clinical Trials 3.0

**Biological Science**

Major: Biological Science
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 83.0
Classification of Instructional Programs (CIP code): 26-0101; 26-0102
Standard Occupational Classification (SOC) code: 19-1029

**About the Program**
The Master of Science in Biological Science (MBS) program now combines the former one-year Medical Science Preparatory (MSP) program curriculum with the Master of Science in Biological Science (MBS) curriculum into a two-year Master’s program. The first year curriculum contains graduate-level biological science coursework, formal MCAT preparation/review, community outreach, and undergraduate review courses that cover chemistry, organic chemistry, and physics. The second year consists of a curriculum and benefits similar to the Interdepartmental Medical Science (IMS) Master’s program. Students transition into the second year of the program after successful completion (3.0 GPA and no courses with grades less than a C) of the first year curriculum.

**Additional Information**
For more information about the program, visit the College of Medicine Master of Science in Biological Science (http://www.drexelmed.edu/Home/AcademicPrograms/GraduateSchoolofBiomedSciencesProfStudies/BiologicalScience.aspx) web page.

**Required Undergraduate Courses**
MSPP 400S Advanced Topics in Chemistry I 4.0
MSPP 401S Advanced Topics in Chemistry II 4.0
MSPP 402S Advanced Topics in Physics I 4.0
MSPP 403S Advanced Topics in Physics II 4.0
MSPP 404S Concepts in Science and Verbal Reasoning I 6.0
MSPP 405S Concepts in Science and Verbal Reasoning II 6.0

**Required MS Courses**
MSPP 511S Concepts in Bioch & Cell Biolo 4.0
MSPP 512S Psychosocial and Behavioral Factors in Health and Medicine 3.0
MSPP 525S Community Dimensions of Medic 2.0
MSPP 505S Lab Tech in Bioch & Molec Biol 2.0
MSPP 513S Special Topics in Anatomy 2.0
MSPP 515S Biological Function & Regulation 4.0
IMSP 502S Medicine and Society I 3.0
IMSP 506S Medical Professionalism and Leadership 2.0
IMSP 513S Biochemical Basis of Disease 8.0
IMSP 522S Function of the Human Body I 3.5
IMSP 524S Cell Biology and Histology I 3.5

**IMSP 523S** Function of the Human Body II 3.5
IMSP 542S Cell Biology and Histology I 5.0
IMSP 543S Cell Biology and Histology II 3.0
IMSP 560S Medical Neuroscience 6.0

**Summer Research Project**
MSPP 550S Research Project 2.0

**Additional Non-required Courses**
IMSP 544S Basic Immunology I 1.5
IMSP 545S Basic Immunology II 1.5
IMSP 552S Fundamentals of Nutrition and Diet 1.0

**Total Credits** 87.0

**Degree Requirements**

**Fall**
MSPP 400S Advanced Topics in Chemistry I 4.0
MSPP 402S Advanced Topics in Physics I 4.0
MSPP 404S Concepts in Science and Verbal Reasoning I 6.0
MSPP 505S Lab Tech in Bioch Molec Biol 2.0
MSPP 511S Concepts in Bioch Molec Biol 2.0
PHRM 512S Graduate Pharmacology 3.0
MSPP 525S Community Dimensions of Medici 2.0

**Term Credits** 25.0

**Spring**
MSPP 401S Advanced Topics in Chemistry II 4.0
MSPP 403S Advanced Topics in Physics II 4.0
MSPP 405S Concepts in Science and Verbal Reasoning II 6.0
MSPP 513S Special Topics in Anatomy 4.0
MSPP 515S Biological Function Regulation 4.0

**Term Credits** 22.0

**Total Credit:** 47.0

**Required Undergraduate Courses**
MSPP 400S Advanced Topics in Chemistry I 4.0
MSPP 401S Advanced Topics in Chemistry II 4.0
MSPP 402S Advanced Topics in Physics I 4.0
MSPP 403S Advanced Topics in Physics II 4.0
MSPP 404S Concepts in Science and Verbal Reasoning I 6.0
MSPP 405S Concepts in Science and Verbal Reasoning II 6.0

**Required MS Courses**
MSPP 511S Concepts in Bioch & Cell Biolo 4.0
MSPP 512S Psychosocial and Behavioral Factors in Health and Medicine 3.0
MSPP 525S Community Dimensions of Medici 2.0
MSPP 505S Lab Tech in Bioch & Molec Biol 2.0
MSPP 513S Special Topics in Anatomy 2.0
MSPP 515S Biological Function & Regulation 4.0
IMSP 502S Medicine and Society I 3.0
IMSP 506S Medical Professionalism and Leadership 2.0
IMSP 513S Biochemical Basis of Disease 8.0
IMSP 522S Function of the Human Body I 3.5
IMSP 524S Cell Biology and Histology I 3.5
Cancer Biology

Major: Cancer Biology
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 40.0-43.0
Classification of Instructional Programs (CIP) code: 26.0911
Standard Occupational Classification (SOC) code: 19-1042

About the Program

The goal of the MS in Cancer Biology program is to provide a master's degree focused on the fundamentals of cancer from an interdisciplinary perspective, including:

- biology and molecular biology of cancer initiation;
- metastasis;
- treatment; and
- bioinformatics/systems biology.

The program is designed to meet the needs of two groups of individuals: (1) new or recent college graduates who wish to increase their marketability for jobs in academic or industrial laboratories through the acquisition of knowledge and skills more developed than obtained through a standard college curriculum; and (2) currently employed technical staff in the pharmaceutical or biotechnology industry (or academia) who wish to advance their position.

Consisting of both classroom and laboratory instruction, the program fills a need to train laboratory personnel in cancer theory and research. Graduates of this program will possess knowledge in both the theoretical as well as the practical level.

Additional Information

Mauricio Reginato, PhD
Program Director
Department of Biochemistry + Molecular Biology
Drexel University College of Medicine
mauricio.reginato@drexelmed.edu

Admission Requirements

For acceptance to the program, the applicant must have completed a four-year biology or chemistry-based bachelor's degree program, or equivalent, with at least a 3.0 GPA. Students must fulfill all requirements for consideration as defined by the Drexel University College of Medicine Biomedical Graduate Education Committee:

- official transcripts from all colleges and universities attended;
- official copies of entrance test scores and official test scores from the Graduate Record Examination (GRE);
- references from at least three instructors or professionals;
- an application fee, made payable to Drexel University is required for application processing (online application is free);
- International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS.

Students applying to the program will be expected to have undergraduate experience in chemistry, cell biology, biochemistry, and mathematics--including, at a minimum--two semesters each of inorganic chemistry, organic chemistry, physics, calculus and biology.

Visit Drexel University's Graduate Admissions (http://www.drexel.edu/grad/programs/ducom) site for additional information regarding specific requirements for applying to the College of Medicine as well as important application dates.

Degree Requirements: Thesis Option

43.0 semester credits

Each semester, throughout the two years, there will be a weekly Cancer Journal Club. Students will also attend the Molecular & Cell Biology & Genetics (MCBG) Seminar series. Each semester contains a research component.

The Thesis Option of this program based on research can be initiated at the end of the first year.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC 510S</td>
<td>Cancer Biology</td>
<td>3.0</td>
</tr>
<tr>
<td>BIOC 512S</td>
<td>Advanced Cancer Biology</td>
<td>2.0</td>
</tr>
<tr>
<td>CBIO 500S</td>
<td>Core Cancer Topics</td>
<td>2.0</td>
</tr>
<tr>
<td>CBIO 503S</td>
<td>Cancer Biology Journal Club</td>
<td>1.0</td>
</tr>
<tr>
<td>CBIO 504S</td>
<td>Cancer Biology 1st Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>CBIO 505S</td>
<td>Cancer Biology 2nd Lab Rotation</td>
<td>2.0</td>
</tr>
<tr>
<td>CBIO 506S</td>
<td>Cancer Biology Thesis Research</td>
<td>9.0</td>
</tr>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 501S</td>
<td>Biostatistics I</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S</td>
<td>Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 526S</td>
<td>Cells to Systems</td>
<td>5.0</td>
</tr>
<tr>
<td>MCBG 513S</td>
<td>Molec &amp; Cell Biology Seminar</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Total Credits

43.0

Suggested Electives

Select a minimum of 5.0 credits of electives:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC 508S</td>
<td>Experimental Approaches to Biochemical Problems</td>
</tr>
<tr>
<td>CBIO 501S</td>
<td>Infection, Inflammation and Cancer</td>
</tr>
<tr>
<td>CBIO 508S</td>
<td>Cancer Biomarkers and Therapeutics</td>
</tr>
<tr>
<td>MCBG 506S</td>
<td>ADVANCED CELL BIOLOGY</td>
</tr>
<tr>
<td>MCBG 514S</td>
<td>Cell Cycle and Apoptosis</td>
</tr>
<tr>
<td>PHRM 525S</td>
<td>Drug Discovery and Development I</td>
</tr>
<tr>
<td>PBHL 633</td>
<td>Epidemiology of Cancer</td>
</tr>
</tbody>
</table>

Total Credits

43.0
Degree Requirements: Non-Thesis Option

40.0 semester credits

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC 510S</td>
<td>Cancer Biology</td>
<td>3.0</td>
</tr>
<tr>
<td>BIOC 512S</td>
<td>Advanced Cancer Biology</td>
<td>2.0</td>
</tr>
<tr>
<td>CBIO 500S</td>
<td>Core Cancer Topics</td>
<td>2.0</td>
</tr>
<tr>
<td>CBIO 503S</td>
<td>Cancer Biology Journal Club (May be repeated for credit)</td>
<td>1.0</td>
</tr>
<tr>
<td>CBIO 504S</td>
<td>Cancer Biology 1st Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>CBIO 505S</td>
<td>Cancer Biology 2nd Lab Rotation</td>
<td>2.0</td>
</tr>
<tr>
<td>CBIO 507S</td>
<td>Special Topics in Cancer Biology</td>
<td>9.0</td>
</tr>
<tr>
<td>IDPT 501S</td>
<td>Biostatistics I</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S</td>
<td>Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 526S</td>
<td>Cells to Systems</td>
<td>5.0</td>
</tr>
<tr>
<td>MCBG 513S</td>
<td>Molec &amp; Cell Biology Seminar</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Suggested Electives

Select a minimum of 4.0 credits of electives.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIOC 508S</td>
<td>Experimental Approaches to Biochemical Problems</td>
</tr>
<tr>
<td>CBIO 501S</td>
<td>Infection, Inflammation and Cancer</td>
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<td>Drug Discovery and Development I</td>
</tr>
<tr>
<td>PBHL 633</td>
<td>Epidemiology of Cancer</td>
</tr>
</tbody>
</table>

Total Credits 40.0

* Students can select a course from the list of suggested electives or by approval from the Program Director.

Clinical Research Organization and Management

Major: Clinical Research Organization and Management
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 36.0
Classification of Instructional Programs (CIP) code: 51.0000
Standard Occupational Classification (SOC) code: 11-9199

About the Program

The Master of Science in Clinical Research Organization and Management is an online program designed both for individuals already trained in the area of clinical sciences, as well as for others who desire a focused education in the proper conduct of clinical research.

The Master of Science in Clinical Research Organization and Management program offers students a rigorous graduate education taught by leaders from the pharmaceutical, biotechnology and medical device industries, as well as from academic research centers. The program provides online courses that include scientific rationale related to the design and analysis of clinical trials, epidemiology and biostatistics, ethics-based reasoning for the conduct of research, clinical trial management and monitoring processes, and federal regulatory rules and policies essential to the development of a broadly-educated and well-prepared professional in clinical research and new therapeutic product investigation.

The program is designed so that graduates will be able to:

- Successfully apply the framework and philosophies of research to the management of clinical trials, employing quality principles of current good clinical practice to produce valid and useful data;
- Ensure that sound ethical principles and values are always recognized and upheld in research involving a human population;
- Use current statistical knowledge and methods in the design, implementation, conduct, and assessment of clinical trial management; and
- Describe the scientific and clinical research literature to effectively interpret the results of clinical research, thereby enhancing the decision-making process.

Students work with advisors to customize their course plans to meet their career goals.

Program Delivery Options

All Clinical Research (CR) courses are offered solely online. Visit Drexel University Online for details.

Additional Information

Sara Perkel, MBA
Director, Graduate Programs in Clinical Research
sara.perkel@drexelmed.edu
215-762-3812

For more information about the program, visit the Master of Science in Clinical Research Organization and Management (http://drexel.com/crom) page on the Drexel University Online site.

For information about applying to the program, visit the Drexel University Online Admissions Criteria (http://www.drexel.com/online-degrees/biomedical-degrees/ms-crom/admissions.aspx) web page.

Degree Requirements

The Master of Science in Clinical Research Organization and Management program consists of 12 courses (36.0 credits). Any courses offered by the Clinical Research Organization Management program may be applied to fulfill the requirements of this major. No master's thesis is required.

The program is organized into five areas of study devoted to clinical research and related administrative and regulatory issues. Students may take courses within their preferred area of study, a cross-section of courses within other areas of study, or any other Clinical Research (CR) courses being offered.

New Product Research and Development

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 513S</td>
<td>Pharmaceutical R&amp;D: Business Process and Information Flow</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 514S</td>
<td>World Wide Regulatory Submissions</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 515S</td>
<td>Intro to Clinical Trials</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 609S</td>
<td>Innovative Product Development</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 620S</td>
<td>Biotech/Research</td>
<td>3.0</td>
</tr>
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</table>

Regulatory Compliance, Ethics and Law

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 505S</td>
<td>Ethical Issues in Research</td>
</tr>
</tbody>
</table>
are crucial skills for those in the health professions. This requirement will expose students to the entire process of developing a research project and reporting on that research project up to and including experiencing a facsimile of the peer review and re-submission process.

It is anticipated that each student will conduct a minimum of nine hours research per week for 3.0 credits per semester. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or, development/evaluation of new clinical devices. Research mentors must be established researchers with a doctoral degree. A curriculum vitae of the proposed research mentor must be submitted with the student’s application for evaluation by the admissions committee and the program director. The appropriateness of the mentor will be evaluated by an ad hoc committee whose members come from the Graduate School faculty. The student must submit a 7-10 page journal-format paper at the end of each semester documenting their research and demonstrating that each successive semester’s work builds upon their prior work.

For more information about the program and to apply, visit the Drexel University Online (http://drexel.com/crhp) site.

### Additional Information

Sara Perkel, MBA  
Director, Graduate Programs in Clinical Research  
sara.perkel@drexelmed.edu (sara.perkel@drexel.edu)  
215-762-3812

### Degree Requirements

The MS in Clinical Research for Health Professionals program requires completing a minimum of 15.0 semester credits, composed of three required courses and two clinical research electives. In addition, students will register for a total of 21.0 research credits.

#### Curriculum

Select three of the following:  

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 500S</td>
<td>Epidemiology</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 515S</td>
<td>Intro to Clinical Trials</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 520S</td>
<td>Applications of Clinical Research Biostatistics</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 525S</td>
<td>Scientific Writing and Medical Literature</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 612S</td>
<td>Fundamentals of Compliance</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 545S</td>
<td>Pharmaceutical Law</td>
<td>3.0</td>
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Select two of the following:  

<table>
<thead>
<tr>
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<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CR 500S</td>
<td>Epidemiology</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 501S</td>
<td>Emerging Trends in Medical Device History</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 505S</td>
<td>Ethical Issues in Research</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 511S</td>
<td>The History of Misconduct in Biomedical Research</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 512S</td>
<td>Fundamentals of Academic Research Administration</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 515S</td>
<td>Intro to Clinical Trials</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 520S</td>
<td>Applications of Clinical Research Biostatistics</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 525S</td>
<td>Scientific Writing and Medical Literature</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 535S</td>
<td>Current Federal Regulatory Issues in Biomedical Research</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 545S</td>
<td>Pharmaceutical Law</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 565S</td>
<td>Contemporary Issues in Human Research Protection</td>
<td>3.0</td>
</tr>
</tbody>
</table>

### About the Program

The MS in Clinical Research for Health Professionals program is a non-thesis curriculum designed for residents, fellows, and clinicians seeking knowledge in the conduct of translational and pharmaceutical research. The degree often acts as an advanced preparation for independent investigators and other practicing researchers familiar with the industry, while developing their clinical careers.

The program is also available to other clinical health professionals such as nurses (with a minimum of a bachelor’s degree required), audiologists, etc., to help these individuals advance their professional opportunities.

Online course work coupled with supervised research activities will allow health care professionals in any academic hospital setting throughout the US to receive an MS degree from Drexel University College of Medicine (DUCoM).

### Research Project

While the MS in Clinical Research for Health Professionals program does not require a thesis, the program is consistent with a master’s level education that challenges students to clearly express well-organized thoughts in written form. The collection, analysis and refinement of scientific information to produce a professional-level written document
Criminalistics is defined as the scientific study and analysis of crime. The disciplines within criminalistics are science based, with most using multiple combinations of the natural sciences to conduct examinations and analysis of evidence and crime scenes.

In addition to required courses in criminal law, trial process and the use of evidence, the Master of Science in Criminalistic Science program offers courses in fingerprint science, forensic engineering, motor vehicle crash reconstruction, firearms and tool mark analysis, fire and explosion analysis, footwear and tire track analysis, bloodstain pattern analysis, trace materials and forensic geology and botany, and nuclear, biological, chemical terrorism/mass disaster management.

**Admission Requirements**

Applicants must have a bachelor's degree from an accredited US college or university or its equivalent. Official general GRE and/or MCAT scores are required for admission. Typical applicants would have a minimum 2.5 GPA.

Selection is based upon academic qualifications, standardized test scores, references, an evaluation of the candidate's goals and commitment, and a telephone interview.

Each applicant's academic record will be evaluated based upon its individual merits. Since consideration for employment within the field of criminalistic science necessitates the absence of a criminal background, it is expected that all individuals applying to this program will have no history of criminal behavior, including prior illicit drug and/or prescription drug abuse.

For additional information on how to apply for this program, contact:

Ms. Thelicia Hill
215.762.4674
thelicia.hill@drexel.edu

Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
Master of Criminalistic Science Program
Mail Stop 344, 245 North 15th Street
Philadelphia, PA 19102-1192

**Degree Requirements**

**Required Courses:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CR 501S</td>
<td>Research Health Professions I</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 502S</td>
<td>Research Health Professions II</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 503S</td>
<td>Research Health Professions III</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 504S</td>
<td>Research Health Professions IV</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 505S</td>
<td>Research Health Professions V</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 506S</td>
<td>Research Health Professions VI</td>
<td>3.0</td>
</tr>
<tr>
<td>CR 507S</td>
<td>Research Health Professions VII</td>
<td>3.0</td>
</tr>
<tr>
<td>MFSP 555S</td>
<td>Forensic Anthropology and Topics in Human Identification</td>
<td>2.0</td>
</tr>
<tr>
<td>MFSP 560S</td>
<td>Criminal Law and the Court: Use of Evidence I</td>
<td>2.0</td>
</tr>
<tr>
<td>MFSP 561S</td>
<td>Techniques of Crime Scene Investigation</td>
<td>2.0</td>
</tr>
<tr>
<td>MFSP 562S</td>
<td>Criminal Law and the Court: Use of Evidence II</td>
<td>2.0</td>
</tr>
<tr>
<td>MFSP 566S</td>
<td>Introduction to Criminal Law and Trial Process</td>
<td>3.0</td>
</tr>
<tr>
<td>MFSP 567S</td>
<td>Ethics for the Forensic Scientist</td>
<td>2.0</td>
</tr>
<tr>
<td>MFSP 568S</td>
<td>Forensic Anthropology and Topics in Human Identification</td>
<td>2.0</td>
</tr>
</tbody>
</table>

**Elective Courses**

Twenty-four credits chosen from the following electives: 24.0

**Research/Journal-type paper requirement (min 21.0 credits)**

Each student conducts a minimum of 9 hours research/week for 3 credits per semester.

- CRHP 501S  Research Health Professions I  3.0
- CRHP 502S  Research Health Professions II  3.0
- CRHP 503S  Research Health Professions III  3.0
- CRHP 504S  Research Health Professions IV  3.0
- CRHP 505S  Research Health Professions V  3.0
- CRHP 506S  Research Health Professions VI  3.0
- CRHP 507S  Research Health Professions VII  3.0

**Total Credits 36.0**

* Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or, development/evaluation of new clinical devices.

Research mentors must be established researchers with a doctoral degree. A curriculum vitae of the proposed research mentor must be submitted with the student's application. The appropriateness of the mentor will be evaluated by an ad hoc committee whose members come from the Graduate School faculty.

The student must submit a 7-10 page journal-format paper at the end of each semester documenting their research and demonstrating that each successive semester's work builds upon their prior work. Contact the program director for additional requirements.

**Criminalistic Science**

**Major: Criminalistic Science**

**Degree Awarded: Master of Science (MS)**

**Calendar Type: Semester**

**Total Credit Hours: 49.0**

**Classification of Instructional Programs (CIP) code: 43.0111**

**Standard Occupational Classification (SOC) code: 19-4092; 33-3021**

**About the Program**

The School of Biomedical Sciences and Professional Studies offers the Master of Science in Criminalistic Science. The Master of Science in Criminalistic Science is designed to introduce students to the basic principles of Criminalistic Science while also providing opportunities to pursue either more traditional and/or more innovative concentrations of study.

Criminalistics is defined as the scientific study and analysis of crime scenes and the evidence within those scenes to solve a crime and apprehend the perpetrator of the crime. The disciplines within criminalistics are science based, with most using multiple combinations of the natural sciences to conduct examinations and analysis of evidence and crime scenes.
Drexel Pathway to Medical School

Major: Drexel Pathway to Medical School
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 47.0
Classification of Instructional Programs (CIP) code: 26.9999
Standard Occupational Classification (SOC) code: 19-1029

About the Program

This intensive, one-year master's degree program provides qualifying candidates a conditional acceptance for matriculation into Drexel University's College of Medicine following successful completion of the program. Small-group instruction is provided during the intensive introductory summer enrichment portion of the curriculum and individual counseling with an administrative advocate is available throughout the program.

More information:
Drexel University College of Medicine
Division of Pre-medical and Pre-health Programs
Graduate School of Biomedical Sciences and Professional Studies
New College Building, Room 4104
245 North 15th Street, Mail Stop 344
Philadelphia, PA 19102
Phone: 215-762-4692
Email: medicalsciences@drexelmed.edu (http://catalog.drexel.edu/graduate/schoolofbiomedicalsciences/drexelpathwaytomedicalschool/mail:medicalsciences@drexelmed.edu)

Visit the Drexel University College of Medicine’s website: Drexel Pathway to Medical School Program (http://www.drexelmed.edu/Home/AcademicPrograms/GraduateSchoolofBiomedicalSciencesProfStudies/DrexelPathwaytoMedicalSchool.aspx).

Admission Requirements

The program is open to all premedical students who have successfully completed the prerequisite coursework for medical school with a grade of C or better. A minimum 2.90 cumulative and sciences undergraduate GPA is required for application to the program, as well as a total MCAT score of 25 (former exam format) with no score in any section less than 8, or a total 45% percentile (new MCAT format) with no subsection less than 45% percentile, subject to change. Applicants who meet these requirements are considered for an interview by the admissions committee of the College of Medicine.

Degree Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPMS 500S</td>
<td>Medical Science Preparation</td>
<td>1.0</td>
</tr>
<tr>
<td>DPMS 501S</td>
<td>Critical Thinking and Scientific Communication</td>
<td>2.0</td>
</tr>
<tr>
<td>DPMS 502S</td>
<td>Accelerated Introductory Medical Biostatistics</td>
<td>3.0</td>
</tr>
<tr>
<td>IMSP 513S</td>
<td>Biochemical Basis of Disease</td>
<td>8.0</td>
</tr>
<tr>
<td>MSPA 520S</td>
<td>Medical Terminology</td>
<td>3.0</td>
</tr>
<tr>
<td>IMSP 506S</td>
<td>Medical Professionalism and Leadership</td>
<td>2.0</td>
</tr>
<tr>
<td>IMSP 522S</td>
<td>Function of the Human Body I</td>
<td>3.5</td>
</tr>
<tr>
<td>IMSP 523S</td>
<td>Function of the Human Body II</td>
<td>3.5</td>
</tr>
<tr>
<td>IMSP 542S</td>
<td>Cell Biology and Histology I</td>
<td>5.0</td>
</tr>
<tr>
<td>MSPP 513S</td>
<td>Special Topics in Anatomy</td>
<td>4.0</td>
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Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>DPMS 503S</td>
<td>Neurobiology of Mental Illness</td>
<td></td>
</tr>
<tr>
<td>DPMS 504S</td>
<td>Functional Neuroanatomy</td>
<td></td>
</tr>
<tr>
<td>IMSP 544S</td>
<td>Basic Immunology I</td>
<td></td>
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<tr>
<td>IMSP 545S</td>
<td>Basic Immunology II</td>
<td></td>
</tr>
<tr>
<td>MSPP 404S</td>
<td>Concepts in Science and Verbal Reasoning I</td>
<td></td>
</tr>
<tr>
<td>MSPP 405S</td>
<td>Concepts in Science and Verbal Reasoning II</td>
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</table>

Total Credits 47.0

Sample Plan of Study

Term 1

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
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<td>Medical Science Preparation</td>
<td>1.0</td>
</tr>
<tr>
<td>DPMS 501S</td>
<td>Critical Thinking and Scientific Communication</td>
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<tr>
<td>DPMS 502S</td>
<td>Accelerated Introductory Medical Biostatistics</td>
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</tr>
<tr>
<td>MSPA 520S</td>
<td>Medical Terminology</td>
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Term Credits 9.0

Term 2

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<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSP 513S</td>
<td>Biochemical Basis of Disease</td>
<td>8.0</td>
</tr>
<tr>
<td>IMSP 522S</td>
<td>Function of the Human Body I</td>
<td>3.5</td>
</tr>
<tr>
<td>IMSP 542S</td>
<td>Cell Biology and Histology I</td>
<td>5.0</td>
</tr>
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<td>Electives</td>
<td>Select from list below:</td>
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<tr>
<td>DPMS 503S</td>
<td>Neurobiology of Mental Illness</td>
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</tr>
<tr>
<td>IMSP 544S</td>
<td>Basic Immunology I</td>
<td></td>
</tr>
<tr>
<td>MSPP 404S</td>
<td>Concepts in Science and Verbal Reasoning I</td>
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Term Credits 22.5

Term 3

<table>
<thead>
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<th>Title</th>
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<tbody>
<tr>
<td>IMSP 506S</td>
<td>Medical Professionalism and Leadership</td>
<td>2.0</td>
</tr>
<tr>
<td>IMSP 523S</td>
<td>Function of the Human Body II</td>
<td>3.5</td>
</tr>
<tr>
<td>MSPP 513S</td>
<td>Special Topics in Anatomy</td>
<td>4.0</td>
</tr>
<tr>
<td>Electives</td>
<td>Select from list below:</td>
<td>6.0</td>
</tr>
</tbody>
</table>
**Drug Discovery and Development**

**Major:** Drug Discovery and Development  
**Degree Awarded:** Master of Science (MS)  
**Calendar Type:** Semester  
**Total Credit Hours:** 38.0  
**Classification of Instructional Programs (CIP) code:** 26.1001  
**Standard Occupational Classification (SOC) code:** 19-1029

### About the Program

The MS in Drug Discovery and Development program provides in-depth exposure to the multiple elements involved in drug discovery and development. This program has been designed to prepare students for a smooth transition into an enduring and productive research career within the pharmaceutical and biotechnology industry. It covers all aspects of drug discovery and development ranging from the discovery and characterization of drug targets through to regulatory approval and commercialization. Students will also be exposed to business aspects as well as to other areas of biotechnology and to the basic sciences of pharmacology and physiology.

The MS in Drug Discovery and Development is available to individuals who have already obtained a BS or BA degree in some field of the biomedical or health sciences who may wish to pursue an industry-focused master's-level degree. This may include individuals who wish to pursue a career in the pharmaceutical or biotechnical industries.

This program is also intended for individuals from other disciplines who wish to have a broader base of information about drug discovery and development, those who may wish to transition into the industry, or those who are already active in the industry and seek to increase their knowledge. The curriculum has been designed with the recognition that the complex pharmaceutical and biotechnical industries require a diversity of personnel experience.

For more information about this program, visit the College of Medicine's Biomedical Graduate Studies (http://www.drexel.edu/medicine/Academics/Graduate-School/Drug-Discovery-Development) page.

### Admission Requirements

For acceptance to the program, the applicant must have completed a four-year biology or chemistry-based bachelor's degree program, or equivalent, with at least a 3.0 GPA. Students must fulfill all requirements for consideration as defined by the Drexel University College of Medicine Biomedical Graduate Education Committee:

- official transcripts from all colleges and universities attended;
- official copies of entrance test scores and official test scores from the Graduate Record Examination (GRE);
- references from at least three instructors or professionals;
- an application fee, made payable to Drexel University is required for application processing (online application is free);
- international applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS.

Students applying to the program will be expected to have undergraduate experience in chemistry, cell biology, biochemistry, and mathematics—including, at a minimum--two semesters each of inorganic chemistry, organic chemistry, physics, calculus and biology.

Visit Drexel University's Graduate Admissions (http://www.drexel.edu/grad/programs/ducom) site for additional information regarding specific requirements for applying to the College of Medicine as well as important application dates.

For additional information on how to apply, visit Drexel's Admissions page for Biomedical Graduate Studies (http://www.drexel.edu/grad/programs/ducom/apply).

### Degree Requirements

The curriculum is designed to provide students with a detailed core focusing on the many facets of the drug discovery and development process, while simultaneously providing students with multiple options to pursue related areas of interest.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>NEUR 500S</td>
<td>Statistics for Neuro/Pharm Research</td>
<td>2.0</td>
</tr>
<tr>
<td>or IDPT 501S</td>
<td>Biostatistics I</td>
<td></td>
</tr>
<tr>
<td>PHRM 512S</td>
<td>Graduate Pharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>PHRM 525S</td>
<td>Drug Discovery and Development I</td>
<td>3.0</td>
</tr>
<tr>
<td>PHRM 526S</td>
<td>Drug Discovery and Development II</td>
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</tr>
<tr>
<td>PHRM 605S</td>
<td>Research in Drug Discovery and Development</td>
<td>4.0</td>
</tr>
<tr>
<td>PHGY 503S</td>
<td>GRADUATE PHYSIOLOGY</td>
<td>4.0</td>
</tr>
<tr>
<td>PHRM 502S</td>
<td>Current Topics in Pharmacology &amp; Physiology</td>
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</tr>
<tr>
<td>PHRM 516S</td>
<td>Advanced Topics in Physiology</td>
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<tr>
<td>PHRM 517S</td>
<td>Advanced Topics in Pharmacology</td>
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**Electives**

<table>
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<tbody>
<tr>
<td>MIIM 521S</td>
<td>Biotechniques I</td>
</tr>
<tr>
<td>MIIM 524S</td>
<td>Vaccines and Vaccine Development</td>
</tr>
<tr>
<td>MIIM 530S</td>
<td>Fundamentals of Molecular Medicine I</td>
</tr>
<tr>
<td>MIIM 531S</td>
<td>Fundamentals of Molecular Medicine II</td>
</tr>
<tr>
<td>MLAS 536S</td>
<td>Animal Models for Biomedical Research</td>
</tr>
<tr>
<td>NEUR 508S</td>
<td>Graduate Neuroscience I</td>
</tr>
<tr>
<td>MIIM 508S</td>
<td>Immunology I</td>
</tr>
<tr>
<td>BIOC 510S</td>
<td>Cancer Biology</td>
</tr>
<tr>
<td>PATH 601S</td>
<td>CELL MOL PATHBIO CANCER ANGIOLG</td>
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<tr>
<td>PHRM 503S</td>
<td>Pharm &amp; Phys 1st Lab Rotation</td>
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<tr>
<td>PHRM 507S</td>
<td>Prin of Neuropharmacology</td>
</tr>
<tr>
<td>PHRM 518S</td>
<td>New Frontiers in Therapy</td>
</tr>
<tr>
<td>PHRM 519S</td>
<td>Methods in Biomedical Research</td>
</tr>
<tr>
<td>Quarter Elective Course Options (must be approved by advisor)</td>
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<tr>
<td>BIO 631</td>
<td>Bioinformatics I</td>
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Total Credit: 47.0
Forensic Science

Major: Forensic Science
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 43.0106
Standard Occupational Classification (SOC) code: 19-4092

About the Program
The Graduate School of Biomedical Sciences and Professional Studies offers the Master of Science in Forensic Science. The curriculum is designed to provide students with a set of core courses that serve as an introduction to the many facets of forensic science as well as an essential foundation for several more specialized disciplines in the field. There are multiple options for specialization, and courses required for each of the concentrations enable students to acquire specialized knowledge on topics that are directly related to their specific areas of interest and career goals.

For more information about this program, visit the College of Medicine’s Master of Science in Forensic Science (http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/ForensicScienceProfessionalPrograms/MasterofForensicScienceMFSProgram.aspx) web page.

Admission Requirements
The forensic program is limited to those students whose undergraduate degree contains a strong background in the natural sciences. The program is designed to attract students at a multidisciplinary level. Students are required to have an undergraduate degree in the natural sciences. A minimum of 3.0 GPA on a 4.0 system is desired; however, supplemental materials and overall experience are factored into the acceptance process. The following must be submitted for consideration:

- Application with $65.00 fee
- Official transcripts from each college and/or university attended
- Three letters of recommendation
- Official MCAT or GRE test scores

Contact Information
For additional information on how to apply for this program, contact:

Ms. Amanda Mangano
215.762.8217

amangano@drexelmed.edu (thelicia.hill@drexel.edu)

Graduate School of Biomedical Sciences and Professional Studies
Drexel University College of Medicine
Forensic Science Program
245 North 15th Street
Mail Stop 344, Rm. 4104
Philadelphia, PA 19102-1192

Degree Requirements

Requirements
Required Core Courses:
- MFSP 550S Biological Aspects of the Forensic Sciences 2.0
- MFSP 557S Drug Chemistry 2.0
- MFSP 561S Techniques of Crime Scene Investigation 3.0
- MFSP 572S Forensic Research Project I 3.0
- MFSP 573S Forensic Research Project II 1.5
- MFSP 574S Forensic Research Paper 1.0
- MFSP 575S Introduction to Criminal Law and Trial Process 3.0
- MFSP 576S Ethics for the Forensic Scientist 2.0
- MFSP 592S Forensic Graduate Seminar 1.5
- MFSP 602S Professional Courtroom Testimony & Moot Court 3.0
- MFSP 564S Forensic Comparative Science 3.0
- MFSP 540S Basic Laboratory Techniques and Quality Assurance/Quality Control 2.0

Concentrations—Complete one concentration and free electives for a total of 18 credits

Criminalistic Concentration:
- MFSP 562S Arson and Explosive Analysis
- MFSP 563S Latent Fingerprint Analysis
- MFSP 571S Bloodstain Pattern Analysis
- MFSP 565S Firearms and Tool Mark Analysis
- MFSP 578S Forensic Photography

Molecular Biology Concentration
- MFSP 577S Genetics for the Forensic Scientist
- MFSP 589S Forensic DNA Analysis
- IDPT 501S Biostatistics I
- IHS 514S Molecular Biology & Biochemistry of the Cell
- MFSP 597S Forensic Serology

Forensic Medicine Concentration
- MFSP 583S The Autopsy in Clinical Forensic Medicine
- MFSP 584S Introduction to Forensic Radiology
- MFSP 585S Clinical Forensic Emergency Medicine and Traumatology
- MFSP 551S Human Function
- MFSP 601S Human Structure With Lab

Chemistry Concentration
- MFSP 558S Instrumental Analysis
- CHEM 530 Analytical Chemistry I
- CHEM 531 Analytical Chemistry II
- CHEM 541 Organic Chemistry I
- CHEM 755 Mass Spectrometry
**Histotechnology**

**Major:** Histotechnology  
**Degree Awarded:** Master of Science (MS)  
**Calendar Type:** Semester  
**Total Credit Hours:** 47.0  
**Classification of Instructional Programs (CIP) code:** 51.1007  
**Standard Occupational Classification (SOC) code:** 29-2011; 29-2012

**About the Program**

The Graduate School of Biomedical Sciences and Professional Studies offers the Master of Science in Histotechnology program. This one-year (12-month) program combines academic studies with a clinical practicum to prepare the students to perform complex tissue specimen preparations in the histology laboratory. The program provides advanced training and is designed to enable graduates to work as highly qualified histotechnologists under the supervision of pathologists.

Coursework includes histology, biochemistry, advanced histotechnology, anatomy, physiology, microbiology, medical ethics, laboratory management and leadership skills. In addition to the course work, students complete a three-month practicum designed to allow students to apply the knowledge and techniques learned during their didactic courses in a clinical hospital setting. The practicum allows the student the opportunity to perform routine as well as specialized, histotechnology techniques under the supervision of a qualified histotechnologist.

**Program Accreditation**

The National Accrediting Agency for Clinical Laboratory Sciences (NAACLS) has established national standards for Histotechnology training programs. The standards include both didactic course work and clinical experiences necessary to properly educate a Histotechnologist. The Master of Histotechnology program at Drexel University College of Medicine is accredited by NAACLS. Visit the NAACLS (http://www.naacls.org) website for more information about the professional activities of this organization.

**Professional Certification**

The American Society for Clinical Pathology Board of Certification (ASCP BOC) has established a national certification program for Histotechnologists. Graduates of the Master of Histotechnology program are eligible to sit for the national certification examination for Histotechnology. Visit the ASCP BOC (http://www.ascp.org/Board-of-Certification) website to read more about the certification program and the professional activities of this organization.

**Professional Affiliation**

The National Society for Histotechnology (NSH) is a non-profit organization, committed to the advancement of Histotechnology, its practitioners and quality standards of practice through leadership, education and advocacy. Visit the NSH website to read more about the professional activities of this organization.

**Career Opportunities**

Histotechnologists are employed in community hospitals, academic centers such as medical schools and university hospitals, private pathology laboratories, medical research centers, government hospitals. Additional opportunities are available in clinical and industrial research, veterinary pathology, marine biology and forensic pathology.

For more information about this program, visit the College of Medicine's Master of Science in Histotechnology (http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/AlliedHealthProfession Programs/HistotechnologyProgram.aspx) page.

**Admission Requirements**

A bachelor's degree in a biological or allied health science, with a cumulative GPA of approximately 2.75, is the minimum requirement for acceptance into the Master's Degree Program. Prerequisite course work includes mathematics, English composition, general chemistry, organic and/or biochemistry and biological science. Microbiology, anatomy and histology are recommended but not required.

All candidates will be required to have a formal interview with one of the program director's prior to final acceptance. Deadline for submission of the application is the second Friday in June of the year in which the students plan to enroll.

Candidates for admission must provide the following credentials:

- Completed application form
- Resume
- Official Transcripts from all schools attended or where coursework was attempted or taken
- Official General Graduate Record Examination (GRE) scores
- Three letters of evaluation
- Self-assessment essays
A. Discuss personal goals, conditions, or career aspirations that motivate you to pursue graduate study at Drexel University.
B. What are your most important accomplishments?
C. What do you expect to achieve through this program?

The application and supporting material must be received no later than the program deadline date.

For further information, contact:
Tina Rader, MHS, PA(ASCP)\textsuperscript{CM}
Master of Histotechnology Program Co-Director
Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
245 N. 15th Street, Mail Stop 344
Philadelphia, PA 19102-1192
(215) 762-4113
tina.rader@drexelmed.edu

Degree Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MFSP 551S</td>
<td>Human Function</td>
<td>3.0</td>
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<tr>
<td>MFSP 552S</td>
<td>Structure of the Human Body</td>
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<tr>
<td>MFSP 553S</td>
<td>Human Structure Lab</td>
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</tr>
<tr>
<td>MHPP 500S</td>
<td>Advanced Histotechnology</td>
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<td>MHPP 502S</td>
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<td>Histotechnology Practicum</td>
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<td>Fundamentals of Histology</td>
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<td>MSPA 510S</td>
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<tr>
<td>MSPA 540S</td>
<td>Histotechnology I</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 560S</td>
<td>Medical Ethics</td>
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</tr>
<tr>
<td>MSPA 580S</td>
<td>Medical Microbiology I</td>
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<tr>
<td>MSPA 590S</td>
<td>Leadership Skills for the Medical Profession</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPP 511S</td>
<td>Concepts in Bioch &amp; Cell Biolo</td>
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Total Credits: 47.0

Sample Plan of Study

First Year

<table>
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<tr>
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<tr>
<td>Fall</td>
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<tr>
<td>MLAS 545S</td>
<td>Fundamentals of Histology</td>
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<td>MSPA 540S</td>
<td>Histotechnology I</td>
</tr>
<tr>
<td>MSPA 590S</td>
<td>Leadership Skills for the Medical Profession</td>
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<tr>
<td>MSPP 511S</td>
<td>Concepts in Bioch Cell Biolo</td>
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Term Credits: 16.0

Spring

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<tr>
<th>Semester</th>
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<tbody>
<tr>
<td>MFSP 551S</td>
<td>Human Function</td>
</tr>
<tr>
<td>MFSP 552S</td>
<td>Structure of the Human Body</td>
</tr>
<tr>
<td>MFSP 553S</td>
<td>Human Structure Lab</td>
</tr>
<tr>
<td>MHPP 500S</td>
<td>Advanced Histotechnology</td>
</tr>
<tr>
<td>MHPP 502S</td>
<td>Histotechnology Capstone Project</td>
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<tr>
<td>MSPA 580S</td>
<td>Medical Microbiology I</td>
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Term Credits: 18.0

Summer

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<th>Course Title</th>
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<td>MHPP 503S</td>
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<tr>
<td>MSPA 510S</td>
<td>Laboratory Management</td>
<td>2.0</td>
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<tr>
<td>MSPA 560S</td>
<td>Medical Ethics</td>
<td>2.0</td>
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</table>

Total Credits: 13.0

Immunology

Major: Immunology
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 36.0
Classification of Instructional Programs (CIP) code: 26.0507
Standard Occupational Classification (SOC) code: 11-9121

About the Program

The MS in Immunology is designed to prepare students for careers in basic discovery, translational, and clinical research pertaining to infectious and inflammatory disease and other immunologic problems pursued in government, industry and academic environments.

The focus of the program will be to train participants in various aspects of research related to immunology and inflammatory disease, in particular, research and development relevant to new immunodiagnostics, immunotherapeutics, and vaccines to prevent and/or treat infectious diseases such as HIV/AIDS, hepatitis, influenza, malaria, and other viral, bacterial, parasitic, and fungal pathogens.

Special attention will be given to the study of:

- immunotherapeutic and vaccine target identification;
- immune response mechanisms;
- immunomodulators and immune response modifiers;
- vaccine discovery and development;
- immunologic redundancy; and
- innate and adaptive immune escape mechanisms.

Expertise in animal model development and use, basic discovery, and biological containment laboratories will also be emphasized.

The MS in Immunology encompasses two years of required and elective courses and a comprehensive research internship completed during the two-year training program. The internship will encompass three specific areas of research:

- the basic discovery of innate and adaptive immune response mechanisms;
- the translational research centered in therapeutic and prevention vaccine development or the development of immunomodulatory strategies; and
- the clinical immunology research arena.

The program is designed for applicants from a number of different academic and career backgrounds, allowing for flexibility for incoming students at a variety of levels. Most course work is offered in the late-afternoon or evenings. In addition to the standard pathway, students may complete their degree requirements in a more compact time frame, or they may select a part-time pathway to permit the simultaneous pursuit of other activities.
Admission Requirements

For acceptance into the Master of Science in Immunology program, the applicant must have completed a four-year biology or chemistry-based BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/ or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

#Official transcripts from all colleges and universities attended
#A current Curriculum Vitae (C.V.) or resume
#References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant's undergraduate curriculum, cumulative GPA, GRE/MCAT scores, recommendation letters, and relevant research and professional experience.

For additional information regarding application deadlines, the online application process, and specific requirements for applying to the College of Medicine, visit Drexel University's Graduate Admissions (http://www.drexel.edu/grad/programs/ducom/immunology) site.

Degree Requirements

Courses encompass the fundamental requirements to establish a solid grounding in microbiology and infectious disease, immunology, biochemistry, genetics, and molecular biology.

Research experiences will form a large component of the training program, with the possibility of completing the degree with or without a thesis document.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
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<td>IDPT 501S</td>
<td>Biostatistics I</td>
<td>2.0</td>
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<tr>
<td>MIIM 527S</td>
<td>Immunology, Immunopathology &amp; Infectious Diseases</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 530S</td>
<td>Fundamentals of Molecular Medicine I</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 531S</td>
<td>Fundamentals of Molecular Medicine II</td>
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<tr>
<td>MIIM 532S</td>
<td>Fund. Mol. Med. III</td>
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<tr>
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<td>Fundamentals in Molecular Medicine V</td>
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<td>MIIM 534S</td>
<td>Fund. Molecular Med. VI</td>
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<td>MIIM 606S</td>
<td>Micro &amp; Immuno Seminar</td>
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<td>MIIM 546S</td>
<td>Introduction to Immunology</td>
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<tr>
<td>MIIM 651S</td>
<td>Research Internship in Immunology</td>
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<tr>
<td>MIIM 654S</td>
<td>Clinical Correlations in Immunology</td>
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</table>

To complete the MS in Immunology degree, 36.0 credits must be accrued. Students may choose from a menu of additional electives, depending on their academic goals.

Possible Electives

<table>
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<tr>
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<td>Micro &amp; Immuno. Journal Club</td>
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<tr>
<td>MIIM 521S</td>
<td>Biotechniques I</td>
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<tr>
<td>MIIM 522S</td>
<td>Biotechniques II</td>
</tr>
<tr>
<td>MIIM 524S</td>
<td>Vaccines and Vaccine Development</td>
</tr>
<tr>
<td>MIIM 525S</td>
<td>Principles of Biocontainment</td>
</tr>
<tr>
<td>MIIM 526S</td>
<td>Animal Models in Biotechnology</td>
</tr>
<tr>
<td>MIIM 527S</td>
<td>Immunology, Immunopathology &amp; Infectious Diseases</td>
</tr>
<tr>
<td>MIIM 540S</td>
<td>Viruses and Viral Infections</td>
</tr>
<tr>
<td>MIIM 541S</td>
<td>Bacteria and Bacterial Infections</td>
</tr>
</tbody>
</table>
About the Program

The Master of Science in Infectious Disease program provides graduate-level training in various aspects of basic, translational, and clinical research related to infectious disease. Emphasis is placed on research and development efforts focused on new diagnostics, therapeutics, and vaccines used to prevent and/or treat infectious diseases such as HIV/AIDS, hepatitis, influenza, malaria, and other diseases caused by viral, bacterial, parasitic, and fungal pathogens.

Special attention is given to the study of therapeutic and vaccine target identification, the discovery and development of drugs and vaccines, and a greater understanding of resistance and immune escape mechanisms that reduce treatment effectiveness.

The program includes two years of required and elective graduate courses as well as a comprehensive research internship to be completed during the course of the training program. The internship encompasses one of three specific areas of research in the field of infectious disease:

- basic discovery involving infectious bacterial, viral, fungal, or parasitic pathogens that cause human disease;
- translational research focused on the development of new approaches to diagnose, prevent, or treat infectious diseases; and
- clinical infectious disease research.

Elective courses available to students in the program provide knowledge and expertise in areas relevant to infectious disease research, such as animal model use in biotechnology, emerging infectious diseases, vaccines and vaccine development, biotechniques and laboratory research, and principles of biocontainment.

The program is designed to prepare students for careers in infectious disease in government, industry, and academic environments. The program is ideally suited for enhancing the scientific credentials of recent college graduates, early career scientists, premedical students, industrial employees, and clinical laboratory technicians.

Although most students will complete the program in two years, some may opt to enroll on a part-time basis, taking up to four years to complete the degree program. While the program can be completed without a dissertation, a thesis option is available. Most courses are offered during the late afternoon or early evening to accommodate students who may be employed during the day in the biotechnology, pharmaceutical, and biomedical arenas. Most courses are offered both live and online, providing the student the flexibility to enroll in one or the other.

Degree Requirements

### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MIIM 542S</td>
<td>Mycology, Fungal Infections and Antibiotics</td>
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<tr>
<td>MIIM 543S</td>
<td>Parasitology and Parasitic Diseases</td>
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<tr>
<td>MIIM 607S</td>
<td>IMMUNOLOGY II</td>
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<tr>
<td>MIIM 612S</td>
<td>MOLEC MECH OF VIRAL PATHOGENSI</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 615S</td>
<td>EXPERIMENTAL THERAPEUTICS</td>
<td>2.0-3.0</td>
</tr>
<tr>
<td>MIIM 630S</td>
<td>Advanced Molecular Biology</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 613S</td>
<td>Emerging Infectious Diseases</td>
<td>1.0</td>
</tr>
</tbody>
</table>

| Total Credits | 36.0 |

### About the Program

The Master of Science in Infectious Disease program provides graduate-level training in various aspects of basic, translational, and clinical research related to infectious disease. Emphasis is placed on research and development efforts focused on new diagnostics, therapeutics, and vaccines used to prevent and/or treat infectious diseases such as HIV/AIDS, hepatitis, influenza, malaria, and other diseases caused by viral, bacterial, parasitic, and fungal pathogens.

Special attention is given to the study of therapeutic and vaccine target identification, the discovery and development of drugs and vaccines, and a greater understanding of resistance and immune escape mechanisms that reduce treatment effectiveness.

The program includes two years of required and elective graduate courses as well as a comprehensive research internship to be completed during the course of the training program. The internship encompasses one of three specific areas of research in the field of infectious disease:

- basic discovery involving infectious bacterial, viral, fungal, or parasitic pathogens that cause human disease;
- translational research focused on the development of new approaches to diagnose, prevent, or treat infectious diseases; and
- clinical infectious disease research.

Elective courses available to students in the program provide knowledge and expertise in areas relevant to infectious disease research, such as animal model use in biotechnology, emerging infectious diseases, vaccines and vaccine development, biotechniques and laboratory research, and principles of biocontainment.

The program is designed to prepare students for careers in infectious disease in government, industry, and academic environments. The program is ideally suited for enhancing the scientific credentials of recent college graduates, early career scientists, premedical students, industrial employees, and clinical laboratory technicians.

Although most students will complete the program in two years, some may opt to enroll on a part-time basis, taking up to four years to complete the degree program. While the program can be completed without a dissertation, a thesis option is available. Most courses are offered during the late afternoon or early evening to accommodate students who may be employed during the day in the biotechnology, pharmaceutical, and biomedical arenas. Most courses are offered both live and online, providing the student the flexibility to enroll in one or the other.

### Admission Requirements

For acceptance into the Master of Science in Infectious Disease program, the applicant must have completed a four-year biology or chemistry-related BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

- Official transcripts from all colleges and universities attended
- A current curriculum vitae (cv) or resume
- References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant’s undergraduate curriculum, cumulative GPA, GRE/MCAT scores, recommendation letters, and relevant research or professional experiences.

Visit the Master of Science in Infectious Disease (http://www.drexel.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/InfectiousDisease.aspx) program website for more detailed information. For additional information regarding application deadlines, the online application process, and specific requirements for applying to the College of Medicine, visit Drexel University’s Graduate Admissions (http://www.drexel.edu/grad/programs/ducom/infectious-diseases) site.
### Interdisciplinary Health Sciences

**Major:** Interdisciplinary Health Sciences  
**Degree Awarded:** Master of Science (MS)  
**Calendar Type:** Semester  
**Total Credit Hours:** 48.0  
**Classification of Instructional Programs (CIP) code:** 51.1099  
**Standard Occupational Classification (SOC) code:** 29-2011; 29-2012

### About the Program

The School of Biomedical Sciences and Professional Studies offers the Master of Science degree in Interdisciplinary Health Sciences. Students matriculating in this program or those already participating in Master of Science in Biological Science (p. 79) or Drexel Pathway to Medical School (p. 84) (DPMS) Master's programs who qualify (see admissions guidelines [here](http://www.drexelmed.edu/Home/AcademicPrograms/InterdisciplinaryHealthSciences.aspx)) and wish to obtain additional, more focused education within the medically related health sciences can earn a Master of Science degree through this program. Having obtained a broad exposure to a variety of health care and medically related sciences during the first year, the second year will permit students to refine their knowledge and further explore closely related subjects in a chosen area of focus in greater depth.

In their second year of the program, students will be required to declare a concentration track. See the College's curriculum requirements, including an earned GPA of no less than 3.0. There are two routes of entry into the Master of Interdisciplinary Health Sciences (IHS) program. US citizens or permanent residents either directly matriculate into the program or may transition into the program from other qualifying programs, such as the Master of Science in Biological Science (p. 70) program. International students are required to enter the Master of Interdisciplinary Health Sciences program directly.

For more information about the program, visit the College of Medicine's MS in Interdisciplinary Health Sciences ([here](http://www.drexelmed.edu/Home/AcademicPrograms/InterdisciplinaryHealthSciences.aspx)) page. For more information about applying to the program, visit the College of Medicine's MS in Interdisciplinary Health Science Admissions ([here](http://www.drexelmed.edu/Home/Admissions/ProfessionalStudiesintheHealthSciences/InterdisciplinaryHealthSciences.aspx)) page for more details about the concentrations.

### Fall

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHS 500S</td>
<td>Career Counseling in the Health Sciences Seminar</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Working with an advisor, students select four courses from the following:

| CR 505S | Ethical Issues in Research |
| CR 515S | Intro to Clinical Trials   |
| CR 525S | Scientific Writing and Medical Literature |
| CR 535S | Current Federal Regulatory Issues in Biomedical Research |
| CR 545S | Pharmaceutical Law         |
| CR 550S | Leadership Skills           |
| CR 612S | Fundamentals of Compliance  |
| CR 617S | Informatics in Pharm Res & Development |
| MLAS 523S | Organizational Management |
| MLAS 525S | Animal Anatomy             |
| MLAS 531S | Embryology                 |
| MLAS 536S | Animal Models for Biomedical Research |
| MLAS 545S | Fundamentals of Histology   |
| MSPA 540S | Histotechnology I          |
| MSPA 580S | Medical Microbiology I     |
| MLAS 531S | Embryology                 |
| PHRM 512S | Graduate Pharmacology      |

### Electives

During their participation in the second year of the program, students will complete a minimum of 24.0 additional credit hours of graduate course work (for a total minimum of 48 hours in entire 2 year program) including a final research project and paper. The Master of Science (MS) will be awarded contingent upon satisfactory completion of all program requirements, including an earned GPA of no less than 3.0.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIIM 501S</td>
<td>Biotechniques I</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 502S</td>
<td>Biotechniques II</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 503S</td>
<td>Molecular Virology</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 504S</td>
<td>Vaccines and Vaccine Development</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 505S</td>
<td>Principles of Biocontainment</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 506S</td>
<td>Animal Models in Biotechnology</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 507S</td>
<td>Viruses and Viral Infections</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 508S</td>
<td>Bacteria and Bacterial Infections</td>
<td>1.0</td>
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<tr>
<td>MIIM 509S</td>
<td>Mycology, Fungal Infections and Antibiotics</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 510S</td>
<td>Parasitology and Parasitic Diseases</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 512S</td>
<td>Emerging Infectious Diseases</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 513S</td>
<td>EXPERIMENTAL THERAPEUTICS</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 514S</td>
<td>Biotechniques and Laboratory Research I</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 515S</td>
<td>Biotechniques and Laboratory Research II</td>
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</tr>
</tbody>
</table>
### Interdisciplinary Health Sciences

#### MSPP 511S Concepts in Bioch & Cell Biolo

#### Spring

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>IHS 501S</td>
<td>Career Counseling in the Health Sciences Seminar I</td>
<td>1.0</td>
</tr>
<tr>
<td>IHS 502S</td>
<td>Neuropharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPP 525S</td>
<td>Community Dimensions of Medicine</td>
<td>2.0</td>
</tr>
</tbody>
</table>

- Working with an advisor, students select two additional courses from the following:
  - PBHL 530 Principles of Epidemiology
  - MLAS 535S Biology & Care Of Lab Animals
  - MSPA 581S Medical Microbiology II
  - MSPP 513S Special Topics in Anatomy
  - MSPP 515S Biological Function & Regulation
  - CR 545S Pharmaceutical Law

**Total Credits**: 24.0

#### Core Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IHS 500S</td>
<td>Career Counseling in the Health Sciences Seminar I</td>
<td>1.0</td>
</tr>
<tr>
<td>IHS 513S</td>
<td>Introduction to Scientific Writing</td>
<td>3.0</td>
</tr>
<tr>
<td>IHS 501S</td>
<td>Career Counseling in the Health Sciences Seminar II</td>
<td>1.0</td>
</tr>
<tr>
<td>IHS 502S</td>
<td>Neuropharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>IHS 507S</td>
<td>Initiating Biomedical Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IHS 508S</td>
<td>MIHS Research Project</td>
<td>1.5</td>
</tr>
<tr>
<td>IHS 509S</td>
<td>MIHS Research Paper</td>
<td>1.5</td>
</tr>
<tr>
<td>MSPP 525S</td>
<td>Community Dimensions of Medicine</td>
<td>2.0</td>
</tr>
<tr>
<td>CR 999S</td>
<td>Special Topics (Intro to Biostatistics)</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits**: 18.0

#### Elective Courses

**Clinical Research, Management and Laboratory Skills**: 18.0

- Select six from the following:
  - CR 614S Pharmacotherapy in New Drug R&D
  - MLAS 523S Organizational Management
  - MSPA 520S Medical Terminology
  - MSPA 590S Leadership Skills for the Medical Profession
  - MLAS 536S Animal Models for Biomedical Research
  - MLAS 535S Biology & Care Of Lab Animals
  - CR 535S Current Federal Regulatory Issues in Biomedical Research
  - CR 999S Special Topics (Clinical Data Management)
  - CR 600S Designing the Clinical Trial
  - CR 612S Fundamentals of Compliance
  - CR 505S Ethical Issues in Research
  - MFSP 589S Forensic DNA Analysis
  - IHS 506S Healthcare in Spanish II

**Total Credits**: 54.0-56.0

**Biochemical and Pharmacologic Principles**: 18.0

- Select six of the following:
  - CR 614S Pharmacotherapy in New Drug R&D

**Total Credits**: 50.0-58.0

#### Concepts in Anatomy and Pathology**: 18.0

- Select six of the following:
  - MLAS 531S Embryology
  - MLAS 545S Fundamentals of Histology
  - MLAS 529S Molecular Genetics
  - MLAS 525S Animal Anatomy
  - MFSP 581S Human Osteology and Calcified Tissue Biology I
  - MFSP 582S Human Osteology and Calcified Tissue Biology II
  - MFSP 556S Forensic Anthropology and Topics in Human Identification
  - MFSP 588S Special Topics in Cell Biology
  - MFSP 554S Principles of Forensic Pathology
  - MFSP 999S Special Topics (Human Structure with Lab)
  - MSPP 513S Special Topics in Anatomy
  - MSPP 511S Concepts in Bioch & Cell Biolo
  - IHS 511S Biology of Cancer

**Total Credits**: 58.0

#### Laboratory Techniques**: 18.0

- Select six of the following:
  - CR 505S Ethical Issues in Research
  - CR 609S Innovative Product Development
  - MFSP 588S Forensic DNA Analysis
  - MFSP 577S Genetics for the Forensic Scientist
  - MFSP 578S Forensic Photography
  - MFSP 579S Forensic Microbiology
  - MFSP 580S Principles of Immunology
  - MLAS 536S Animal Models for Biomedical Research
  - MLAS 535S Biology & Care Of Lab Animals
  - MLAS 545S Fundamentals of Histology
  - IHS 514S Molecular Biology & Biochemistry of the Cell

**Total Credits**: 47.0

#### Medical Science

**Required Courses for this Concentration**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSP 512S</td>
<td>Medical Biochemistry</td>
<td>8.0</td>
</tr>
<tr>
<td>IMSP 520S</td>
<td>Medical Physiology I</td>
<td>3.5</td>
</tr>
<tr>
<td>IMSP 521S</td>
<td>Medical Physiology II</td>
<td>3.5</td>
</tr>
<tr>
<td>IMSP 540S</td>
<td>Cell Biology &amp; Microanatomy I</td>
<td>5.0</td>
</tr>
<tr>
<td>IMSP 541S</td>
<td>Cell Biology and Microanatomy II</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Medical Science

Major: Medical Science
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 57.0
Classification of Instructional Programs (CIP) code: 26.9999
Standard Occupational Classification (SOC) code: 11-9121

About the Program

The Master of Science in Medical Science (MMS) program offers students whose record necessitates a second year of study, the opportunity to earn the Master of Science degree in order to successfully compete as medical school applicants. The MMS curriculum permits students to take additional medical school and other graduate coursework while completing an extensive research project, thus further strengthening their academic backgrounds while gaining a competency highly valued by the vast majority of US medical school admission committees.

The MMS program serves some of our brightest students (as demonstrated by high MCAT scores and other aspects of their previous records) who nevertheless need two years of study in order to gain acceptance to medical school. In addition, it also serves as a destination for some students who begin the one year Interdepartmental Medical Science MS degree program, but opt to transfer into a more comprehensive and highly rigorous program.

Additional Information

Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
245 North 15th Street, Mail Stop 344, Room 4104 NCB
Philadelphia, PA 19102
215.762.4692
medicalsciences@drexelmed.edu

Degree Requirements

To fulfill requirements for the MS in Medical Science, students conduct either bench-top or clinical research with a Primary Investigator. Students who have a 3.00 or higher GPA may take one second-year medical school course and students whose GPA falls below a 3.00 are required to take 6 credits of graduate level biological science coursework. After successful completion of the program, the student is awarded a Master of Science degree.

Required Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSP 502S</td>
<td>Medicine and Society I</td>
<td>3.0</td>
</tr>
<tr>
<td>IMSP 506S</td>
<td>Medical Professionalism and Leadership</td>
<td>2.0</td>
</tr>
<tr>
<td>IMSP 512S</td>
<td>Medical Biochemistry</td>
<td>8.0</td>
</tr>
</tbody>
</table>

Total Credits 34.0

Graduate Level Elective Credits 6.0

CR 520S Applications of Clinical Research Biostatistics
CR 530S Biostats in Vet Science
MMSP 501S Research in Medical Science I
MMSP 502S Research in Medical Science II
MMSP 504S Research Seminar II

Required Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IMSP 520S</td>
<td>Medical Physiology I</td>
<td>3.5</td>
</tr>
<tr>
<td>IMSP 521S</td>
<td>Medical Physiology II</td>
<td>3.5</td>
</tr>
<tr>
<td>IMSP 540S</td>
<td>Cell Biology &amp; Microanatomy I</td>
<td>5.0</td>
</tr>
<tr>
<td>IMSP 541S</td>
<td>Cell Biology and Microanatomy II</td>
<td>3.0</td>
</tr>
<tr>
<td>IMSP 560S</td>
<td>Medical Neuroscience</td>
<td>6.0</td>
</tr>
<tr>
<td>MMSP 501S</td>
<td>Research in Medical Science I</td>
<td>6.0</td>
</tr>
<tr>
<td>MMSP 503S</td>
<td>Research Seminar I</td>
<td>1.0</td>
</tr>
</tbody>
</table>

A minimum of 10.0 credits in the following courses is required with the 10.0 approval of the program director.

CR 525S Scientific Writing and Medical Literature
CR 535S Current Federal Regulatory Issues in Biomedical Research
CR 565S Contemporary issues in Human Research Protection
CR 600S Designing the Clinical Trial
CR 609S Innovative Product Development
CR 612S Fundamentals of Compliance
CR 614S Pharmacotherapy in New Drug R&D
CR 617S Informatics in Pharm Res & Development
IHS 505S Healthcare in Spanish I
IHS 506S Healthcare in Spanish II
IHS 511S Biology of Cancer
IMSP 571S Medical Nutrition I
IMSP 572S Medical Nutrition II
IMSP 573S Medical Immunology I
IMSP 574S Medical Immunology II
MFSP 581S Human Osteology and Calcified Tissue Biology I
MFSP 582S Human Osteology and Calcified Tissue Biology II
MFSP 583S The Autopsy in Clinical Forensic Medicine
MFSP 584S Introduction to Forensic Radiology
MFSP 585S Clinical Forensic Emergency Medicine and Traumatology
MFSP 586S Introduction to Forensic Pediatrics
MFSP 589S Forensic DNA Analysis
MLAS 523S Organizational Management
MLAS 529S Molecular Genetics
MLAS 531S Embryology
MMSP 520S Medical Pathology I
MMSP 521S Medical Pathology II
MSPA 580S Medical Microbiology I
MSPA 581S Medical Microbiology II
MSPP 513S Special Topics in Anatomy
PHRM 512S Graduate Pharmacology

Total Credits 57.0
Pathologists’ Assistant

Major: Pathologists’ Assistant
Degree Awarded: Master of Science (MS)
Calendar Type: Semester
Total Credit Hours: 91.0
Classification of Instructional Programs (CIP) code: 51.0811
Standard Occupational Classification (SOC) code: 29-2055

About the Program

The School of Biomedical Sciences and Professional Studies offers the Master of Science in Pathologists’ Assistant (PathA). The pathologists’ assistant is an intensely trained allied health professional who provides anatomic pathology services under the direction and supervision of a pathologist. Pathologists’ assistants interact with pathologists in the same manner that physicians’ assistants carry out their duties under the direction of physicians in surgical and medical practice.

The PathA program offers students the opportunity to train in the highly specialized field of anatomic pathology. This two-year, full-time program begins in May of each year. The first year is comprised of the instructional portion of the program supplemented by pathology laboratory exposure. The second year of the program is composed of several hospital-based clinical rotations offering progressively responsible experience in autopsy and surgical pathology. These rotations are supplemented with informal classroom education.

Program Accreditation

The National Accrediting Agency for Clinical Laboratory Sciences (NAACLS): NAACLS, in conjunction with the AAPA, has established national standards for Pathologists’ Assistant training programs. The standards include both didactic course work and clinical experiences necessary to properly educate a pathologists’ assistant. The Master of Pathologists’ Assistant program at the Drexel University College of Medicine is accredited by NAACLS. Visit the NAACLS (http://www.naacls.org) website for more information about the professional activities of this organization.

Professional Certification

The American Society for Clinical Pathology Board of Registry (ASCP BOC): The ASCP BOC, in conjunction with the AAPA, has established a national certification program for Pathologists’ Assistants. In 2005, the ASCP BOC first offered a national certification examination for Pathologists’ Assistants. In order to be eligible for the BOC examination, applicants must be graduates of a pathologists’ assistant educational program accredited by the National Accrediting Agency for Clinical Laboratory Science (NAACLS). Visit the ASCP BOC (http://www.ascp.org/Board-of-Certification) website to read more about the certification program and the professional activities of this organization.

Professional Affiliation

The American Association of Pathologists’ Assistants (AAPA): The AAPA is the only national professional organization for pathologists’ assistants. The AAPA:

- is a not-for-profit, volunteer organization dedicated to advancing the pathologists’ assistant profession by providing its members with education, networking, and professional support;
- supports professional competency through program accreditation and individual certification;
- promotes public and professional awareness of the pathologist’s assistant as an integral member of the healthcare team.

Visit the AAPA (http://www.pathassist.org) website for more additional information about this association.

Career Opportunities

Pathologists’ assistants are employed in community hospitals, academic centers such as medical schools and university hospitals, private pathology laboratories, medical research centers, government hospitals and medical examiner offices.

For more information about this program, visit the College of Medicine’s Master of Science in Pathologists’ Assistant (http://www.drexelmed.edu/CollegeOfMedicine/AcademicPrograms/ProfessionalStudiesintheHealthSciences/AlliedHealthProfessionPrograms/AAPA/PathologistsAssistantProgram.aspx) program’s web page.

Admission Requirements

A pathologist’s assistant is someone who has the ability to relate to people, the capacity for calm and reasoned judgment and who demonstrates a commitment to quality patient care. The program’s courses and content are ideal for:

- Recent graduates with a degree in a biological or allied health science, with exposure to anatomy, physiology, chemistry and microbiology. Previous exposure to pathology is recommended.
- Allied health professionals, in particular cytotechnologists, histotechnologists and medical technologists.

Admission requirements

Students will be selected on the basis of adequate educational background and medical experience. A bachelor’s degree in a biological or allied health science with a cumulative GPA of at least 3.0 is the minimum requirement for acceptance into the program. Prerequisite course work will include microbiology, human anatomy, physiology, mathematics, English composition, general chemistry, organic and/or biochemistry and biological science.

All candidates will be required to have a formal interview with the Selection Committee prior to final acceptance. Deadline for submission of the application is the second Friday in February of the year in which the students plan to enroll. Candidates for admission must provide the following credentials:

- Completed application form
- Resume
- Official transcripts from all college or university attended or where coursework was attempted or taken
- Official General Graduate Record Examination (GRE) scores
- Three letters of evaluation
- Self-assessment essays:
  A. Discuss personal goals, conditions, or career aspirations that motivate you to pursue graduate study at Drexel University.
  B. What are your most important accomplishments?
  C. What do you expect to achieve through this program?
Degree Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFSP 551S</td>
<td>Human Function</td>
<td>3.0</td>
</tr>
<tr>
<td>MLAS 531S</td>
<td>Embryology</td>
<td>3.0</td>
</tr>
<tr>
<td>MLAS 545S</td>
<td>Fundamentals of Histology</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 500S</td>
<td>Gross Anatomy</td>
<td>5.0</td>
</tr>
<tr>
<td>MSPA 510S</td>
<td>Laboratory Management</td>
<td>2.0</td>
</tr>
<tr>
<td>MSPA 520S</td>
<td>Medical Terminology</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 530S</td>
<td>Biomedical Photography</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPA 540S</td>
<td>Histotechnology I</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 541S</td>
<td>Histotechnology II</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 550S</td>
<td>Applied Anatomic Pathology</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPA 560S</td>
<td>Medical Ethics</td>
<td>2.0</td>
</tr>
<tr>
<td>MSPA 570S</td>
<td>Medical Pathology I</td>
<td>6.0</td>
</tr>
<tr>
<td>MSPA 571S</td>
<td>Medical Pathology II</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPA 580S</td>
<td>Medical Microbiology I</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPA 581S</td>
<td>Medical Microbiology II</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 590S</td>
<td>Leadership Skills for the Medical Profession</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 600S</td>
<td>Surgical Pathology I</td>
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<td>6.0</td>
</tr>
<tr>
<td>MSPA 602S</td>
<td>Surgical Pathology III</td>
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<tr>
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</tr>
<tr>
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</tr>
<tr>
<td>MSPA 612S</td>
<td>Autopsy Pathology III</td>
<td>6.0</td>
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</tbody>
</table>

Total Credits: 91.0

Plan of Study

First Year

<table>
<thead>
<tr>
<th>Term</th>
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</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
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<tr>
<td>MLAS 531S</td>
<td>Embryology</td>
</tr>
<tr>
<td>MLAS 545S</td>
<td>Fundamentals of Histology</td>
</tr>
<tr>
<td>MSPA 500S</td>
<td>Gross Anatomy</td>
</tr>
<tr>
<td>MSPA 510S</td>
<td>Laboratory Management</td>
</tr>
<tr>
<td>MSPA 520S</td>
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</tr>
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| Term 2 | |
| MSPA 530S | Biomedical Photography | 4.0 |
| MSPA 540S | Histotechnology I | 3.0 |
| MSPA 570S | Medical Pathology I | 6.0 |
| MSPA 580S | Medical Microbiology I | 4.0 |

Second Year

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>Term 3</td>
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<tr>
<td>MFSP 551S</td>
<td>Human Function</td>
</tr>
<tr>
<td>MSPA 541S</td>
<td>Histotechnology II</td>
</tr>
<tr>
<td>MSPA 550S</td>
<td>Applied Anatomic Pathology</td>
</tr>
<tr>
<td>MSPA 571S</td>
<td>Medical Pathology II</td>
</tr>
<tr>
<td>MSPA 581S</td>
<td>Medical Microbiology II</td>
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</table>

| Term 4 | |
| MSPA 560S | Medical Ethics | 2.0 |
| MSPA 600S | Surgical Pathology I | 6.0 |
| MSPA 610S | Autopsy Pathology II | 6.0 |
| Term Credits | 14.0 |

| Term 5 | |
| MSPA 601S | Surgical Pathology II | 6.0 |
| MSPA 611S | Autopsy Pathology II | 6.0 |
| Term Credits | 12.0 |

| Term 6 | |
| MSPA 602S | Surgical Pathology III | 6.0 |
| MSPA 612S | Autopsy Pathology III | 6.0 |
| Term Credits | 12.0 |

Total Credit: 91.0

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MFSP 551S</td>
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<tr>
<td>MLAS 531S</td>
<td>Embryology</td>
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<td>MLAS 545S</td>
<td>Fundamentals of Histology</td>
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<td>MSPA 500S</td>
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</tr>
<tr>
<td>MSPA 530S</td>
<td>Biomedical Photography</td>
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<td>MSPA 540S</td>
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<td>MSPA 541S</td>
<td>Histotechnology II</td>
<td>3.0</td>
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<td>MSPA 550S</td>
<td>Applied Anatomic Pathology</td>
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<tr>
<td>MSPA 560S</td>
<td>Medical Ethics</td>
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<tr>
<td>MSPA 570S</td>
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<td>MSPA 571S</td>
<td>Medical Pathology II</td>
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</tr>
<tr>
<td>MSPA 580S</td>
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</tr>
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<td>MSPA 581S</td>
<td>Medical Microbiology II</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 590S</td>
<td>Leadership Skills for the Medical Profession</td>
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</tr>
<tr>
<td>MSPA 540S</td>
<td>Histotechnology I</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 541S</td>
<td>Histotechnology II</td>
<td>3.0</td>
</tr>
<tr>
<td>MSPA 550S</td>
<td>Applied Anatomic Pathology</td>
<td>4.0</td>
</tr>
<tr>
<td>MSPA 560S</td>
<td>Medical Ethics</td>
<td>2.0</td>
</tr>
<tr>
<td>MSPA 570S</td>
<td>Medical Pathology I</td>
<td>6.0</td>
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<tr>
<td>MSPA 571S</td>
<td>Medical Pathology II</td>
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</tr>
<tr>
<td>MSPA 580S</td>
<td>Medical Microbiology I</td>
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<tr>
<td>MSPA 581S</td>
<td>Medical Microbiology II</td>
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<td>MSPA 590S</td>
<td>Leadership Skills for the Medical Profession</td>
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<tr>
<td>MSPA 600S</td>
<td>Surgical Pathology I</td>
<td>6.0</td>
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<td>MSPA 601S</td>
<td>Surgical Pathology II</td>
<td>6.0</td>
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<tr>
<td>MSPA 602S</td>
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</tr>
<tr>
<td>MSPA 610S</td>
<td>Autopsy Pathology I</td>
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<td>6.0</td>
</tr>
<tr>
<td>MSPA 612S</td>
<td>Autopsy Pathology III</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Total Credits: 91.0

For further information, contact:
Tina Rader, MHS, PA (ASCP)
Program Co-Director
Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
245 N. 15th Street, Mail Stop 344
Philadelphia, PA 19102-1192
215-762-4692
tina.rader@drexelmed.edu
Microbiology and Immunology

Major: Microbiology and Immunology
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Semester
Total Credit Hours: 36.0-48.0 (MS); 96.0 (PhD)
Classification of Instructional Programs (CIP) code: 26.0599
Standard Occupational Classification (SOC) code: 19-1022

About the Program

The Department of Microbiology and Immunology offers students the MS and PhD degrees. The programs are designed to promote understanding of the molecular mechanisms of infectious diseases. The department has research programs in the areas of parasitic, viral, and opportunistic infections; bacterial pathogenesis and genomics; immunology; and drug development driven by investigators with national and international reputations and with extended histories of extramural funding from the NIH, as well as other sources of funding.

In the first year, students complete both required courses in the core curriculum, and research laboratory rotation requirements. All students must pass an examination at the end of the first year, while also attending seminars and journal clubs.

MS in Microbiology and Immunology

MS students are required to successfully complete the core curriculum and the first-year program-specific coursework (Molecular Pathogenesis I and II and Immunology). The preliminary examination, taken at the end of the first year, involves a proposal describing the research to be undertaken towards completion of the MS degree. In all semesters, MS students must attend seminars and journal clubs.

PhD in Microbiology and Immunology

PhD students are required to successfully complete the core curriculum and the first year program-specific coursework (Molecular Pathogenesis I and II and Immunology). The preliminary examination, taken at the end of the first year, involves a research proposal written in response to a question submitted by a committee of the Program's faculty. Advanced level courses in immunology, virology, advanced molecular biology, microbial pathogenesis, experimental therapeutics and emerging infectious diseases are offered to interested students in the second year and PhD students are required to enroll for credit for at least two advanced courses.

PhD candidates must pass a qualifying examination in the middle of their third year. In all semesters, PhD students must attend seminars and journal clubs. PhD students are also required to submit a minimum of two manuscripts (publications from their research) during the course of the program. The average amount of time required to complete the PhD requirements is five years.

Courses Repeatable for Credit

As well as taking all required courses, MS and PhD students may re-enroll in courses having the status “repeatable for credit” (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

For more information, including scheduling a plan of study, visit the College of Medicine's Microbiology and Immunology Program (http://www.drexelmed.edu/Home/AcademicPrograms/ BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/ MicrobiologyImmunology.aspx) website.

MS Degree Requirements: Non-Thesis Option

MS without thesis: 36.0 semester credits

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 501S</td>
<td>Biostatistics I</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S</td>
<td>Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 526S</td>
<td>Cells to Systems</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 850S</td>
<td>Literature Review Non-Thesis MS</td>
<td>4.0</td>
</tr>
<tr>
<td>MIIM 502S</td>
<td>Micro &amp; Immuno. Journal Club</td>
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</tr>
<tr>
<td>MIIM 508S</td>
<td>Immunology I</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 512S</td>
<td>Molecular Pathogenesis I</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 513S</td>
<td>MOLECULAR PATHOGENESIS II</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 606S</td>
<td>Micro &amp; Immuno Seminar</td>
<td>1.0</td>
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</table>

Suggested Electives

Select three of the following:

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<th>Title</th>
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</thead>
<tbody>
<tr>
<td>MIIM 504S</td>
<td>Micro. &amp; Immuno. 1st Rotation</td>
</tr>
<tr>
<td>MIIM 524S</td>
<td>Vaccines and Vaccine Development</td>
</tr>
<tr>
<td>MIIM 604S</td>
<td>Special Topics in Virology</td>
</tr>
<tr>
<td>MIIM 607S</td>
<td>IMMUNOLOGY II</td>
</tr>
<tr>
<td>MIIM 613S</td>
<td>Emerging Infectious Diseases</td>
</tr>
<tr>
<td>MIIM 615S</td>
<td>EXPERIMENTAL THERAPEUTICS</td>
</tr>
<tr>
<td>MIIM 630S</td>
<td>Advanced Molecular Biology</td>
</tr>
</tbody>
</table>

Total Credits 38.0

*Additional courses from the Biograduate Medical programs may be taken as electives. Students should check with the College of Medicine's Biomedical Graduate Studies (http://www.drexelmed.edu/home/AcademicPrograms/BiomedicalGraduateStudies.aspx) programs.

MS Degree Requirements: Thesis Option

MS with thesis: 48.0 semester credits

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
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<td>IDPT 501S</td>
<td>Biostatistics I</td>
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<td>IDPT 526S</td>
<td>Cells to Systems</td>
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</tr>
<tr>
<td>IDPT 600S</td>
<td>Thesis Defense</td>
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<tr>
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<td>Micro. &amp; Immuno. 1st Rotation</td>
<td>4.0</td>
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<td>MIIM 508S</td>
<td>Immunology I</td>
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<td>Molecular Pathogenesis I</td>
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<tr>
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<td>3.0</td>
</tr>
<tr>
<td>MIIM 600S</td>
<td>Micro. &amp; Immuno Thesis Research</td>
<td>9.0</td>
</tr>
<tr>
<td>MIIM 606S</td>
<td>Micro &amp; Immuno Seminar</td>
<td>1.0</td>
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Suggested Electives

<table>
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<tr>
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<tr>
<td>MIIM 630S</td>
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<tr>
<td>MIIM 606S</td>
<td>Micro &amp; Immuno Seminar</td>
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<tr>
<td>MIIM 615S</td>
<td>EXPERIMENTAL THERAPEUTICS</td>
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<tr>
<td>MIIM 613S</td>
<td>Emerging Infectious Diseases</td>
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<tr>
<td>MIIM 607S</td>
<td>IMMUNOLOGY II</td>
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<td>MIIM 512S</td>
<td>Molecular Pathogenesis I</td>
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<tr>
<td>MIIM 513S</td>
<td>MOLECULAR PATHOGENESIS II</td>
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<td>MIIM 508S</td>
<td>Immunology I</td>
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</table>
### PhD Degree Requirements

**PhD: 96.0 semester credits**

#### Required Courses

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</thead>
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<tr>
<td>IDPT 501S</td>
<td>Biostatistics I</td>
<td>2.0</td>
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<tr>
<td>IDPT 521S</td>
<td>Molecular Structure and Metabolism</td>
<td>5.0</td>
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<td>IDPT 526S</td>
<td>Cells to Systems</td>
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</tr>
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<td>IDPT 600S</td>
<td>Thesis Defense</td>
<td>9.0</td>
</tr>
<tr>
<td>MIIM 502S</td>
<td>Micro &amp; Immuno. Journal Club</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 504S</td>
<td>Micro. &amp; Immuno. 1st Rotation</td>
<td>4.0</td>
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<td>MIIM 505S</td>
<td>Micro. &amp; Immuno. 2nd Rotation</td>
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</tr>
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<td>MIIM 506S</td>
<td>Micro. &amp; Immuno. 3rd Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>MIIM 508S</td>
<td>Immunology I</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 512S</td>
<td>Molecular Pathogenesis I</td>
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<tr>
<td>MIIM 513S</td>
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<tr>
<td>MIIM 600S</td>
<td>Micro.&amp;Immuno Thesis Research</td>
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<tr>
<td>MIIM 606S</td>
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**Suggested Electives**

Select two of the following:

<table>
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<tr>
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</thead>
<tbody>
<tr>
<td>MIIM 604S</td>
<td>Special Topics in Virology</td>
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<tr>
<td>MIIM 607S</td>
<td>IMMUNOLOGY II</td>
</tr>
<tr>
<td>MIIM 613S</td>
<td>Emerging Infectious Diseases</td>
</tr>
<tr>
<td>MIIM 615S</td>
<td>EXPERIMENTAL THERAPEUTICS</td>
</tr>
<tr>
<td>MIIM 630S</td>
<td>Advanced Molecular Biology</td>
</tr>
</tbody>
</table>

**Total Credits:** 61.0

#### Additional Notes

- No electives are required for the MS with Thesis option. This list includes suggested electives, however additional courses from the Biograduate Medical programs may also be taken. Students should check with the College of Medicine's Biomedical Graduate Studies (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx) programs.

### About the Program

The Master of Science in Molecular Medicine program provides training in the academic, research and entrepreneurial aspects of the biomedical sciences with an emphasis on translational research in the development of therapeutics and vaccines. This flexible program, offered in the early evening, has been designed to both enhance the academic credentials of individuals currently employed in industrial or educational pursuits, and to offer an opportunity for an *ente* degree for individuals interested in following a career in the biomedical industrial sciences.

The Master of Science in Molecular Medicine program is designed to provide academic and practical biotechnological knowledge in translational research, particularly in the areas of molecular therapeutics and vaccine development.

The program is ideally suited for enhancing the scientific credentials of the following target groups:

- industrial employees
- high school biology teachers
- new college graduates
- college undergraduates
- pre-medical students

The degree encompasses the fundamental requirements to establish a sound grounding in microbiology, biochemistry, genetics, and molecular biology. The program is designed with two years of required and elective graduate courses, and a research internship in the summer session of the first or second year. The flexibility of the curriculum enables students to complete the degree requirement within 18 months on a full-time basis, and up to 4 years on a part-time basis. The successful completion of the degree will be determined by grades obtained in the graduate courses, participation in seminars and journal clubs, and performance in the research component.

The research component of the curriculum can be fulfilled by two alternative approaches: (1) a research internship in which a 12 week research program will be undertaken in the summer session of either the first or second year of the program; or (2) as a combination of a 6 week research rotation in the laboratory of a participating faculty member in combination with the taking of one or more elective courses which focus on state-of-the-art biotechniques. A thesis is not required.

Classes can be attended at any of three Drexel College of Medicine locations: Center City and Queen Lane campuses in Philadelphia, and the Pennsylvania Biotechnology Center in nearby Doylestown. State-of-the-art video conferencing provides real-time interactive learning at all three locations.

### Admission Requirements

For acceptance into the Master of Science in Molecular Medicine program, the applicant must have completed a four-year biology or chemistry-based BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly
desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

- Official transcripts from all colleges and universities attended
- A current curriculum vitae (CV) or resume
- References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant's undergraduate curriculum, cumulative GPA, GRE/MCAT scores, recommendation letters, and relevant research or professional experiences.

For additional information about the program, view the MS in Molecular Medicine (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/MolecularMedicine.aspx) page on the College of Medicine's website.

Degree Requirements

About the Curriculum

Through the combination of required and elective courses, a total of 36.0 credits is required to successfully obtain the degree of Masters of Science in Molecular Medicine. In order to maintain full-time student status, a minimum of 9.0 credits must be taken in any given academic semester. Students should work with their program advisors to plan their course of study.

Research Requirements

The research component can be fulfilled by two approaches: (1) a research internship in which a 12-week research program will be undertaken in the summer session of either the first or second year of the program. (The internship can be undertaken in a laboratory of a participating faculty member, or in a laboratory of one of the Industrial Partners when necessary research training plans of longer duration and depth can be developed with the approval of the Program Advisory Committee); or (2) as a combination of a 6-week research rotation in the laboratory of a participating faculty member in combination with the taking of one or more elective courses which focus on state-of-the-art biotechniques.

For a plan of study listing the sequence of how courses should be completed, students should work with their program advisor.

Recommended Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 501S</td>
<td>Biostatistics I</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Electives

To complete the 36.0 credits total, students select from a menu of additional electives, and complete their required research component.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIIM 540S</td>
<td>Viruses and Viral Infections</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 541S</td>
<td>Bacteria and Bacterial Infections</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 542S</td>
<td>Mycology, Fungal Infections and Antibiotics</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 543S</td>
<td>Parasitology and Parasitic Diseases</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 527S</td>
<td>Immunology, Immunopathology &amp; Infectious Diseases</td>
<td>3.0</td>
</tr>
<tr>
<td>MIIM 530S</td>
<td>Fundamentals of Molecular Medicine I</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 531S</td>
<td>Fundamentals of Molecular Medicine II</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 532S</td>
<td>Fund. Mol. Med. III</td>
<td>2.0</td>
</tr>
<tr>
<td>MIIM 533S</td>
<td>Fundamentals in Molecular Medicine V</td>
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</tr>
<tr>
<td>MIIM 534S</td>
<td>Fund. Molecular Med. VI</td>
<td>1.0</td>
</tr>
<tr>
<td>MIIM 606S</td>
<td>Micro &amp; Immuno Seminar</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Total Credits 36.0

Molecular Pathobiology

Major: Molecular Pathobiology

Degree Awarded: Master of Science (MS); Doctor of Philosophy (PhD)

Calendar Type: Semester

Total Credit Hours: 36.0-48.0 (MS); 96.0 (PhD)

Classification of Instructional Programs (CIP) code: 26.0204

Standard Occupational Classification (SOC) code: 19-1029

Note: This program is currently not accepting students.

About the Programs

The Molecular Pathobiology program provides a thorough education in contemporary knowledge of pathophysiological mechanisms and prepares students for careers in research as well as teaching in academic and corporate institutions. Students entering without advanced standing should complete the MS program in two to three years and the PhD program in four to five years.

The program has a large faculty, drawn from many basic science and clinical departments within the University. Active research programs involve HIV neuropathology, cancer biology and therapeutics, inhibition of tumor angiogenesis, ulcerative colitis, pathophysiology of apoptosis, tissue engineering, transplant immunology, and diseases of the cardiovascular, respiratory, biliary, and gastrointestinal systems.
Funding for these programs provides an opportunity for research training in such diverse areas as the cellular and molecular biology of cancer; tumor immunology and virology; molecular genetics; neurobiology; pathophysiology of cardiovascular, biliary, and gastrointestinal diseases; and contemporary advances in epithelial ion transport, signal transduction, tissue engineering, and apoptosis.

To learn more about applying to Drexel College of Medicine programs visit the Drexel College of Medicine's Biomedical Studies [website](http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Admissions/MastersandDoctoral.aspx).

About the Curriculum

Background courses in biochemistry, molecular and cell biology, and integrative biology are taken during the first academic year. In addition, every student carries out short research projects in three different laboratories chosen by the student. This exposure to research not only gives the student broad research training, but also helps the student to select a thesis advisor at the end of the first academic year. In the second year, the student begins thesis research and takes several advanced courses, tailored to the student’s individual interests.

Courses Repeatable for Credit

As well as taking all required courses, MS and PhD students may re-enroll in courses having the status “repeatable for credit” (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

For more information, including a scheduling a plan of study, visit the College of Medicine’s Molecular Pathobiology Program [website](http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/MolecularPathobiology.aspx).

MS Degree Requirements: Thesis Option

**MS with thesis: 48.0 semester credits**

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
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</tr>
<tr>
<td>IDPT 501S</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S</td>
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</tr>
<tr>
<td>IDPT 526S</td>
<td>5.0</td>
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<td>IDPT 600S</td>
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</tr>
<tr>
<td>PATH 502S</td>
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<td>PATH 503S</td>
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<td>PATH 509S</td>
<td>3.0</td>
</tr>
<tr>
<td>PATH 600S</td>
<td>9.0</td>
</tr>
<tr>
<td>PATH 601S</td>
<td>4.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Suggested Electives</th>
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</tr>
</thead>
<tbody>
<tr>
<td>ANAT 602S</td>
<td>MEDICAL NEUROSCIENCE</td>
</tr>
<tr>
<td>BIOC 510S</td>
<td>Cancer Biology</td>
</tr>
<tr>
<td>MIIM 500S</td>
<td>MEDICAL MICROBIOLOGY</td>
</tr>
<tr>
<td>NEUR 508S</td>
<td>Graduate Neuroscience I</td>
</tr>
<tr>
<td>NEUR 607S</td>
<td>INTEGRATED NEUROSCIENCE</td>
</tr>
<tr>
<td>PATH 502S</td>
<td>PATHOLOGY 1ST LAB ROTATION</td>
</tr>
<tr>
<td>PATH 505S</td>
<td>PATHOLOGY 2ND LAB ROTATION</td>
</tr>
<tr>
<td>PATH 506S</td>
<td>PATHOLOGY 3RD LAB ROTATION</td>
</tr>
</tbody>
</table>

| PHGY 503S | GRADUATE PHYSIOLOGY | 48.0 |

* Additional courses from the Biograduate Medical programs may be taken as electives. Students should check with the College of Medicine’s Biomedical Graduate Studies [website](http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx) program.

MS Degree Requirements: Non-Thesis Option

**MS without thesis: 39.0 semester credits**

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 501S</td>
<td>2.0</td>
</tr>
<tr>
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<td>IDPT 526S</td>
<td>5.0</td>
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<tr>
<td>IDPT 850S</td>
<td>4.0</td>
</tr>
<tr>
<td>PATH 503S</td>
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</tr>
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<td>PATH 509S</td>
<td>3.0</td>
</tr>
<tr>
<td>PATH 601S</td>
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</table>

<table>
<thead>
<tr>
<th>Suggested Electives</th>
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<tbody>
<tr>
<td>ANAT 602S</td>
<td>MEDICAL NEUROSCIENCE</td>
</tr>
<tr>
<td>BIOC 510S</td>
<td>Cancer Biology</td>
</tr>
<tr>
<td>MIIM 500S</td>
<td>MEDICAL MICROBIOLOGY</td>
</tr>
<tr>
<td>NEUR 508S</td>
<td>Graduate Neuroscience I</td>
</tr>
<tr>
<td>NEUR 607S</td>
<td>INTEGRATED NEUROSCIENCE</td>
</tr>
<tr>
<td>PATH 502S</td>
<td>PATHOLOGY 1ST LAB ROTATION</td>
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<tr>
<td>PATH 505S</td>
<td>PATHOLOGY 2ND LAB ROTATION</td>
</tr>
<tr>
<td>PATH 506S</td>
<td>PATHOLOGY 3RD LAB ROTATION</td>
</tr>
</tbody>
</table>

| PHGY 503S | GRADUATE PHYSIOLOGY | 48.0 |

* Additional courses from the Biograduate Medical programs may be taken as electives. Students should check with the College of Medicine’s Biomedical Graduate Studies [website](http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx) programs.

PhD Degree Requirements

During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student’s Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After concluding their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

96.0 semester credits

During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student’s Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final...
stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After completing their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

About the Curriculum

The interdisciplinary, research-oriented Molecular and Cell Biology and Genetics program offers both MS and PhD degrees. Its strength is derived from the combined research expertise of the faculty in various departments, including Neurobiology and Anatomy, Biochemistry and Molecular biology, Microbiology and Immunology, Medicine, Pathology, and Pharmacology and Physiology. Faculty members conduct research on a broad array of topics, including cell, molecular, and cancer biology as well as genetics, infectious diseases and immunology.

About the MS Program

In the MS program, the focus is on strengthening the student's grasp of molecular biology and biotechnology and on providing a knowledge of research methods available in this fast-expanding field.

About the PhD Program

This program is research focused, with the ultimate goal of training students to become leaders of scientific research in academics and industry. In addition to completing the curriculum requirements, PhD students must pass a qualifying exam at the end of their second year.

Additional Information

For more information about the program, contact:

Caitlin Kaltenbach
Academic Coordinator
Biomedical Graduate and Postgraduate Studies
Drexel University College of Medicine
2900 Queen Lane Suite G24
Philadelphia, PA 19129-1096
215.991.8146
caitlin.kaltenbach@drexelmed.edu

Admission Requirements

Drexel University College of Medicine has a rolling admissions policy, which means that complete applications are reviewed as they are received. Applicants are therefore advised to apply early, as decisions to accept or deny admission may be made before the official deadlines.

To learn more about applying to Drexel College of Medicine programs visit the Drexel College of Medicine's Biomedical Studies Admissions (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Admissions/MastersandDoctoral.aspx) website.

About the PhD Program

Background courses in biochemistry, molecular and cell biology, and integrative biology are taken during the first academic year. In addition, every student carries out short research projects in three different laboratories during the first year. This exposure to research not only gives the student broad research training, but also helps the student to select a thesis advisor at the end of the first academic year. In the second year, the student begins thesis research and takes several advanced courses, tailored to the student’s individual interests.

The program offers a weekly seminar series with invited external and intramural speakers who address the program’s broad research interests. Journal Club members meet weekly in their own informal setting to present results of interest from the current literature.

Courses Repeatable for Credit

As well as taking all required courses, MS and PhD students may re-enroll in courses having the status "repeatable for credit" (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

For more information, including scheduling a plan of study, visit the College of Medicine’s Molecular and Cell Biology and Genetics Program (http://www.drexelmed.edu/Home/AcademicPrograms/
Neuroscience

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Semester
Total Credit Hours: 36.0 - 48.0 (MS); 96.0 (PhD)
Classification of Instructional Programs (CIP) code: 26.1501
Standard Occupational Classification (SOC) code: 11-9121

About the Program

The College of Medicine School of Biomedical Sciences and Professional Studies offers an interdepartmental and multidisciplinary graduate program in Neuroscience leading to MS and PhD degrees. The program provides a vibrant research component for both MS and PhD degrees leading to published scientific work in reputable journals, as well as training in the panoply of research and presentation skills required to conduct and disseminate the research. Students are provided with a curriculum of integrated courses that include the essentials for biomedical research as well as courses that span cellular, developmental, systems, and behavioral neurosciences, as well as neuroanatomy and injury and disease of the nervous system. Upon completing these programs, students pursue careers in academic, governmental, or industrial settings.
The MS in Neuroscience Program

The MS program provides students a broad background in neuroscience and the techniques used in neuroscience research. In addition to the thesis-based MS program, Drexel offers a non-thesis degree program in which students can earn the degree without a research project by taking additional classes and writing a literature review paper. Students who wish to continue their graduate training after the MS degree may apply to the PhD program, and their credits may be applied to the doctoral program.

The PhD in Neuroscience Program

The PhD program trains individuals to conduct independent hypothesis-driven research and to teach in the neurosciences. The program includes two years of coursework as well as original research leading to published thesis work. Laboratory rotations begin in the fall of the first year.

For more information, visit the College of Medicine's Neuroscience Program (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/Neuroscience.aspx) website.

Admission Requirements

Students interested in cellular, systems (including neuro-engineering) and behavioral neuroscience are encouraged to apply. There are no minimal requirements but applicants should be competitive with regard to grades, GRE scores, research experience, and letters of recommendation. Applicants are encouraged to use email to contact any of the faculty of the program with whom they may share scientific interests to discuss their suitability to the program and/or potential projects in relevant laboratories.

The Drexel University College of Medicine: School of Biomedical Sciences and Professional Studies has a rolling admissions policy, which means that complete applications are reviewed as they are received. Applicants are therefore advised to apply early, as decisions to accept or deny admission may be made before the official deadlines.

To learn more about applying to Drexel College of Medicine programs visit the College of Medicine’s Biomedical Studies (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Admissions/MastersandDoctoral.aspx) website.

About the Curriculum

Students in both the PhD and MS programs begin their coursework with a core curriculum. The curriculum consists of a series of core courses that are shared by all of the biomedical graduate programs in the medical school, and a series of programmatic courses. All students in the Neuroscience Program must take the core curriculum, although the possibility exists for students to be excused from a particular course if they are able to prove that they already have the necessary knowledge required of the particular course.

During the second year, students select elective courses and begin their thesis research in consultation with the Advisory-Examination Committee. At the end of the second year, students take a comprehensive examination to qualify for PhD candidacy.

There are three rotations in the curriculum for which the student will be assigned a grade. The purpose of these rotations is to enable the student to select the most appropriate Graduate Advisor to supervise the research project for the student. The Neuroscience Program Director and Steering Committee will advise each student on the selection of rotations, as well as on the progress and outcome of rotations. Flexibility will be afforded in certain situations in which the student may be able to select an advisor before completing all three rotations, or in situations wherein it is advisable to terminate a particular rotation early in favor of another choice.

Courses Repeatable for Credit

As well as taking all required courses, MS and PhD students may re-enroll in courses having the status “repeatable for credit” (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

MS Degree Requirements: Non-Thesis Option

MS without thesis: 36.0 semester credits

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ANAT 501S Neurobiology Topics I</td>
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<tr>
<td>ANAT 602S MEDICAL NEUROSCIENCE</td>
<td>6.0</td>
</tr>
<tr>
<td>IDPT 500S Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>or IDPT 550S Biochemistry and Biophysics</td>
<td></td>
</tr>
<tr>
<td>IDPT 526S Cells to Systems</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 850S Literature Review Non-Thesis MS</td>
<td>4.0</td>
</tr>
<tr>
<td>NEUR 500S Statistics for Neuro/Pharm Research</td>
<td>2.0</td>
</tr>
<tr>
<td>NEUR 609S Graduate Neuroscience II</td>
<td>4.0</td>
</tr>
<tr>
<td>NEUR 508S Graduate Neuroscience I</td>
<td>2.5</td>
</tr>
</tbody>
</table>

Advanced Neuroscience Course

Select at least one of the following: 1.0-4.0

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NEUR 511S Advanced Cellular and Developmental Neuroscience</td>
<td></td>
</tr>
<tr>
<td>NEUR 512S Advanced Systems and Behavioral Neuroscience</td>
<td></td>
</tr>
<tr>
<td>NEUR 634S MOTOR SYSTEMS</td>
<td></td>
</tr>
</tbody>
</table>

Additional Suggested Electives

Suggested Electives (min. 2.5 credits) 2.5

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MCBG 506S ADVANCED CELL BIOLOGY</td>
<td></td>
</tr>
<tr>
<td>PHRM 512S Graduate Pharmacology</td>
<td></td>
</tr>
<tr>
<td>PHGY 503S GRADUATE PHYSIOLOGY</td>
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</tbody>
</table>

Total Credits 36.0-39.0

Additional courses from the Biomedical Medical programs may be taken as electives. Students should check with the College of Medicine's Biomedical Graduate Studies (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx) programs.

MS Degree Requirements: Thesis Option

MS with thesis: 48.0 minimum semester credits

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ANAT 501S Neurobiology Topics I</td>
<td>2.0</td>
</tr>
<tr>
<td>or PHRM 502S Current Topics in Pharmacology &amp; Physiology</td>
<td></td>
</tr>
<tr>
<td>ANAT 602S MEDICAL NEUROSCIENCE</td>
<td>6.0</td>
</tr>
<tr>
<td>IDPT 500S Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>or IDPT 550S Biochemistry and Biophysics</td>
<td></td>
</tr>
</tbody>
</table>
### Advanced Neuroscience Course

Select at least one of the following: 1.0-4.0

- **NEUR 511S** Advanced Cellular and Developmental Neuroscience
- **NEUR 512S** Advanced Systems and Behavioral Neuroscience
- **NEUR 634S** MOTOR SYSTEMS

### Suggested Electives

- **MCBG 506S** ADVANCED CELL BIOLOGY
- **PHRM 512S** Graduate Pharmacology
- **PHGY 503S** GRADUATE PHYSIOLOGY

### Total Credits

55.5-58

* Additional courses from the Biomedical Graduate programs may be taken as electives. Students should check with the College of Medicine's Biomedical Graduate Studies (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx) programs.

### PhD Degree Requirements

Students are required to complete 96.0 credits; for additional graduation requirements, refer to the Biomedical Graduate Studies Handbook and the Neuroscience Program Policies and Procedures (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/Neuroscience.aspx).

During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student’s Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After concluding their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

PhD students may enroll in courses having the status “repeatable for credit” (such as journal club, seminar and research courses) for the duration of their program in order to meet the degree completion requirement of 96.0 credits.

### Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ANAT 501S</td>
<td>Neurobiology Topics I</td>
<td>1.0-2.0</td>
</tr>
<tr>
<td>or PHRM 502S</td>
<td>Current Topics in Pharmacology &amp; Physiology</td>
<td></td>
</tr>
<tr>
<td>IDPT 500S</td>
<td>MEDICAL NEUROSCIENCE</td>
<td>6.0</td>
</tr>
<tr>
<td>IDPT 502S</td>
<td>Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S</td>
<td>Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>or IDPT 550S</td>
<td>Biochemistry and Biophysics</td>
<td></td>
</tr>
<tr>
<td>IDPT 526S</td>
<td>Cells to Systems</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 600S</td>
<td>Thesis Defense</td>
<td>9.0</td>
</tr>
<tr>
<td>NEUR 500S</td>
<td>Statistics for Neuro/Pharm Research</td>
<td>2.0</td>
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<tr>
<td>NEUR 501S</td>
<td>Neuroscience 1st Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>NEUR 502S</td>
<td>Neuroscience 2nd Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>NEUR 503S</td>
<td>Neuroscience 3rd Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>NEUR 508S</td>
<td>Graduate Neuroscience I</td>
<td>2.5</td>
</tr>
<tr>
<td>NEUR 600S</td>
<td>Neuroscience Thesis Research (multiple semesters, as required)</td>
<td>54.0-72.0</td>
</tr>
<tr>
<td>NEUR 609S</td>
<td>Graduate Neuroscience II</td>
<td>4.0</td>
</tr>
</tbody>
</table>

### Pharmacology and Physiology

**Major:** Pharmacology and Physiology

**Degree Awarded:** Master of Science (MS) and Doctor of Philosophy (PhD)

**Calendar Type:** Semester

**Total Credit Hours:** 43.0-60.0 (MS); 96.0 (PhD)

**Classification of Instructional Programs (CIP) code:** 26.1002

**Standard Occupational Classification (SOC) code:** 19-1042

### About the Programs

The Department of Pharmacology and Physiology offers graduate programs leading to the MS and the PhD degrees. The programs require independent research under the direction of departmental faculty members who are engaged in highly active research programs involving molecular, cellular, and behavioral approaches to experimental pharmacology and physiology in a strongly collaborative environment.

Students in both the PhD and MS programs begin their coursework with a core curriculum in biomedical sciences, and immediately start laboratory rotations. Intensive graduate level pharmacology, physiology and neuropharmacology courses round out the core programmatic courses. Specialization in ion channel physiology, smooth muscle physiology, behavioral pharmacology and signal transduction processes may involve the taking of several elective courses. Each program requires the defense of a thesis based on original research.

### About the MS Program

The MS program, requiring two years of full-time study, provides a broad knowledge and technical expertise in pharmacology and physiology, allowing graduates to become partners in research in either an academic or an industrial environment. Students who wish to continue their graduate
students after the MS degree may apply to the PhD program, and their course credits may be applied to the doctoral program.

**About the PhD Program**

PhD candidates must pass a qualifying examination by November of their third year and they must have one accepted co-author manuscript and one submitted first-author manuscript in peer-reviewed journals during the course of the program.

**Admission Requirements**

Drexel University College of Medicine has a rolling admissions policy, which means that complete applications are reviewed as they are received. Applicants are therefore advised to apply early, as decisions to accept or deny admission may be made before the official deadlines.

To learn more about applying to Drexel College of Medicine programs visit the Drexel College of Medicine's Biomedical Studies (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Admissions/MastersandDoctoral.aspx) website.

**MS/PhD Degree Requirements**

**About the Curriculum**

The core curriculum is a comprehensive interdisciplinary program of study for all first-year research master's and PhD students in the Biomedical Graduate Studies programs. The goal of the core curriculum is to provide a broad foundation in biomedical sciences and serve as a framework for advanced study in more specialized areas.

**Courses Repeatable for Credit**

As well as taking all required courses, MS and PhD students may re-enroll in courses having the status “repeatable for credit” (such as journal club, seminar and research courses) for the duration of their program in order to meet the total number of credits required for graduation.

For more information about scheduling and developing a plan of study, visit the College of Medicine’s Pharmacology and Physiology (http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Admissions/MastersandDoctoral.aspx) page.

**MS Program Requirements**

**MS Degree Requirements: Non-Thesis Option**

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S  Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 501S  Biostatistics I</td>
<td>2.0</td>
</tr>
<tr>
<td>or NEUR 500S Statistics for Neuro/Pharm Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 526S Cells to Systems</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 850S Literature Review Non-Thesis MS</td>
<td>4.0</td>
</tr>
<tr>
<td>PHRM 502S Current Topics in Pharmacology &amp; Physiology</td>
<td>1.0</td>
</tr>
<tr>
<td>PHRM 507S Prin of Neuropharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>PHRM 512S Graduate Pharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>PHRM 516S Advanced Topics in Physiology</td>
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</tr>
<tr>
<td>PHRM 517S Advanced Topics in Pharmacology</td>
<td>1.0</td>
</tr>
<tr>
<td>PHGY 503S GRADUATE PHYSIOLOGY</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Advanced Pharmacology and Physiology electives** 4.0

Students are required to select a minimum of three advanced electives. Students normally consult with their committee to select advanced electives.

| Total Credits | 44.0 |

**MS Degree Requirements: Thesis Option**

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S  Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 501S  Biostatistics I</td>
<td>2.0</td>
</tr>
<tr>
<td>or NEUR 500S Statistics for Neuro/Pharm Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 526S Cells to Systems</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 600S Thesis Defense</td>
<td>9.0</td>
</tr>
<tr>
<td>PHRM 502S Current Topics in Pharmacology &amp; Physiology</td>
<td>1.0</td>
</tr>
<tr>
<td>PHRM 503S Pharm &amp; Phys 1st Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>PHRM 504S Pharm &amp; Phys 2nd Lab Rotation</td>
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</tr>
<tr>
<td>PHRM 507S Prin of Neuropharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>PHRM 512S Graduate Pharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>PHRM 516S Advanced Topics in Physiology</td>
<td>1.0</td>
</tr>
<tr>
<td>PHRM 517S Advanced Topics in Pharmacology</td>
<td>1.0</td>
</tr>
<tr>
<td>PHRM 600S Pharmacology Thesis Research</td>
<td>9.0</td>
</tr>
</tbody>
</table>

| Total Credits | 61.0 |

**PhD Program Requirements**

**PhD Degree Requirements**

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IDPT 500S  Responsible Conduct of Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 501S  Biostatistics I</td>
<td>2.0</td>
</tr>
<tr>
<td>or NEUR 500S Statistics for Neuro/Pharm Research</td>
<td>2.0</td>
</tr>
<tr>
<td>IDPT 521S Molecular Structure and Metabolism</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 526S Cells to Systems</td>
<td>5.0</td>
</tr>
<tr>
<td>IDPT 600S Thesis Defense</td>
<td>9.0</td>
</tr>
<tr>
<td>PHRM 502S Current Topics in Pharmacology &amp; Physiology</td>
<td>1.0</td>
</tr>
<tr>
<td>PHRM 503S Pharm &amp; Phys 1st Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>PHRM 504S Pharm &amp; Phys 2nd Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>PHRM 505S Pharm &amp; Phys 3rd Lab Rotation</td>
<td>4.0</td>
</tr>
<tr>
<td>PHRM 507S Prin of Neuropharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>PHRM 512S Graduate Pharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>PHRM 516S Advanced Topics in Physiology</td>
<td>1.0</td>
</tr>
<tr>
<td>PHRM 517S Advanced Topics in Pharmacology</td>
<td>1.0</td>
</tr>
<tr>
<td>PHRM 600S Pharmacology Thesis Research</td>
<td>9.0</td>
</tr>
</tbody>
</table>

| Total Credits | 44.0 |
Advanced Pharmacology and Physiology Electives
Students are required to select a minimum of two advanced electives. 8.0
For more information about advanced elective options, visit the
College of Medicine's Pharmacology and Physiology website.

Additional Electives
Students are required to select additional electives to complete the
minimum of 96.0 credits for graduation. Additional courses from the
Biograduate Medical programs may be taken as electives. Students
should check with the College of Medicine's Biomedical Graduate
Studies programs.

Total Credits 96.0
The Goodwin College of Professional Studies offers the Masters in Professional Studies program which is designed for individuals and practitioners with established career paths who are interested in developing marketable skills to meet evolving workforce demands; seeking professional development; and expanding promotional opportunities.

Major

Professional Studies (MS) (p. 106)

Professional Studies

Major: Professional Studies
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 30.0000
Standard Occupational Classification (SOC) code: 11-9199

Note: Effective Winter Term 2014, students are no longer being accepted into this program.

About the Program

The MS in Professional Studies degree contains a common core of knowledge and skills relevant for 21st century professionals in nearly every field. The curriculum is the result of a collaboration of research and scholarship with practical, industry-inspired experience and consists of a solid foundation of core courses, plus a choice of one of the following concentrations:

The degree contains a common core of knowledge and skills relevant for 21st century professionals in nearly every field. The degree also will provide knowledge and skills for immediate application in three important professional fields of study:

- **Creativity and Innovation Concentration**
  Students will form an in depth understanding of creativity, enhanced communication, and creative problem solving, while learning how these may be applied to practical situations that further workplace culture of creativity.

- **Educational Policy Concentration**
  Students will learn the factors involved in educational policy-making and how to apply educational policy-making skills in their professional roles where applicable. The concentration is designed to prepare educators of all types in the decision-making process of educational policy development.

- **E-Learning Leadership Concentration**
  Students will acquire knowledge of online and distance learning leadership theory and practice in emerging information and communication technologies, multimedia pedagogical strategies, and e-learning design and delivery.

- **Homeland Security Management Concentration**
  Students will develop competencies relating to homeland security strategy and policy development, national security issues in terrorism, critical infrastructure protection, intelligence, land and maritime border and port protection, and developing technologies in homeland security.

- **Human Resource Development Concentration**
  Students will develop the skills they need to strategically lead human resource development and align organizational learning with organizational goals. This concentration program addresses specific topics in human resource development, such as coaching and mentoring, implementing and evaluating change, performance competencies, and designing and developing multimedia applications for learning.

The Masters in Professional Studies is a part-time graduate degree program that is offered entirely online.

Admission Requirements

Acceptance to the program requires:

- Completed online application (http://www.drexel.com/online-degrees/business-degrees/ms-prof-studies/apply.aspx) form
- Bachelor's degree from an accredited institution
- Undergraduate GPA of 3.0 or higher (graduate degree GPAs will be considered along with the undergraduate GPA). Applicants with a cumulative GPA below 3.0 may be considered.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online (customerservice@drexel.com). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts. Use our Transcript Look-up Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions.
- Two letters of recommendation. Drexel University Online now accepts electronic letters of recommendation. Submission instructions are available at: http://www.drexel.edu/apply/recommend. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
- Personal essay — between 500-750 words, describing your interest in the program. Specifically, please discuss the following:
  - How the program relates to your previous educational activities
  - If changing course, why are you moving in a new direction with your educational goals
  - How the program relates to your current line of work
  - How you plan to apply the program to your future goals
- Resume
- International students must submit a TOEFL score of 550 or higher. View additional International students requirements (http://www.drexel.com/online-degrees/education-degrees/ms-humanresourcedevelopment/international.aspx).
- An interview may be requested.
### Degree Requirements

#### Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PRST 501</td>
<td>Communication for Professionals</td>
<td>3.0</td>
</tr>
<tr>
<td>PRST 503</td>
<td>Ethics for Professionals</td>
<td>3.0</td>
</tr>
<tr>
<td>PRST 504</td>
<td>Research Methods &amp; Statistics</td>
<td>3.0</td>
</tr>
<tr>
<td>PRST 612</td>
<td>Data Analysis and Interpretation</td>
<td>3.0</td>
</tr>
<tr>
<td>PRST 615</td>
<td>Program Evaluation</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 501</td>
<td>Introduction to Project Management</td>
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#### Concentration

Select one of the following concentrations:

**Creativity & Innovation Concentration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>CRTV 501</td>
<td>Foundations in Creativity</td>
</tr>
<tr>
<td>CRTV 502</td>
<td>Tools and Techniques in Creativity</td>
</tr>
<tr>
<td>CRTV 503</td>
<td>Creativity in the Workplace</td>
</tr>
<tr>
<td>CRTV 610</td>
<td>Creativity and Change Leadership</td>
</tr>
<tr>
<td>CRTV 620</td>
<td>Research Methods and Assessment of Creative and Innovative Thinking</td>
</tr>
<tr>
<td>CRTV 630</td>
<td>Global Perspectives on Creativity</td>
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</table>

**Educational Policy Concentration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPO 620</td>
<td>Education Policy: Concepts, Issues, and Applications</td>
</tr>
<tr>
<td>EDPO 624</td>
<td>Shaping of American Education Policy: Global Forces</td>
</tr>
<tr>
<td>EDPO 628</td>
<td>American Educational Policy and U.S. Competitiveness</td>
</tr>
<tr>
<td>EDPO 632</td>
<td>Ethics in Educational Policy Making</td>
</tr>
<tr>
<td>EDPO 636</td>
<td>Access &amp; Equity in Educational Policy Making</td>
</tr>
<tr>
<td>EDPO 640</td>
<td>Educational Policy-Making Tactics &amp; Influence</td>
</tr>
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</table>

**E-Learning Leadership Concentration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ELL 501</td>
<td>The Purpose and Business of E-Learning</td>
</tr>
<tr>
<td>ELL 502</td>
<td>E-Learning Technologies</td>
</tr>
<tr>
<td>ELL 503</td>
<td>Teaching and Learning Issues in E-Learning</td>
</tr>
<tr>
<td>ELL 504</td>
<td>Learning Technologies &amp; Disabilities</td>
</tr>
<tr>
<td>ELL 604</td>
<td>Design &amp; Delivery of E-Learning I</td>
</tr>
<tr>
<td>ELL 605</td>
<td>Design &amp; Delivery of E-Learning II</td>
</tr>
</tbody>
</table>

**Homeland Security Management Concentration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSM 544</td>
<td>Introduction to Homeland Security</td>
</tr>
<tr>
<td>HSM 549</td>
<td>Terrorism and Homeland Security</td>
</tr>
<tr>
<td>HSM 554</td>
<td>Critical Infrastructure Protection</td>
</tr>
<tr>
<td>CST 604</td>
<td>Technology for Homeland Security</td>
</tr>
<tr>
<td>CST 609</td>
<td>National Security Intelligence</td>
</tr>
<tr>
<td>CST 614</td>
<td>Counterintelligence</td>
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</table>

**Human Resource Development**

<table>
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<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>EDUC 811</td>
<td>Designing and Developing Multimedia Applications For Learning</td>
</tr>
<tr>
<td>EHRD 500</td>
<td>Foundations of Human Resources Development</td>
</tr>
<tr>
<td>EHRD 601</td>
<td>Leading and Evaluating Change</td>
</tr>
<tr>
<td>EHRD 602</td>
<td>Coaching and Mentoring for Sustainable Learning</td>
</tr>
<tr>
<td>EHRD 603</td>
<td>Strategic Competencies for HRD Leaders</td>
</tr>
<tr>
<td>EHRD 605</td>
<td>Organizational Learning &amp; Strategy</td>
</tr>
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**Electives**

Select one of the following:

<table>
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<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>HSM 644</td>
<td>Public Management in Crisis</td>
</tr>
<tr>
<td>HSM 645</td>
<td>Emergency Incident Risk Management</td>
</tr>
<tr>
<td>PRST 640</td>
<td>Policy Analysis</td>
</tr>
<tr>
<td>PRST 603</td>
<td>Communicating in Virtual Teams</td>
</tr>
<tr>
<td>PRST 690</td>
<td>Course PRST 690 Not Found</td>
</tr>
</tbody>
</table>

#### Capstone Requirements

- **Creativity**
  - CRTV 695 Applied Project in Creativity Studies I
  - CRTV 696 Applied Project in Creativity Studies II

- **E-Learning Leadership**
  - ELL 695 Applied Project in E-Learning Leadership I
  - ELL 696 Applied Project in E-Learning Leadership II

- **Educational Policy**
  - PRST 690 Course PRST 690 Not Found **
  - PRST 690 Course PRST 690 Not Found **

- **Homeland Security Management**
  - HSM 695 Applied Project in Homeland Security Management I
  - HSM 696 Applied Project in Homeland Security Management II

- **Human Resource Development**
  - PRST 690 Course PRST 690 Not Found **
  - PRST 690 Course PRST 690 Not Found **

**Total Credits**: 45.0

*Students with an MS in Human Resource Development are not required to take EHRD 500. Students wishing to complete the Certificate in Human Resource Development (http://www.drexel.edu/catalog/certificates/edu-hr.htm) must take an additional course, EHRD 604 Developing Human Resources.

** Special topics courses are placeholders while the capstone courses in these fields are undergoing approval.
College of Nursing and Health Professions

The College of Nursing and Health Professions offers a wide range of graduate programs. Many programs offer flexible scheduling, making it possible for students to continue their education with night and weekend courses. Others are web-based programs available online.

**Majors**

- Art Therapy and Counseling (MA) (p. 169)
- Couple and Family Therapy (PhD) (p. 122)
- Dance/Movement Therapy and Counseling (MA) (p. 124)
- Family Therapy (MFT) (p. 173)
- Creative Arts Therapies (PhD) (p. 182)
- Health Administration (MHA) (p. 174)
- Human Nutrition (MS) (p. 178)
- Music Therapy and Counseling (MA) (p. 171)
- Nurse Anesthesia (MSN) (p. 137)
- Nursing Practice (DNP) (p. 128)
- Nursing - Advanced Role (MSN)
  - Clinical Nurse Leader (p. 144)
  - Clinical Trials Research (p. 112)
  - Nursing Education (p. 151)
  - Nursing Innovation (p. 153)
  - Nursing Innovation and Intra/Entrepreneurship (p. 135)
  - Nursing Leadership and Health Systems Management (p. 138)
  - MSN-Bridge Program (p. 134)
- Nursing - Nurse Practitioner (MSN)
  - Adult-Gerontology Acute Care Nurse Practitioner
  - Adult-Gerontology Primary Care Nurse Practitioner (p. 140)
  - Family/Individual Across the Lifespan Nurse Practitioner (p. 149)
  - Pediatric Acute Care Nurse Practitioner (p. 159)
  - Pediatric Primary Care Nurse Practitioner (p. 161)
  - Pediatric Primary Care and Pediatric Acute Care Dual Option Nurse Practitioner (p. 162)
  - Psychiatric Mental Health Nurse Practitioner (p. 166)
  - Women's Health/Gender Related Nurse Practitioner (p. 167)
- Nursing (PhD) (p. 185)
- Nutrition Sciences (PhD) (p. 189)
- Physical Therapy (DPT) (p. 130)
- Rehabilitation Sciences
  - Rehabilitation Sciences (DHSc) (p. 126)
  - Rehabilitation Sciences (MHS, PhD) (p. 197)
- Physician Assistant (MHS)
  - MHS with PA Certificate Program (p. 176)
  - Post-Professional Master's Program (p. 190)

**Certificates**

- Art Therapy (p. 193)
- Complementary and Integrative Therapies (p. 119)
- Couple and Family Therapy (p. 112)
- Dance/Movement Therapy (p. 194)
- Forensic Trends and Issues in Contemporary Healthcare (p. 113)
- Holistic Hospice and Palliative Care (p. 120)
- Hand and Upper Quarter Rehabilitation (p. 112)
- Integrative Addiction Therapies (p. 121)
- Issues in Human Trafficking (p. 134)
- Medical Family Therapy (p. 109)
- Music Therapy (p. 195)
- Nurse Anesthesia (p. 196)
- Nursing Certificates - Advanced Role
  - Clinical Nurse Leader Post-Graduate Certificate (p. 146)
  - Clinical Trials Research (p. 112)
  - Nursing Innovation (p. 149)
  - Integrated Nursing Care of Autism Spectrum Disorder (p. 192)
  - Nursing Education Post-Bachelor's Certificate (p. 114)
  - Nursing Education Post-Master's Certificate (p. 158)
  - Nursing Leadership and Health Systems Management (p. 114)
- Nursing Certificates - Nurse Practitioner
  - Adult-Gerontology Acute Care Nurse Practitioner Post-Master's Certificate
  - Adult-Gerontology Primary Care Nurse Practitioner Post-Master's Certificate (p. 110)
  - Family/Individual Across the Lifespan Nurse Practitioner Post-Master's Certificate (p. 132)
  - Pediatric Acute Care Nurse Practitioner Post-Master's Certificate (p. 180)
  - Pediatric Primary Care Nurse Practitioner Post-Master's Certificate (p. 115)
  - Pediatric Primary Care and Pediatric Acute Care Dual Nurse Practitioner Post-Master's Certificate (p. 181)
  - Psychiatric Mental Health Nurse Practitioner Post-Master's Certificate (p. 116)
  - Women's Health/Gender Related Nurse Practitioner Post-Master's Certificate (p. 200)
- Pediatric Rehabilitation (p. 116)
- Substance Use Disorder Treatment (p. 118)
- Veterans' Healthcare (p. 118)
- Women's Integrative Health (Advanced Study) (p. 121)

**About the College**

As the practice of medicine has become more complex with the advent of technology and new drug therapies, so has the provision of health services. An increasingly diverse, aging US population experiencing higher rates of chronic illness is demanding more service and culturally competent care. While technology improvements help provide the means to deliver safer, high-quality care, our society is facing shortages in health professionals such as nurses, mental health workers, nurse anesthetists, physician assistants, and rehabilitation science professionals. The demand for these and other skilled professionals continues to increase and is expected to remain steady well into the 21st century. There is no more vibrant a place to prepare for these kinds of meaningful, rewarding careers than at Drexel University's College of Nursing and Health Professions (http://www.drexel.edu/cnhp). The College offers associate's,
bachelor’s, master’s, and doctoral degrees in more than a dozen health care fields.

Just as the health profession disciplines have come of age, so has the College of Nursing and Health Professions. Founded in 1969 as the College of Allied Health Professions with just three degree programs and a faculty of five, the college has undergone a remarkable evolution. Today it serves over 3,000 students, with a broad array of contemporary program offerings. Along the way, it has earned widespread recognition and accreditation for the education of health professionals.

Mission and Approach
The College believes that the health care needs of today and tomorrow can best be met by professionals who have expertise in their own fields and a concurrent understanding of other health disciplines. In addition to providing a broad-based education that balances academic learning with clinical training, the University promotes collaboration among students in our College of Nursing and Health Professions, our School of Public Health, and the College of Medicine, which draws from the rich traditions of predecessors Hahnemann University and the Medical College of Pennsylvania.

Teamwork is as important in academics as it is in health care. The College of Nursing and Health Professions’ dedicated and knowledgeable faculty members work closely with students, providing a supportive and creative learning environment. Graduates from the College possess a wide range of experiences and the knowledge, compassion, and lifelong learning skills needed to become accomplished health care professionals.

The student body, which is diverse in age and culture, reflects Drexel University’s commitment to provide qualified students with an opportunity for advanced education. Drexel welcomes nontraditional applicants and especially encourages applications from underrepresented minorities and those interested in practicing in underserved areas.

Many of Drexel’s College of Nursing and Health Professions programs offer flexible scheduling, making it possible for students to continue their education through part-time, online, night, or weekend study.

Accreditation
Nursing programs are accredited by the CCNE (Commission on Collegiate Nursing Education), and the PA State Board of Nursing.

The Couple and Family Therapy MFT degree and Post-Master’s Certificates are accredited by COAMFTE (Commission on Accreditation of Marriage and Family Therapy Education).

The Creative Arts in Therapy MA degrees in Dance/Movement Therapy, Music Therapy, and Art Therapy are approved by the ADTA (American Dance Therapy Association), the AMTA (American Music Therapy Association), and the AATA (American Art Therapy Association), respectively.

The Didactic Program in Nutrition is accredited by ACEND (Accreditation Council for Education in Nutrition and Dietetics).

The Health Services Administration program is certified by AUPHA (Association of University Programs in Health Administration).

The Nurse Anesthesia program is accredited by the Council on Accreditation of Nurse Anesthesia Educational Programs.

The Professional Physical Therapy (DPT) program is accredited by CAPTE (Commission on Accreditation in Physical Therapy Education).

The Physician Assistant program is accredited by ARC-PA (Accreditation Review Commission on Education for the Physician Assistant).

Certificate Program in Medical Family Therapy
Certificate Level: Graduate
Admission Requirements: Master’s degree
Certificate Type: Certificate
Number of Credits to Completion: 14.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.1505
Standard Occupational Classification (SOC) Code: 21-1013

This certificate program is offered to those individuals who have earned a master’s degree and seek further education. The program, offered online, is designed to introduce a variety of currently practicing health care professionals to the ways acute and chronic medical illnesses and conditions influence and are influenced by psychosocial, relational, and family conditions and environments. Additionally, couple and family therapists and other professionals trained in the sub-specialty of medical family therapy (or collaborative healthcare) will learn to work cooperatively to bridge gaps in the health care systems, and provide comprehensive and culturally congruent family focused services.

Required Courses
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MFTP 518</td>
<td>Medical Family Therapy</td>
<td>3.0</td>
</tr>
<tr>
<td>MFTP 537</td>
<td>Multicultural &amp; Family Systems Approach to Healthcare</td>
<td>4.0</td>
</tr>
<tr>
<td>MFTP 538</td>
<td>Issues and Trends in Health Policy for Families</td>
<td>3.0</td>
</tr>
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</table>

Select one of the following: 4.0

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>CFTP 500</td>
<td>Introduction to Systems Theory</td>
</tr>
<tr>
<td>CFTP 501</td>
<td>Introduction to Family Therapy</td>
</tr>
<tr>
<td>CFTP 503</td>
<td>Historical and Sociocultural Influences</td>
</tr>
<tr>
<td>CFTP 505</td>
<td>Bowen Theory</td>
</tr>
<tr>
<td>CFTP 508</td>
<td>Structural Family Therapy</td>
</tr>
<tr>
<td>CFTP 510</td>
<td>Sex Therapy</td>
</tr>
<tr>
<td>CFTP 517</td>
<td>Addictions in The Family</td>
</tr>
<tr>
<td>CFTP 519</td>
<td>Family Violence</td>
</tr>
<tr>
<td>CFTP 520</td>
<td>Family Life Cycle</td>
</tr>
<tr>
<td>CFTP 537</td>
<td>Nosology &amp; Couple and Family Therapy Practice</td>
</tr>
</tbody>
</table>

Total Credits: 14.0

Adult-Gerontology Acute Care Nurse Practitioner Post-Master’s Certificate
Certificate Level: Graduate
Admission Requirements: Master’s degree
Certificate Type: Post-Graduate
Number of Credits to Completion: 39.0
This certificate is offered to those individuals who have earned a master's degree in nursing and seek further preparation as an Adult Gerontology Acute Care Nurse Practitioner (AG-ACNP). Transcripts will be reviewed and course work will be determined on an individual basis. Students meet on campus for mandatory On-Campus Intensive (OCI) learning experiences, simulation, and evaluation. Graduates will be eligible to sit for the ANCC's Adult Gerontology Acute Care Certification Examination.

Program of Study
All incoming post masters students have the opportunity for previous coursework to be evaluated on an individual basis for transfer of credit. Students should check with the MSN Program Transfer Credit Evaluator for the exact schedule. Acute care pharmacology is required prior to beginning the clinical courses.

Admission Requirements

- A Master's degree with a major in nursing (MSN) from a regionally accredited program with a cumulative grade point average of at least 3.0 on a scale of 4.0.
- A copy of your current, unrestricted United States RN license or eligibility for licensure as a registered nurse. License verification from your nursing license registry website are acceptable. Once accepted, applicants must have a current RN license in the state of Pennsylvania. In addition, students are required to have a RN Nursing License for the state in which the clinical practicum rotations are being completed.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online through a password secured link or website (use our email address, customerservice@drexel.com). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts. Click here to use our Transcript Look-up Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions. If you attended a Diploma School of Nursing and the school was affiliated with a college/university, the official transcript must be submitted from the college for any non-nursing courses for which you received credit.
- Current Curriculum vitae and/or resume detailing work experience, including specific job responsibilities and departments.
- Two professional letters of recommendation (from either a previous or immediate supervisor and/or a former nursing faculty member who can attest to the applicant's clinical knowledge, skill and potential aptitude for graduate study). References will not be accepted from colleagues or family members. Drexel University Online now accepts electronic letters of recommendation. Click here (http://www.drexel.edu/apply/recommend) for instructions regarding their submission. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
- Personal statement (800-1,600 words) that will give the Admissions Committee a better understanding of why you are choosing this particular program of study, your plans upon completion of this program, and how your current work experience will enhance your experience in this program.
- Applicants seeking admission into the AG-ACNP Post-Graduate Certificate Program must complete 640 clinical practicum hours. Accepted students will need to be issued a Pennsylvania RN license in addition to their current RN license if it is not from Pennsylvania.
- International applicants: Please click here (http://www.drexel.com/online-degrees/nursing-degrees/cert-pm-apmhnp/international.aspx) to view additional requirements.
- Once the student is accepted into the program, a GAP analysis may be completed to determine credit eligibility for previously faculty supervised clinical hours. Note: The GAP Analysis is not mandatory for acceptance into the program. If the prospective student chooses to have a GAP Analysis completed, it is performed after confirmed admissions.
- A personal interview may be required (online or telephone options will be available).

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 548</td>
<td>Advanced Pathophysiology</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 549</td>
<td>Advanced Pharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
<td>4.0</td>
</tr>
<tr>
<td>NURS 554</td>
<td>Pharmacology for Adult-Gerontology Acute Care Nurse Practitioners</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 570</td>
<td>Adult Gerontology Acute Care NP I: Introduction</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 571</td>
<td>Adult Gerontology Acute Care NP III: Mgmt/Case of Patients in Acute/Crit Care Med Set</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 572</td>
<td>Adult Gerontology Acute Care Nurse Practitioner III: Mgmt/Case of Patients in Acute Surgical Setting</td>
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</tr>
<tr>
<td>NURS 573</td>
<td>Adult Gerontology Acute Care NP IV: Management of Care of Patients in Critical Care Settings</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 580</td>
<td>Adult Gero Acute Care NP V: Mgmt/Case of Clients</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 664</td>
<td>Professional Issues for Nurse Practitioners</td>
<td>1.0</td>
</tr>
</tbody>
</table>

Total Credits 39.0

Adult-Gerontology Primary Care Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Post-Master's certificate
Number of Credits to Completion: 34.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
The Post-Master's Certificate in Adult-Gerontology Primary Care (A-GPC) Nurse Practitioner program is intended for MSN prepared professionals who would like to gain further knowledge in the primary care continuum. It is designed to prepare practitioners who will take advanced nursing roles as clinicians, educators, researchers, and leaders in the rapidly changing, evidence-driven healthcare environment. Emphasis is placed on evidence-based practice, interdisciplinary collaboration, and critical use of evolving technology. Graduates will be prepared to provide care for adults throughout their lifespan to promote maximal health, reduce risks and manage acute and chronic health condition.

Graduates will be eligible to apply for certification as an Adult-Gerontology Primary Care Nurse Practitioner through the American Academy of Nurse Practitioners (AANP) and American Nurses Credentialling Center (ANCC).

The program is 34.0 credits and can generally be completed in two years of part-time study. Six hundred and forty (640) clinical hours are required for completion of the program.

Program of Study

All incoming post masters students have the opportunity for previous coursework to be evaluated on an individual basis for transfer of credit. Students should check with the MSN Program Transfer Credit Evaluator for the exact schedule. Adult -Gerontology Primary Care pharmacology is required prior to the beginning of the clinical courses.

Admission Requirements

• A Master's degree with a major in nursing (MSN) from a regionally accredited program with a cumulative grade point average of at least 3.0 on a scale of 4.0.
• A copy of your current, unrestricted United States RN license or eligibility for licensure as a registered nurse. License verification from your nursing license registry website are acceptable. Once accepted, applicants must have a current RN license in the state of Pennsylvania. In addition, students are required to have a RN Nursing License for the state in which the clinical practicum rotations are being completed.
• Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online through a password secured link or website (use our email address, customerservice@drexel.com). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts. Click here to use our Transcript Look-up Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions. If you attended a Diploma School of Nursing and the school was affiliated with a college/university, the official transcript must be submitted from the college for any non-nursing courses for which you received credit.
• Current Curriculum vitae and/or resume detailing work experience, including specific job responsibilities and departments.
• Two professional letters of recommendation (from either a previous or immediate supervisor and/or a former nursing faculty member who can attest to the applicant's clinical knowledge, skill and potential aptitude for graduate study). References will not be accepted from colleagues or family members. Drexel University Online now accepts electronic letters of recommendation. Click here (http://www.drexel.edu/apply/recommend) for instructions regarding their submission. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
• Personal statement (800-1,600 words) that will give the Admissions Committee a better understanding of why you are choosing this particular program of study, your plans upon completion of this program, and how your current work experience will enhance your experience in this program.
• Applicants seeking admission into the A-GPC Post-Graduate Certificate Program must complete 640 clinical practicum hours. Accepted students will need to be issued a Pennsylvania RN license in addition to their current RN license if it is not from Pennsylvania
• International applicants: Please click here (http://www.drexel.com/online-degrees/nursing-degrees/cert-pm-apmhnp/international.aspx) to view additional requirements.
• Once the student is accepted into the program, a GAP analysis may be completed to determine credit eligibility for previously faculty supervised clinical hours. Note: The Gap Analysis is not mandatory for acceptance into the program. If the prospective student chooses to have a Gap Analysis completed, it is performed after confirmed admissions.
• A personal interview may be required (online or telephone options will be available).

Program Requirements

Students meet on campus for a mandatory On-Campus Intensive learning experiences, simulation, and evaluation. Graduates will be eligible to sit for the ANCC's Adult Gerontology Primary Care Certification Examination.

Sample Plan of Study

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>7.0</td>
<td>NURS 548 Advanced Pathophysiology 3.0</td>
</tr>
<tr>
<td></td>
<td></td>
<td>NURS 549 Advanced Pharmacology 3.0</td>
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<tr>
<td></td>
<td></td>
<td>NURS 664 Professional Issues for Nurse Practitioners 1.0</td>
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<tr>
<td></td>
<td>3.0</td>
<td>Term Credits</td>
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<tr>
<td>2</td>
<td></td>
<td>NURS 641 Advanced Pharmacology for Adult-Gerontology Primary Care Nurse Practitioners 3.0</td>
</tr>
<tr>
<td></td>
<td>3.0</td>
<td>Term Credits</td>
</tr>
<tr>
<td>3</td>
<td>4.0</td>
<td>NURS 550 Advanced Clinical Assessment Diagnostic Reasoning Across the Lifespan 4.0</td>
</tr>
<tr>
<td></td>
<td>4.0</td>
<td>Term Credits</td>
</tr>
<tr>
<td>4</td>
<td>5.0</td>
<td>NURS 660 Adult-Gero Primary Care I: Introduction to Adult-Gero Primary Care and Care of the Young-Adult 5.0</td>
</tr>
<tr>
<td></td>
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</tr>
<tr>
<td>5</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Classification of Instructional Program (CIP) Code: 51.3822
Standard Occupational Classification (SOC) Code: 29-1171
Certificate in Advanced Practice in Hand and Upper Quarter Rehabilitation

Certificate Level: Graduate
Admission Requirements: Bachelor’s degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 16.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.2308
Standard Occupational Classification (SOC) Code: 29-1123

The Certificate in Hand and Upper Quarter Rehabilitation program is designed for practicing clinicians in physical therapy and occupational therapy who wish to gain advanced understanding of the upper quarter, including the cervical spine, shoulder, elbow, wrist, and hand. This program consists of four courses offered in an online and weekend format.

The curriculum is based on the most recent hand therapy practice analysis conducted by the Hand Therapy Certification Commission (HTCC). The HTCC oversees the certification process for qualifying occupational and physical therapists as “certified hand therapists” or CHTs. This Certificate of Advanced Practice in Hand and Upper Quarter Rehabilitation is recognized by HTCC as a resource to assist with preparation for the CHT examination.

After successfully completing the four required courses, students receive a post-professional certificate of completion. The credits may be transferred into degree programs within Physical Therapy and Rehabilitation Sciences.

Foundations of Practice Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTRS 767</td>
<td>Foundations in Hand Therapy</td>
<td>4.0</td>
</tr>
<tr>
<td>PTRS 768</td>
<td>Upper Quarter Joint Pathology</td>
<td>4.0</td>
</tr>
<tr>
<td>PTRS 769</td>
<td>Nerve Injuries of the Upper Quarter</td>
<td>4.0</td>
</tr>
<tr>
<td>PTRS 770</td>
<td>Diseases That Affect the Hand</td>
<td>4.0</td>
</tr>
</tbody>
</table>

Total Credits: 16.0

For more information, visit the College’s Hand Therapy Certificate webpage (https://www.drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Advanced-Practice-Hand-and-Upper-Quarter-Rehabilitation). To apply, please visit the program’s Drexel University Online webpage (http://www.drexel.edu/online-degrees/nursing-degrees/cert-hand).

Certificate in Clinicals Trials Research

Certificate Level: Graduate
Admission Requirements: Bachelor’s degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 14.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.0719
Standard Occupational Classification (SOC) Code: 11-9111

Note: Effective Winter Term 2014, students are no longer being accepted into this certificate program.

The certificate program is designed for individuals who have earned an undergraduate degree in nursing and seek further preparation in clinical trials research. This online program is designed for nurses who wish to be involved in clinical trials and research in a variety of roles and settings. Graduates of this program assume roles such as:

- Research Coordinator
- Clinical Scientist
- Clinical Trials Manager
- Coordinator
- Developer

Many potential employers exist outside the hospital environment—in the community or private practices and with pharmaceutical and other scientific companies that produce, test, and market new products. The clinical trials field is a hot field for nursing employment—especially seasoned nurses who have expertise in one or more clinical areas.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 582</td>
<td>Foundation of Good Clinical Practice in Clinical Trials Mngmt</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 583</td>
<td>Operational Leadership in Clinical Trials Management</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 584</td>
<td>Current Topics in Clinical Trials</td>
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</tr>
<tr>
<td>NURS 585</td>
<td>Clinical Trials Research Practicum</td>
<td>5.0</td>
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</tbody>
</table>

Total Credits: 14.0

Additional Information

For more information about this program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu
267.359.5691

Certificate in Couple and Family Therapy

Certificate Level: Graduate
Admission Requirements: Master’s degree
Certificate Type: Post-Master's Certificate
Number of Credits to Completion: 43.0
Instructional Delivery: Campus
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 51.1505
Standard Occupational Classification (SOC) Code: 21-1013

About the Program
Drexel University offers a post-master’s program leading to a certificate in couple and family therapy. The program is accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE) of the American Association for Marriage and Family Therapy (AAMFT). The post-master’s certificate in couple and family therapy can be expected to lead towards licensure as a Marriage and Family Therapist, meets the foundational educational and clinical to become credentialed as an Emotionally Focused Therapist and satisfies the Pre-Clinical Membership requirements for AAMFT.

Clinical Practicum Experience
PMC students are enrolled in practicum for 4 consecutive quarters. Interns generally participate in one practicum site during their tenure in the PMC. All interns must complete a continuous 12-month calendar year at one practicum site prior to graduation. Interns will be expected to spend 20 hours per week working at the approved program practicum site. Scheduling of specific times will be negotiated by the intern, on-site supervisor and CFT Director of Clinical Training. Interns will receive supervision from AAMFT Approved Supervisors/or Equivalent and Credentialed Emotionally Focused Therapist Supervisors. The practicum schedule must not conflict with class schedule. Interns are expected to average 13-15 client contact hours per week in order to achieve the 350 clinical hour requirement by the end of the program. Case loads usually consist of more than 14 clients to ensure that the intern will average 13-15 client contact hours per week.

Curriculum
The curriculum assists students in integrating theory and practice. Issues of race, ethnicity, culture, class, gender, sexual orientation, spirituality, religion, age, ability, power, and privilege are addressed throughout the program. Students are fully trained to assume clinical practice in couple and family therapy.

Required Courses
Theoretical Foundations
- CFTP 501 Introduction to Family Therapy 4.0
- CFTP 503 Historical and Sociocultural Influences 4.0
Clinical Practice
- CFTP 508 Structural Family Therapy 4.0
Individual Development and Family Relations
- CFTP 520 Family Life Cycle 4.0
Professional Identity and Ethics
- CFTP 522 Legal and Ethical Implications in Couple and Family Therapy Practice 4.0
Research
- CFTP 525 Research in Couple and Family Therapy 4.0
Required Additional Learning
- CFTP 526 Person of the Therapist Experience I 2.0
Electives
- CFTP 505 Bowen Theory
- CFTP 506 Contextual Theory and Therapy
- CFTP 507 Collaborative Approaches
- CFTP 509 Couples Therapy
- CFTP 510 Sex Therapy
- CFTP 511 Object Relations Theory
- CFTP 512 Behavioral Models of Family Therapy
- CFTP 517 Addictions in The Family
- CFTP 518 Medical Family Therapy
- CFTP 519 Family Violence
- CFTP 537 Nosology & Couple and Family Therapy Practice

Practicum
- CFTP 530 Practicum I 2.0
- CFTP 531 Practicum II 2.0
- CFTP 532 Practicum III 2.0
- CFTP 533 Practicum IV 1.0

Total Credits 43.0

Certificate in Forensic Trends and Issues in Contemporary Healthcare
Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 9.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 43.0106
Standard Occupational Classification (SOC) Code: 19-4092

The certificate program examines contemporary trends and issues related to the wide range of interpersonal violence, crime and sudden violent death that may be encountered in a variety of healthcare settings. Theoretical tenets, methods for assessment and related implications for intervention and/or referral will be examined from a multifaceted perspective—including that of the offender, crime victim, families, and the healthcare community-at-large.

Program Goals
- Examine social attitudes and perceptions toward victimization and offending behavior;
- Identify the psychological, physical and legal aspects of victimization;
- Assess victim trauma and identify appropriate interventions for victimized clients;
- Assess the motivational intent and behavior patterns of offenders who commit aggressive crimes;
Certificate in Nursing Education

- Analyze institutional approaches and subsequent response patterns to victims and offenders in a variety of settings (e.g., inpatient, outpatient, primary care settings, academic, etc.);
- Assess ethical dimensions of healthcare issues relative to the role and scope of practice and healthcare providers;
- Examine healthcare policy assessment, development and/or modification to enhance health promotion of offenders and victims across the lifespan.

Admission

Admission to this program requires completion of a BS/BA degree. The program is intended for providers and educators in the healthcare sciences, as well as professionals who have direct contact with victims and/or offenders across disciplines and areas of practice (e.g. social workers, criminal justice, police, high school teachers, etc). The program is open to practitioners, graduate student and healthcare educators across the continuum of specialties and agencies.

Requirements

NURS 519 Forensic Science Foundations 3.0
NURS 528 Victimology – Contemporary Trend 3.0
NURS 533 Forensic Mental Health 3.0

Total Credits 9.0

Additional Information

For more information about this program, contact:
Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu (rf53@drexel.edu)
267.359.5692

Certificate in Nursing Leadership in Health Systems Management

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-baccalaureate
Number of Credits to Completion: 12.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.3817
Standard Occupational Classification (SOC) Code: 25-1072

This certificate program focuses on development of a leadership style and skills set essential for individuals in or seeking administrative roles. The program provides a four-course grouping of classes from the MSN in Nursing Leadership in Health Systems Management curriculum. Selected classes provide essential skills for supervisory and management positions that help professionals perform in their expanded roles and grow as emerging leaders.

Emphasis will be placed on fiscal and organizational management, strategic planning, integrated quality outcomes measurement, organizational structures, marketing, and management of human resources within organizations. The program provides the student with information and strategies to problem solve, make decisions, resolve conflict and operationalize the mission and goals of the healthcare delivery organization.

Required Courses

NURS 557 Leadership and Stewardship in the Health Professions 3.0
NURS 558 Economics of Healthcare Management & Policy 3.0

Additional Information

For more information about this program, contact:
Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu
267.359.5691

Additional information is also available on Drexel's College of Nursing and Health Professions Nursing Education Certificate (http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Nursing-Education-Faculty-Role) webpage and on Drexel University Online's Nursing Education Certificate (http://www.drexel.com/online-degrees/nursing-degrees/cert-pm-cnf) webpage.
<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 559</td>
<td>Operations Management in Contemporary Healthcare Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 562</td>
<td>Workforce Management in Healthcare Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 564</td>
<td>The Business of Healthcare</td>
<td></td>
</tr>
<tr>
<td>NURS 567</td>
<td>Strategic Management: Power, Politics and Influence in Healthcare Systems</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits 12.0

**Additional Information**

For more information about this program, contact:

Ms. Amy Pelak Rothstein  
Student Services Manager  
aip347@drexel.edu (fr53@drexel.edu)  
267.359.5692


**Pediatric Primary Care Nurse Practitioner Post-Master's Certificate**

*Certificate Level: Graduate*

*Admission Requirements: Master's degree*

*Certificate Type: Post-Master's*

*Number of Credits to Completion: 34.0*

*Instructional Delivery: Online*

*Calendar Type: Quarter*

*Expected Time to Completion: 2 years*

*Financial Aid Eligibility: Not aid eligible*

*Classification of Instructional Program (CIP) Code: 51.3809*

*Standard Occupational Classification (SOC) Code: 29-1171*

This certificate is offered to those individuals who have earned a master’s degree in nursing and seek further preparation to become a Pediatric Primary Care Nurse Practitioner (PNP). Transcripts will be reviewed and course work will be determined on an individual basis. Students meet on campus for a mandatory On-Campus Intensive (OCI) learning experiences, simulation, and evaluation. Graduates will be eligible to sit for the ANCC’s Pediatric Primary Care Nurse Practitioner Certification Examination and/or for the PNCB's Pediatric Primary Care Certification Examination.

**Admission Requirements**

- A Master's degree with a major in nursing (MSN) from a regionally accredited program with a cumulative grade point average of at least 3.0 on a scale of 4.0.
- A copy of your current, unrestricted United States RN license or eligibility for licensure as a registered nurse. License verification from your nursing license registry website are acceptable. Once accepted, applicants must have a current RN license in the state of Pennsylvania. In addition, students are required to have a RN Nursing License for the state in which the clinical practicum rotations are being completed.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online through a password secured link or website (use our email address, customerservice@drexel.com). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts. Click here to use our Transcript Look-up Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions. If you attended a Diploma School of Nursing and the school was affiliated with a college/university, the official transcript must be submitted from the college for any non-nursing courses for which you received credit.
- Current Curriculum vitae and/or resume detailing work experience, including specific job responsibilities and departments.
- Two professional letters of recommendation (from either a previous or immediate supervisor and/or a former nursing faculty member who can attest to the applicant's clinical knowledge, skill and potential aptitude for graduate study). References will not be accepted from colleagues or family members. Drexel University Online now accepts electronic letters of recommendation. Click here (http://www.drexel.edu/apply/recommend) for instructions regarding their submission. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
- Personal statement (800-1,600 words) that will give the Admissions Committee a better understanding of why you are choosing this particular program of study, your plans upon completion of this program, and how your current work experience will enhance your experience in this program.
- International applicants: Please click here (http://www.drexel.com/online-degrees/nursing-degrees/cert-pm-apmhnp/international.aspx) to view additional requirements.
- Once the student is accepted into the program, a GAP analysis may be completed to determine credit eligibility for previously faculty supervised clinical hours. Note: The Gap Analysis is not mandatory for acceptance into the program. If the prospective student chooses to have a Gap Analysis completed, it is performed after confirmed admissions.
- A personal interview may be required (online or telephone options will be available).

**Program of Study**

All incoming post maters’ students have the opportunity for previous coursework to be evaluated on an individual basis for transfer credit. Students should check with the MSN Program Transfer Credit Evaluator for the exact schedule. Pediatric pharmacology is required prior to beginning the clinical courses.

**Required Courses**

<table>
<thead>
<tr>
<th>Support Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 548  Advanced Pathophysiology</td>
</tr>
</tbody>
</table>
Certificate in Pediatric Rehabilitation

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 12.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.2308
Standard Occupational Classification (SOC) Code: 29.1123

This program is for licensed physical and occupational therapists who work or aspire to work in early intervention, school-based therapy or other pediatric services and who seek to develop expertise in this field.

Graduates of the program will be prepared to enhance activity, participation and measurable outcomes for children and their families through the application of research, theory, and emergent knowledge to practice. Issues across the spectrum of care, for ages from birth to 21, are addressed and practitioners have the opportunity to enhance their comprehension of family and client-centered practice in a diversity of settings. The program incorporates philosophies of practice, issues of advanced clinical decision making, intervention and service delivery approaches, advocacy, and clinical leadership.

Students can tailor their studies and assignments to meet personal needs. Individualized assignments allow them to apply key themes and issues to practice. The program also offers physical therapists the opportunity and resources to prepare for specialty certification through the American Board of Physical Therapy Specialists.

After successfully completing the required credits, students receive a post-professional certificate of completion. The credits may be transferred into degree programs within Physical Therapy and Rehabilitation Sciences.

Requirements
Select 12.0 credits from the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PTRS 740</td>
<td>Issues in Pediatric Health &amp; Rehabilitation</td>
<td>3.0</td>
</tr>
<tr>
<td>PTRS 760</td>
<td>Pediatric Decision Making</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits: 12.0

Psychiatric Mental Health Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Post-Master's
Number of Credits to Completion: 34.0
Instructional Delivery: Online, Campus
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 58.3810
Standard Occupational Classification (SOC) Code: 29.1123

This certificate is offered to those individuals who have earned a master's degree in nursing and seek further preparation as a Psychiatric Mental Health Nurse Practitioner (PMHNP). Transcripts will be reviewed and course work will be determined on an individual basis. Students meet on campus for a mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. Once the certificate program is successfully completed, students will be eligible to sit for the ANCC’s Psychiatric and Mental Health Certification Examination.

Admission Requirements

- A Master's degree with a major in nursing (MSN) from a regionally accredited program with a cumulative grade point average of at least 3.0 on a scale of 4.0.
- A copy of your current, unrestricted United States RN license or eligibility for licensure as a registered nurse. License verification from your nursing license registry website are acceptable. Once accepted, applicants must have a current RN license in the state of Pennsylvania. In addition, students are required to have a RN Nursing License for the state in which the clinical practicum rotations are being completed.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online through a password secured link or website (use our email address, customerservice@drexel.com). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until
you have submitted the remaining transcripts. Click here to use our Transcript Look-up Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions. If you attended a Diploma School of Nursing and the school was affiliated with a college/university, the official transcript must be submitted from the college for any non-nursing courses for which you received credit.

- Current Curriculum vitae and/or resume detailing work experience, including specific job responsibilities and departments.
- Two professional letters of recommendation (from either a previous or immediate supervisor and/or a former nursing faculty member who can attest to the applicant’s clinical knowledge, skill and potential aptitude for graduate study). References will not be accepted from colleagues or family members. Drexel University Online now accepts electronic letters of recommendation. Click here (http://www.drexel.edu/apply/recommend) for instructions regarding their submission. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
- Personal statement (800-1,600 words) that will give the Admissions Committee a better understanding of why you are choosing this particular program of study, your plans upon completion of this program, and how your current work experience will enhance your experience in this program.
- International applicants: Please click here (http://www.drexel.com/online-degrees/nursing-degrees/cert-pm-apmhpnr/international.aspx) to view additional requirements.
- Once the student is accepted into the program, a GAP analysis may be completed to determine credit eligibility for previously faculty supervised clinical hours. Note: The Gap Analysis is not mandatory for acceptance into the program. If the prospective student chooses to have a Gap Analysis completed, it is performed after confirmed admissions.
- A personal interview may be required (online or telephone options will be available).

Program of Study
All incoming post-master’s students in nurse practitioner tracks have the opportunity for previous coursework to be evaluated on an individual basis for transfer of credit. Students should check with the MSN Program Transfer Credit Evaluator for the exact schedule. Psychopharmacology is required prior to beginning the clinical courses.

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Support Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 548</td>
<td>Advanced Pathophysiology</td>
</tr>
<tr>
<td>NURS 549</td>
<td>Advanced Pharmacology</td>
</tr>
<tr>
<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concentration Courses</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 555</td>
</tr>
<tr>
<td>NURS 592</td>
</tr>
<tr>
<td>NURS 593</td>
</tr>
</tbody>
</table>
Certificate in Substance Use Disorder Treatment

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-baccalaureate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 34.0104
Standard Occupational Classification (SOC) Code: 21-1011

This certificate is designed for individuals with bachelor’s degrees in psychology, social work, nursing, or other allied health professions who want to advance their knowledge of substance use disorders treatment and supervision practices. It is being offered through the Behavioral Health Counseling Department within the College of Nursing and Health Professions of Drexel University, and is designed for individuals working in health care settings serving people with substance use disorders. The certificate requires the completion of six online courses for a total of 18.0 quarter credits. Completion of this certificate does not in and of itself certify clinical expertise. The required coursework can also be applied toward a specialty focus area for students in the Innovations and Intra/Entrepreneurship Advanced Practice Nursing Track.

Each course focuses on a core competency needed to facilitate recovery from substance abuse. Students will acquire knowledge concerning the etiology of substance abuse behavior; the bio-psycho-social nature of addiction; substance use patterns across the lifespan and; recovery and relapse prevention. Students will also develop skills related to motivational enhancement, cognitive / behavioral change and workforce supervision.

Program goals
The goal of this certificate program is for students to:

- Gain an understanding of the bio-psycho-social dynamics of substance use;
- Develop evidence-based treatment competencies;
- Gain educational training hours to either obtain or maintain a credential as a drug/alcohol counseling professional.

In and of itself, this certificate does not take the place of supervised, clinical training, but rather serves as one of several possible components required to obtain a professional certification or clinical license to practice.

Program Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BACS 534</td>
<td>Approaches to Substance Use Disorders</td>
<td>3.0</td>
</tr>
<tr>
<td>BACS 535</td>
<td>Motivational Enhancement Skills</td>
<td>3.0</td>
</tr>
<tr>
<td>BACS 540</td>
<td>Recovery and Relapse Prevention</td>
<td>3.0</td>
</tr>
<tr>
<td>BACS 568</td>
<td>Substance Use Counseling with Special Populations</td>
<td>3.0</td>
</tr>
<tr>
<td>BACS 560</td>
<td>Preventing Substance Use Disorders</td>
<td>3.0</td>
</tr>
<tr>
<td>BACS 570</td>
<td>Clinical Supervision Skills</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits 18.0

Certificate in Veterans' Healthcare

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Graduate
Number of Credits to Completion: 12.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.0701
Standard Occupational Classification (SOC) Code: 11-9111

Drexel University wants to salute veterans by providing a certificate to health care providers indicating the achievement of advanced understanding, comprehension and application of the issues surrounding the veteran who has returned to the United States. There are 21.6 million veterans in the United States and Puerto Rico and about 8 million of them are enrolled in the VA health care system. About 2/3 of our veterans are not receiving care at the Veterans Administration Health System, and most would be receiving health care in our civilian medical system.

This certificate program provides the learner with the knowledge and skills to provide our veterans with resources they might not be aware of, to recognize and refer if appropriate military specific medical problems and to provide the health care provider with the ability to identify and then treat health care issues within this unique population. Veterans have served our nation, and some have paid a personal health cost in that service. By completing this certificate, the health care provider will be able to identify, treat, refer and advocate for the veteran with specialized skills and knowledge, being more fully equipped to care for the medical needs of this unique group.

The certificate program is a four course, 12.0 credit certificate with three required courses and one additional course chosen from two electives. IPS 548: The Military and Veteran Cultures must be taken first, but the remaining courses may be taken in any order. Students will be required to take IPS 550 and IPS 551 but may elect to take either IPS 552 or CIT 552 (cross listed with NURS 552) as the fourth course.

Admission Requirements:

- Bachelor's degree (BA/BS) from a fully accredited program.
- 3.0 GPA or above on all previous coursework or last 60 credits completed.
- Official transcripts from all previous educational institutions required.
- Personal statement describing interest in certificate program.
- Curriculum Vitae or Resume.
- One professional letter of recommendation.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPS 548</td>
<td>Foundations in Transdisciplinary Professional Collaboration</td>
<td>3.0</td>
</tr>
<tr>
<td>IPS 549</td>
<td>The Military and Veteran Culture</td>
<td>3.0</td>
</tr>
<tr>
<td>IPS 551</td>
<td>Veteran Advocacy</td>
<td>3.0</td>
</tr>
<tr>
<td>IPS 553</td>
<td>Neuroscience of Learning</td>
<td>3.0</td>
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</table>

Concentrations (6-9 credits)

<table>
<thead>
<tr>
<th>Health Professions</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>IPS 552</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Total Credits 18.0
IPS 550 The Unique Health Care Needs of our Military and Veterans

Substance Use Disorders (select 2) 6.0
  BACS 534 Approaches to Substance Use Disorders
  BACS 535 Motivational Enhancement Skills
  BACS 540 Recovery and Relapse Prevention

Education 6.0
  EDAE 601 Foundations of Adult Education
  EDAE 602 Adult Learning and Development

Legal Studies 9.0
  LSTU 502S Ethics and Professional Standards
  LSTU 505S Health Care Quality, Patient Safety and Risk Management

Business (select 2) 6.0
  ORGB 625 Leadership and Professional Development
  ORGB 631 Leading Effective Organizations
  ORGB 640 Negotiations for Leaders

Public Health (6 credits) 6.0
  Select courses with approval

Total Certificate Credits 18.0-21.0

Additional Information
For more information about this program, contact:
Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu (fr53@drexel.edu)
267.359.5692

Additional information is also available on the Drexel's College of Nursing and Health Professions Veterans' Healthcare (http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Veterans-Healthcare) web page and Drexel University Online's Veterans' Healthcare (http://www.drexel.com/online-degrees/nursing-degrees/cert-cvh) web page.

Certificate of Advanced Study in Complementary and Integrative Therapies

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Graduate
Number of Credits to Completion: 12.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.3300
Standard Occupational Classification (SOC) Code: 29-1199

The Certificate of Advanced Study in Complementary and Integrative Therapies (CIT) program is designed to provide practicing healthcare professionals with an "evidence-based program" in complementary and integrative therapies. This knowledge will allow them to assess, guide and evaluate patient use and to integrate CIT into their professional practice. The program provides students with the cultural and theoretical basis for applying complementary and integrative therapies while focusing on the skills and techniques of specific therapies.

This program is applicable to a wide range of healthcare professionals including nurses, nurse practitioners, physician's assistants, creative arts therapists, couple and family therapists, women's health practitioners, members of oncology organizations, members of AHNA and more. Admission requires a minimum of a bachelor's degree from an accredited college or university.

The program content is congruent with the educational standards set forth by the American Association of Holistic Nurses (AHNA) and the Foundations in Clinical Aromatherapy course adheres to the educational standards (level one) set forth by the National Association for Holistic Aromatherapy (NAHA).

Features and Benefits:
- Embraces the foundational principles of holistic Integrative care, focusing on the mind, body, spirit approach to achieve optimal health and healing within the framework of conventional healthcare.
- Courses are taught by internationally-recognized leaders in Complementary and Integrative Therapies and faculty trained in both conventional healthcare and integrative therapies.
- Program is taught wholly online in a highly dynamic learning format that engages students.

Admission Requirements:
Individuals submitting an application must fulfill the following:

- 2.75 GPA or above on all previous coursework
- Minimum of a bachelor's degree from an accredited college or university
- Official transcripts from all universities or colleges attended
- Nurse, physician assistants, and other healthcare professionals who hold licensure or a certificate: copy of license, eligibility for licensure, or certificate
- Current resume
- Completed application form
- Two letters of recommendation
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
  - Why you are choosing this particular program of study
  - Your plans upon completion of the certificate
  - How your current work experience will enhance your experience in this program
- International students will need to meet university international student admissions guidelines, including TOEFL Program Requirements.

Required Courses
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIT 501</td>
<td>Foundations of Phytotherapy</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 502</td>
<td>Foundations of Complementary and Integrative Therapies</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 503</td>
<td>Holistic Living For The Caregiver</td>
<td>3.0</td>
</tr>
<tr>
<td>Select one of the following:</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 511</td>
<td>Spirituality, Health and Healing</td>
<td></td>
</tr>
<tr>
<td>CIT 512</td>
<td>Body Movement Therapies</td>
<td></td>
</tr>
</tbody>
</table>
Certificate of Advanced Study in Holistic Hospice and Palliative Care

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 12.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.3306
Standard Occupational Classification (SOC) Code: 29-1199

The Certificate of Advanced Study in Holistic Hospice and Palliative Care provides students with a mind-body-spirit approach to end-of-life care. Graduates of the program develop mastery in providing compassionate spiritual care to patients and their families.

The use of Complementary and Integrative Therapies (CIT) within the scope of end-of-life care provides practitioners the tools needed to treat the holistic spectrum of the patient and their family, while integrating an effective and efficient delivery of care. The program's curriculum focuses on evidenced-based complementary and integrative therapy approaches that can be integrated within the framework of conventional healthcare practice.

Features and Benefits:
- This holistic program is driven by the principle of patient-centered care that provides compassionate and supportive integrative care to both the patient and their family.
- Courses are taught by internationally recognized leaders in Complementary and Integrative Therapies and faculty trained in both conventional healthcare and integrative therapies.
- Courses are offered wholly online in a highly dynamic learning format that engages students.

Admission Requirements:
- 2.75 GPA or above on all previous coursework
- A baccalaureate degree with a major in a health-related field from an accredited college or university
- Official transcripts from all universities or colleges attended
- A completed application form
- Nurse, nurse practitioner, physician assistants, and other healthcare professionals who hold licensure or a certificate: copy of license, eligibility for licensure, or certificate
- Current resume
- Two letters of recommendation
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
  - Why you are choosing this particular program of study
  - Your plans upon completion of the certificate
  - How your current work experience will enhance your experience in this program
- International students will need to meet university international student admissions guidelines, including TOEFL Program Requirements.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIT 503</td>
<td>Holistic Living For The Caregiver</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 621</td>
<td>Spirituality in Hospice and Palliative Care</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 622</td>
<td>Holistic Therapies in Hospice and Palliative Care</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 623</td>
<td>Cross Cultural Issues</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits 12.0

Additional Information

For more information about this program, contact:
Ms. Amy Pelak Rothstein
Student Services Manager
alp347@drexel.edu  (fr53@drexel.edu)
267.359.5692

Additional information is also available on the Drexel's College of Nursing and Health Professions Holistic Hospice and Palliative Care (http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Advanced-Study-Holistic-Hospice-and-Palliative-Care) web page and Drexel University Online's Holistic Hospice and Palliative Care (http://www.drexel.com/online-degrees/nursing-degrees/cert-hospice) web page.
Certificate of Advanced Study in Integrative Addiction Therapies

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 12.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.3300
Standard Occupational Classification (SOC) Code: 29-1199

The Certificate of Advanced Study in Integrative Addiction Therapies prepares healthcare professionals to treat patients suffering from substance use disorders within the holistic spectrum by healing the body, mind, and spirit. Students will learn to integrate evidence-based complementary and integrative therapies (CIT) such as nutritional neuroscience, neurofeedback, meditation, auricular acupuncture, and Qigong bioenergy therapies within the framework of conventional healthcare. These integrative therapies will enable healthcare practitioners to incorporate innovative, caring and holistic methods to an underserved population.

Substance use disorders are among this country’s most ubiquitous health and social issues. This cutting edge program is designed to empower practitioners to utilize complementary and integrative therapies within the scope of conventional healthcare practice to treat substance use disorders and enhance patient outcomes. It will provide practitioners the tools needed to treat the substance use disorder patient (and their family) within the holistic spectrum, healing body, mind and spirit.

A holistic, integrative treatment program for addiction requires combining neurometabolic treatment with other facets (bio, psycho, social, spiritual, economic), including counseling and education to support lifestyle change.

Features and Benefits:

- This ground-breaking Integrative Addiction Therapies program is the first program of its kind worldwide.
- It is the first program to offer future addiction healthcare professionals the skills needed to help their patients achieve health and recovery within the holistic spectrum healing mind, body and spirit, using natural and integrative methods.
- Courses are taught by internationally recognized leaders in Complementary and Integrative Therapies and distinguished psychotherapists in the field of Integrative Addiction Therapies.
- Courses are offered wholly online in a dynamic and interactive learning environment.

Admission Requirements:

- 2.75 GPA or above on all previous coursework
- A baccalaureate degree with a major in a health-related field from an accredited college or university
- Official transcripts from all universities or colleges attended
- A completed application form

- Nurse, nurse practitioner, physician assistants, and other healthcare professionals who hold licensure or a certificate: copy of license, eligibility for licensure, or certificate
- Current resume
- Two letters of recommendation
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
  - Why you are choosing this particular program of study
  - Your plans upon completion of the certificate
  - How your current work experience will enhance your experience in this program
- International students will need to meet university international student admissions guidelines, including TOEFL Program Requirements.

Required courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIT 503</td>
<td>Holistic Living For The Caregiver</td>
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</tr>
<tr>
<td>CIT 624</td>
<td>Foundations of Integrative Addiction Therapy</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 625</td>
<td>Spirituality, Empowerment, and Transformation</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 631</td>
<td>Introduction to Nutritional Neuroscience</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits 12.0

Additional Information

For more information about this program, contact:

Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu (fr53@drexel.edu)
267.359.5692

Additional information is also available on the Drexel's College of Nursing and Health Professions Integrative Addiction Therapies (http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Advanced-Study-Integrative-Addiction-Therapies) web page and Drexel University Online's Integrative Addiction Therapies (http://www.drexel.com/online-degrees/nursing-degrees/cert-asiat) web page

Certificate of Advanced Study in Women's Integrative Health

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 12.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.5822
Standard Occupational Classification (SOC) Code: 29-1199

The Certificate of Advanced Study in Women’s Integrative Health provides healthcare professionals with a mind-body-spirit approach to care. Studies have shown that women desire a broader, integrative approach to their healthcare and share a philosophical congruence with Complementary and Integrative Health core values. In this program, students learn to integrate evidence-based complementary and integrative therapies such as nutritional neuroscience, neurofeedback, meditation, auricular acupuncture, and Qigong bioenergy therapies within the framework of conventional healthcare and share a philosophical congruence with Complementary and Integrative Health core values.
Features & Benefits:

- This pioneering program in Women’s Integrative Health provides healthcare professionals evidenced based integrative treatment protocols that are holistic, addressing the mind, body, spirit complex that are inherently personalized and individualized.
- Courses are taught by leading Women’s Integrative Health Practitioners and internationally-recognized experts in complementary and integrative therapies.
- Courses are offered entirely online in a dynamic and interactive learning environment.

Admission Requirements:

- 2.75 GPA or above on all previous coursework
- A baccalaureate degree with a major in a health-related field from an accredited college or university
- Official transcripts from all universities or colleges attended
- A completed application form
- Nurse, nurse practitioner, physician assistants, and other healthcare professionals who hold licensure or a certificate: copy of license, eligibility for licensure, or certificate
- Current resume
- Two letters of recommendation
- Personal statement (no more than two pages and no less than one page double-spaced) that will give the admissions committee a better understanding of the followings:
  - Why you are choosing this particular program of study
  - Your plans upon completion of the certificate
  - How your current work experience will enhance your experience in this program
- International students will need to meet university international student admissions guidelines, including TOEFL Program Requirements.

Additional Information

For more information about this program, contact:

Ms. Amy Pelak Rothstein
Student Services Manager
aip347@drexel.edu  (fr53@drexel.edu)
267.359.5692

Additional information is also available on the Drexel's College of Nursing and Health Professions Women's Integrative Health (http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Advanced-Study-Womens-Integrative-Health) web page and Drexel University Online's Women's Integrative Health (http://www.drexel.edu/online-degrees/nursing-degrees/cert-aswiw) web page

**Couple and Family Therapy**

**Major:** Couple and Family Therapy  
**Degree Awarded:** Doctor of Philosophy (PhD)  
**Calendar Type:** Quarter  
**Total Credit Hours:** 82.0  
**Classification of Instructional Programs (CIP) code:** 51.1505  
**Standard Occupational Classification (SOC) code:** 21-1013

**About the Program**

The PhD program in Couple and Family Therapy (CFT) aims to develop the next generation of couple and family therapy scholars with a particular focus on research related to family based psychotherapy, families and health and health disparities. Students are trained to advance the knowledge base of couple and family therapy through education, research and clinical services with a particular emphasis on evidenced informed treatment modalities.

Graduates of the Couple and Family Therapy PhD program will serve as researchers in public and private institutions, faculty in graduate programs of couple and family therapy, psychology, social work or medical schools, and as clinicians in mental health agencies or private practice.

The PhD program in Couple and Family Therapy is rooted in relational and systems theories and therapies. Emphasis is on specialized training in couple and family therapy theories such as Attachment-based Family Therapy and Emotionally Focused Family Therapy and Medical Family Therapy approaches. Students are expected to demonstrate critical and analytical thinking with respect to the broad areas of systems theory and therapy, and have a primary interest in research and scholarship. The Couple and Family Therapy Department is committed to attracting minority scholars as well as training students to be aware and sensitive to contextual issues such as race, class, gender, spirituality and sexual orientation, as well as power and privilege.

For additional information about the PhD in Couple and Family Therapy, visit the program's Couple and Family Therapy (https://www.drexel.edu/cnhp/academics/doctoral/PHD-Couple-Family-Therapy) web site.

**Degree Requirements**

Students are required to complete the standard curriculum in couple and family therapy before pursuing the doctoral curriculum. The standard curriculum is offered in the COAMFTE- accredited Master of Family Therapy (p. 173) and Post-Master's Certificate programs at the University. A minimum of 82.0 post-master's quarter hours are required for the PhD program.

The curriculum includes study in the following areas:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CIT 503</td>
<td>Holistic Living For The Caregiver</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 534</td>
<td>Witches, Wise Women and Women Healers</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 602</td>
<td>Women's Integrative Health</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 658</td>
<td>Advanced Women's Integrative Health</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>12.0</strong></td>
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</tbody>
</table>
• Theory and research in couple and family therapy
• Research methodology, including statistics, research design, and computer applications
• Specialized instruction in couple and family therapy
• Attachment-based Family Therapy, diverse family structures, Emotionally Focused Therapy and Medical Family Therapy, Forensic Family Therapy
• Supervised clinical experience
• Supervision of supervision

### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
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<td>Diverse Families and Communities: Intervention Strategies</td>
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<td>Family Healthcare Policy</td>
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<td>Special Topics in Couple and Family Therapy</td>
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<td>Dyadic Analysis and Longitudinal Causal Modeling in CFT</td>
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<td>Psychotherapy Outcome and Process Research</td>
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**ARTS**

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**NHP**

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**RSCH**

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<td>RSCH 813</td>
<td>Measurement Theory in Healthcare</td>
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<td>Interpretation of Data</td>
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<td>Foundations of Biostatistics</td>
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**Clinical Training**

Select Three of The Following Courses

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<td>Core Skills in Emotionally Focused Therapy</td>
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<td>CFTP 755</td>
<td>Introduction to Attachment-based Family Therapy</td>
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<td>CFTP 756</td>
<td>ABFT Core Skills Advanced Course</td>
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**Dissertation**

Complete Three Courses Below

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<td>CFTP 803</td>
<td>Couple and Family Therapy Dissertation Defense</td>
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**Additional Course (Elective)**

Students select an additional elective courses (Students may choose to go outside of the program to meet this requirement, provided each course is at least 4.0 credits and at the doctoral level of sophistication or they may select one of the following courses.)

### Total Credits

56.0-130.0
Dance/Movement Therapy and Counseling

Major: Dance/Movement Therapy Counseling
Degree Awarded: Master of Arts (MA)
Calendar Type: Quarter
Total Credit Hours: 90.0
Classification of Instructional Programs (CIP) code: 51.2301
Standard Occupational Classification (SOC) code: 29-1129

About the Program

Dance/movement therapy (DMT) is a body/mind-integrated approach to mental health counseling, in which movement is an essential medium. In this two-year curriculum, student learn to effectively engage in therapy relationships that support the emotional, cognitive, social and physical integration and functioning of the clients with whom they will work.

The curriculum engages students in experiential and reflective learning processes as well as more traditional discussion, lecture, tutorial, and clinical education formats. Through a balance of classroom education and clinically supervised practicum and internship experiences, students develop a strong foundation for skilled DMT practice. Program coursework supports an understanding of human development, multicultural diversity, psychopathology, therapeutic change processes, and social systems. Students apply this understanding and observational skills based in Laban Movement Analysis (LMA) to assess client functioning and formulate therapy goals. Improvisational processes support the design of relevant movement and verbal therapy interventions in both individual and group therapy forms. The curriculum includes specialized approaches with adult and child clinical populations.

For additional information about the program, visit the College of Nursing and Health Professions’ Dance/Movement Therapy (https://www.drexel.edu/chnp/academics/graduate/MA-Dance-Movement-Therapy-Counseling) web site.

Degree Requirements

Core Courses

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<td>Group Dynamics and Therapy</td>
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<td>ARTS 508</td>
<td>Introduction to Behavioral Research I</td>
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Dance/Movement Therapy Track Courses

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<td>Neuroscience: Concepts and Applications for Creative Arts Therapy</td>
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<td>Movement Observation I</td>
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<td>Laban Movement Analysis Lab</td>
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<td>ARTS 556</td>
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<td>Dance/Movement Therapy Theory and Practice - Children I</td>
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<td>Dance/Movement Therapy Theory and Practice - Children II</td>
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<td>ARTS 559</td>
<td>Introduction to Dance/Movement Therapy History and Literature</td>
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<td>Movement Perspectives in Human Development</td>
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<td>Family Dance/Movement Therapy: A Systems Approach</td>
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Clinical Education Courses

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<td>ARTS 610</td>
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Thesis

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<tr>
<td>ARTS 624</td>
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Electives

Select one of the following:

- ARTS 551 Introduction to Anatomy and Kinesiology for Dance/Movement Therapy
- ARTS 651 Medical Dance/Movement Therapy
- ARTS 652 The Kestenberg Movement Profile
Additional Electives * 
As needed, in consultation with the program director students can select the following electives:

- ARTS 625 For Thesis Only
- ARTS 699 Independent Study in Creative Arts Therapy

Total Credits 90.0

Sample Plan of Study

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Term Credits 15.0

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Term Credits 15.0

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Term Credits 13.0

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Term Credits 5.0

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<td>ARTS 658 Dance/Movement Therapy Advanced Group Supervision I</td>
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Elective * 
- ARTS 651 Medical Dance/Movement Therapy
- ARTS 652 The Kestenberg Movement Profile

Term Credits 13.0

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<td>ARTS 605 Theories of Psychotherapy II</td>
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<td>ARTS 611 Clinical Internship II</td>
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<td>ARTS 623 Thesis III</td>
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Term Credits 13.0

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Term Credits 16.0

Total Credit: 90.0

* Please note that the electives are in addition to the 90 credits required for the degree. Please consult with you advisor before registering for an elective.

Creative Arts Therapies Department Faculty

Yasmine Awais, ATR-BC, ATCS, LCAT (Art Institute of Chicago). Assistant Clinical Professor. Multicultural art therapy, clinical supervision.

Joke Bradt, PhD, MT-BC (Temple University). Associate Professor. Research in music therapy, chronic pain, systematic reviews.

Gayle Gates, MA, BC-DMT (Immaculate Heart College, CA) Associate Director, Dance/Movement Therapy Programs. Assistant Clinical Professor. Early childhood development and mother-child interaction, intervention with at risk preschoolers.
About the Program
The Doctor of Health Science (DHSc) in Rehabilitation Sciences program is designed to be an advanced doctoral degree program open to physical and occupational therapists seeking leadership roles in education and/or clinical practice. The mission of the program is to prepare these individuals to take leadership roles as educators and master clinicians in rehabilitation sciences and to promote transfer of knowledge, evidence-based practice, professional responsibility, and lifelong learning across a variety of academic and clinical settings. The curriculum includes foundation courses in the health professions, teaching, research, and the opportunity for focused study in a specialized area of clinical practice such as pediatrics, orthopedics and hand rehabilitation.

Program Delivery
Coursework is predominantly online, with onsite components arranged on preset week days or weekends during the curriculum. Most of the coursework will be offered without pre- or co-requisites to maximize students’ ability to balance their work and personal lives while completing the degree. Each student chooses an area of practice that matches the expertise of one of our faculty members; an arrangement that ensures optimal mentorship for the students.

Goals and Objectives
The objectives of the DHSc program include four areas: leadership, education, scholarship, and clinical health care practice. Graduates of the Doctor of Health Science in Rehabilitation Sciences program will be prepared to:

- Practice as a master clinician in an area of advanced practice through clinical decision-making that is consistent with concepts of client-centered care and current best evidence.
- Synthesize theory, research, and health care policy relevant to individuals with movement dysfunction to promote transfer of knowledge into clinical practice.
- Serve effectively as consultants to patients, clients, community organizations, and professional colleagues.
- Serve effectively as educators in rehabilitation sciences in the academic, clinical, and community settings.
- Develop and evaluate structure, tests and measures, process, and outcomes of service delivery and/or intervention through scholarship in an area of advanced practice or education.
- Communicate information effectively through peer-reviewed professional presentations/publications.

Additional Information
For more information, visit the Department of Physical Therapy and Rehabilitation Sciences (https://www.drexel.edu/cnhp/academics/departments/Physical-Therapy) web page.

Admission Requirements
Applicants must possess a master's or clinical doctoral professional degree in physical therapy or a related field such as MPT, MSPT, MOT, DPT, or OTD or some other master's degree for admission consideration. In addition applicants must have a current, active US or Canadian license to practice their discipline. Applicants would complete a standard graduate application including submission of the following:

- Copy of professional license
- College/university transcripts with minimal overall GPA of 3.0
- GRE scores
- Two letters of recommendation from advisors, supervisors, professors, or mentors
- CV
- Personal statement outlining career plan and topic of research interest

Degree Requirements

### Foundation Courses

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<tr>
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<td>NHP 766</td>
<td>Health Promotion, Fitness and Wellness</td>
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<td>NHP 767</td>
<td>Leadership &amp; Professional Issues</td>
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<tr>
<td>RSCH 758</td>
<td>Application of Evidence to Practice</td>
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### Teaching Courses

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<td>NHP 762</td>
<td>Health Professional Education</td>
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<td>RHAB 760</td>
<td>Academia for Rehabilitation Scientists</td>
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<td>RHAB 824</td>
<td>Teaching Practicum I</td>
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</tr>
<tr>
<td>RHAB 825</td>
<td>Teaching Practicum II</td>
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</tr>
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</table>
Teaching Facilities

The primary teaching resource for this program is supported distance learning technology. Instructional materials are provided through text, graphics, audio and video formats and are available online through a course management system 24 hours a day. The online courses are highly interactive through the use of web discussion boards, audio chat tools, and video conferencing. Program faculty share a belief that it is important to fully support distance learning students, and support will be offered via email, telephone, fax, and video-conferencing. The College of Nursing and Health Professions invests in state-of-the-art technology to foster an effective teaching and learning environment. The onsite portions of the program are held on the Center City (Health Sciences) Campus of Drexel University. The Department of Physical Therapy and Rehabilitation Sciences has two state-of-the-art dedicated teaching laboratories.

Research Facilities

The department’s research facilities include over 9,000 square feet of well-equipped research laboratory space (Biomechanics, Gait, Pediatrics, and Neuromuscular Performance Labs), with equipment including force plates, EMG, motion analysis and human performance measurement equipment. This space includes conference rooms, PhD and post doc offices and is located next door to the College's 14,000 square feet, multi-disciplinary clinical practice.

The Department of Physical Therapy and Rehabilitation also values community partners as a central part of the research resources. Many faculty and students are involved in community-based research through collaborations with CanChild Centre, 11th Street Family Health Center, and numerous pediatric hospitals, out-patient facilities, and early intervention providers. Faculty are collaborating on research projects with nationally and internationally known researchers on several multi-site funded projects.

Physical Therapy and Rehabilitation Sciences Faculty

Maria Benedetto, DPT (University of Puerto Rico; Columbia University). Associate Clinical Professor. Motor learning and motor control in pediatrics; timed ambulation; obstacle course for children with and without motor disabilities.

Lisa Ann Chiarello, PT, PhD, PCS (Hahnemann University; Ithaca College) Director, PhD Program. Professor. Models of service delivery in early intervention; parent-child relationship and the use of play; family-centered care.

David Ebaugh, PT, PhD (Drexel University). Assistant Professor. Quantitative analysis of movement in patients with shoulder pathology; differential diagnosis of shoulder problems; orthopedic examinations and interventions.

Jane Fedorczyk, PT, PhD, CHT, ATC (Beaver College). Assistant Professor. Models of service delivery in pediatrics; orthopedics; sports medicine.

Kevin E. Gard, DPT, OCS (Temple University) Vice-Chair, Department of Physical Therapy and Rehabilitation Sciences and Director, Professional Doctor of Physical Therapy Program. Associate Clinical Professor. Orthopedics; musculoskeletal disorders.

Jan Meiers, PT, DPT, GCS (Temple University) Assistant Director of Clinical Education. Assistant Clinical Professor. Wellness in the geriatric population.

Kathryn D. Mitchell, PT, DPT, NCS (Temple University) Assistant Director of Clinical Education. Assistant Clinical Professor. Adult neuromuscular rehabilitation, vestibular rehabilitation, and balance and falls; clinical health informatics.

Margaret O’Neil, PT, PhD, MPH (MCP Hahnemann University; Duke University; University of North Carolina at Chapel Hill). Associate Professor. Measurement of and interventions to improve physical activity and fitness levels and promote participation in children and youth with
who are overweight/obese and those with physical disabilities (especially cerebral palsy).

Margo Orlin, PT, PhD (Drexel University) Interim Chair. Department of Physical Therapy and Rehabilitation Sciences. Associate Professor, Gait and function in children with developmental disabilities, evaluation of musculoskeletal interventions for children with cerebral palsy; enhancing participation for children and adolescents with cerebral palsy.


Deborah Rose, PT, DPT, PCS (Drexel University). Adjunct Instructor. Pediatric clinical specialist.

Patricia Rubertone, MSW, MPT (Temple University; Hahnemann University) Director of Clinical Education. Assistant Clinical Professor. Student learning; course design.

Patricia A. Shewokis, PhD (University of Georgia). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy(fNIR) and electroencephalography (EEG) and methodology and research design.

Sheri Silfies, PT, PhD (MCP Hahnemann University) Research Lab Coordinator. Associate Professor. Identification and treatment of impairments in neuromuscular control of trunk mobility and postural stability in patients with low back pain; focusing on mechanism of recurrent low back pain.

Susan Smith, PT, PhD (University of Connecticut, Texas Woman’s University) Associate Dean for Research and Health Professions, Graduate Education, CNHP. Associate Professor. Health promotion and interventions for manifestations of low bone mass in women; quantitative evaluation and interventions in orthopedic physical therapy with an emphasis on spinal pain and dysfunction.

Sarah Wenger, PT, DPT, OCS (Arcadia University; Temple University) Coordinator of Experiential Learning. Assistant Clinical Professor. Health, wellness and fitness, models for preventative physical therapy.

**Interdepartmental Faculty**

Joseph A. Rubertone, MPT, PhD (West Virginia University). Associate Clinical Professor. Connectivity of vestibular nuclear complex, brain tumor imaging, and clinical studies pertaining to the effectiveness of stroke rehabilitation.

**Doctor of Nursing Practice**

**Major:** Nursing Practice

**Degree Awarded:** Doctor of Nursing Practice (DNP)

**Calendar Type:** Quarter

**Total Credit Hours:** 46.0

**Classification of Instructional Programs (CIP) code:** 51.3818

**Standard Occupational Classification (SOC) code:** 11-9111

**About the Program**

The Doctor of Nursing Practice (DNP) at Drexel University is designed for nurses seeking a terminal degree in nursing practice and offers an alternative to research-focused doctoral programs. The mission of the DNP program is to prepare individuals to assume leadership roles as executives or practitioners and to apply evidence-based practice to improve individual, family, and community health outcomes.

Nurses graduating in Drexel's DNP program are well-equipped to fully implement the science developed by nurse researchers in PhD, DNSc, and other research-focused nursing doctorates.

**Program Objectives**

The objectives are focused in two areas: leadership in an executive role and a practitioner role. Graduates of the DNP degree will be prepared to:

1. Evaluate patient care delivery approaches to meet the current and anticipated needs of patient populations based on outcomes and scientific findings.
2. Translate research into clinical practice and policy to improve care and outcomes.
3. Use advanced communication skills - to lead quality improvement and patient safety.
4. Use principles of business, finance, economics, and health policy to develop and implement plans to improve the quality of healthcare delivery.
5. Demonstrate sensitivity to diversity in patients and providers.
6. Evaluate effective strategies for the management of ethical dilemmas that can occur in the course of healthcare delivery.

**Admission Requirements**

Applicants must have a bachelor of science in nursing or advanced practice masters’ degree in nursing. In addition, applicants must have a current, active US license to practice nursing. Applicants would complete a standard graduate application including submission of the following:

- Copy of professional license, advanced certificate(s) and advanced practice license(s)
- University/college transcripts (except for graduates of Drexel)
- Two letters of recommendation from advisors, supervisors, professors or mentors
- CV
- Personal statement on reasons for their interest in the DNP and career plan

**Degree Requirements**

**Curriculum**

The sequence of the doctoral program of study is organized to integrate the core courses while at the same time prepare students for immersion in research courses. The clinical and role practica provide students with opportunity to enhance their leadership skills in clinical practice and executive roles in service delivery.

The program offers two tracks:

- **The Practitioner Track:** for the student who wants to remain in clinical practice post-graduation.
- **The Executive Track:** for graduates who want careers in executive nursing and health care management, but who still prefer a nursing doctorate with a connection to clinical practice.
Required Courses

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 703</td>
<td>Health Policy and Economics</td>
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<tr>
<td>NURS 706</td>
<td>Applied Epidemiology</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 713</td>
<td>Human Responses to Altered Function in Health and Illness</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 716</td>
<td>Scientific Foundation of Nursing Knowledge Development</td>
<td>3.0</td>
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<tr>
<td>NURS 718</td>
<td>Quantitative Methods for Practice-based Nursing Inquiry</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 719</td>
<td>Leadership in Organizations and Systems</td>
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<td>NURS 720</td>
<td>Health Information Technology and Information Systems</td>
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<td>NURS 819</td>
<td>Qualitative Methods in Clinical Nursing</td>
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<td>Doctoral Nursing Practice Clinical Practicum</td>
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<td>Doctoral Nursing Practice Role Practicum</td>
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<td>NURS 836</td>
<td>Clinical and Applied Nursing Ethics</td>
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<tr>
<td>NURS 837</td>
<td>Translating Evidence into Clinical Practice</td>
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<td>NURS 840</td>
<td>DNP Project Seminar</td>
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<td>NURS 841</td>
<td>DNP Project Advisement</td>
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<tr>
<td>NURS 891</td>
<td>Doctoral Nursing Special Topics for the Nurse Executive</td>
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</tr>
<tr>
<td>or NURS 892</td>
<td>Doctoral Nursing Special Topics for the Nurse Practitioner</td>
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</tr>
<tr>
<td>RSCH 519</td>
<td>Introduction to Biostatistics</td>
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</table>

Total Credits 46.0

Program Delivery

The DNP program is an online program that includes program orientation and didactic instructions on information and technology and a residency requirement. The program orientation and didactic instructions on information and technology occur before the fall session.

The residency requirement occurs during the first year summer session when the student is enrolled in 2 didactic courses on campus. The student is expected to develop and implement a DNP project. The student may defend his or her DNP project proposal online. During the defense, the student will demonstrate effective verbal communication skills and knowledge in the area of interest to the academic committee (2 faculty selected by the student in collaboration with his or her advisor) and finalize plans for implementation of the DNP project. The last on-site visit will be the oral defense of the DNP project that denotes the culmination of the degree program.

Sample Plan of Study

First Year

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<thead>
<tr>
<th>Term</th>
<th>Course</th>
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<tbody>
<tr>
<td>Fall</td>
<td>RSCH 519 Introduction to Biostatistics</td>
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<td>NURS 716 Scientific Foundation of Nursing Knowledge Development</td>
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<td>Winter</td>
<td>NURS 706 Applied Epidemiology</td>
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Spring

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<th>Course</th>
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<tr>
<td>NURS 713 Human Responses to Altered Function in Health and Illness</td>
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Summer

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<tr>
<td>NURS 718 Quantitative Methods for Practice-based Nursing Inquiry</td>
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<td>NURS 819 Qualitative Methods in Clinical Nursing</td>
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Second Year

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<tr>
<td>Fall</td>
<td>NURS 830 Doctoral Nursing Practice Clinical Practicum</td>
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<td>NURS 703 Health Policy and Economics</td>
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Winter

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<th>Course</th>
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<tbody>
<tr>
<td>NURS 835 Doctoral Nursing Practice Role Practicum</td>
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<tr>
<td>NURS 836 Clinical and Applied Nursing Ethics</td>
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<th>Term Credits</th>
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Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 837 Translating Evidence into Clinical Practice</td>
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<tr>
<td>NURS 891 or 892 Doctoral Nursing Special Topics for the Nurse Executive</td>
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</tr>
<tr>
<td>or NURS 892 Doctoral Nursing Special Topics for the Nurse Practitioner</td>
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Summer

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<td>NURS 840 DNP Project Seminar</td>
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Third Year

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<td>Fall</td>
<td>NURS 841 DNP Project Advisement</td>
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Total Credit: 46.0

* Continue as necessary.

Interdepartmental Faculty

Barbara Amendolia, DrNP, NNP, APN-BG (Drexel University). Assistant Clinical Professor. Neonatology, specifically feeding difficulties and respiratory diseases of the newborn.

Katherine Kaby Anselmi, PhD, JD, CRNP (University of Pennsylvania). Associate Dean of Accreditation/Regulatory Affairs & Online Innovation. Associate Clinical Professor. Nursing, law, family nurse practitioner, women’s health nurse practitioner.

Joan Rosen Bloch, PhD, CRNP (University of Pennsylvania). Associate Professor. Maternal and infant health outcomes with a particular focus on racial and ethnic perinatal health disparities.
Kathleen Fisher, PhD, CRNP (Pennsylvania State University). Associate Clinical Professor. Health care for vulnerable populations, decision making in vulnerable populations (i.e. individuals with intellectual disability.)

Sandra A. Friedman, MSN, CNM (Yale University). Assistant Clinical Professor. Interdisciplinary team simulation and debriefing, health assessment and health promotion, nurse midwifery with specialty in adolescent health, nurse managed health center administration.


Elizabeth Gonzalez, PhD, PMHCNS-BC (New York University) Department Chair, Doctoral Nursing Program. Associate Clinical Professor. Chronic stress, geropsychiatry, depression among the elderly, minority health issues and cross-cultural research among family caregivers of relatives with Alzheimer's disease.

Thomas L. Hardie, EdD, RN, PMHCNS-BC (Columbia University, Teachers College). Associate Professor. Psychiatric nursing, cancer survivorship, treatment research outcomes in substance abuse

Bobbie Posmontier, PhD, CNM, PMHNP-BC (University of Pennsylvania). Assistant Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Al Rundio, Jr., PhD, DNP, RN, APRN, NEA, BC (University of Pennsylvania) Interim Associate Dean for Advanced Practice Nursing Programs, Chair of DNP Program. Clinical Professor. Nursing graduate leadership and management track.

Roberta Waite, EdD, MSN (Widener University; University of Pennsylvania) Assistant Dean of Academic Integration and Evaluation of Community Programs. Associate Professor. Psychiatric nursing; depression and ADHD in minority adults, and the effects of adverse childhood experiences on adult health in minority adults.

**Doctor of Physical Therapy**

**Major: Physical Therapy**

**Degree Awarded:** Doctor of Physical Therapy (DPT)

**Calendar Type:** Quarter

**Total Credit Hours:** 128.0

**Classification of Instructional Programs (CIP) code:** 51.2308

**Standard Occupational Classification (SOC) code:** 29-1123

**About the Program**

The Doctor of Physical Therapy (DPT) curriculum produces broadly educated physical therapists, while being sensitive to the needs of the health care community and the students’ interests. The program strives to foster both intellectual and professional growth in students and is reflective of contemporary practice to prepare graduates for the ongoing changes in health care delivery.

The Doctor of Physical Therapy (DPT) program prepares students for autonomous practice in physical therapy. As a science, physical therapy examines human motion at the tissue, organ, and systems levels. In the clinical environment, physical therapists (PTs) examine and evaluate patients/clients and implement procedural interventions that restore physical function for all people across the life span. As essential practitioners in the health care delivery system, PTs assume roles in rehabilitation services, prevention and health maintenance programs, and professional and community programs. As professional members of the health care team, PTs supervise support personnel, serve as consultants to other health care personnel, serve as consultants to families and caregivers, participate in administrative services, and conduct clinical research. PTs also serve as advocates for health policy and standards of care that help ensure optimum care for their patients/clients.

Graduates of the Doctor of Physical Therapy program are prepared to fulfill their professional obligations, provide leadership to the profession, and use their knowledge and skills to contribute to the health care of society.

The 31-month curriculum spans ten academic quarters and consists of integrated didactic and clinical study with an emphasis on adult learning methodology. The curriculum consists of foundational courses during the first year, with subsequent quarters sequenced to progress through the hierarchy of educational objectives from simple to complex. All didactic material is organized for synthesis and application to professional practice.

For more information visit the Physical Therapy and Rehabilitation Science (https://www.drexel.edu/cnhp/academics/dental/DPT-Doctor-Physical-Therapy) page on the College of Nursing and Health Professions website.

For application instructions, visit the Drexel's Graduate Admission web page for the Doctor of Physical Therapy (http://drexel.edu/grad/programs/cnhp/professional-doctor-of-physical-therapy).

**Degree Requirements**

The DPT curriculum occurs in a 10-week quarter format over ten quarters: fall, winter, spring, and summer I; fall, winter, spring, and summer II; and fall and winter III. Classes begin in late September for first-year students. The curriculum is subject to modification.

**First Year**

**Fall**

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<tr>
<th>Course Code</th>
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<tr>
<td>PTRS 530</td>
<td>Kinesiology I</td>
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<tr>
<td>PTRS 534</td>
<td>Physical Therapy Exam Intervention I</td>
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<tr>
<td>PTRS 532</td>
<td>Human Gross Anatomy I</td>
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<tr>
<td>PTRS 537</td>
<td>Clinical Correlations I</td>
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<td>PTRS 633</td>
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<td>PTRS 613</td>
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**Term Credits:** 15.5

**Winter**

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<tr>
<td>PTRS 533</td>
<td>Human Gross Anatomy II</td>
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<tr>
<td>PTRS 531</td>
<td>Kinesiology II</td>
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<td>PTRS 535</td>
<td>Physical Therapy Exam Intervention II</td>
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<td>PTRS 539</td>
<td>Topics in Pathophysiology I</td>
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<tr>
<td>PTRS 624</td>
<td>Functional Modality</td>
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<td>PTRS 614</td>
<td>Clinical Practice II</td>
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<tr>
<td>PTRS 751</td>
<td>Evidence-Based Practice</td>
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**Term Credits:** 18.0

**Spring**

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<tr>
<td>NEUR 507</td>
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### Term Credits

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<tr>
<td>PTRS 620</td>
<td>Orthopedic Physical Therapy: Upper Extremity</td>
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<tr>
<td>PTRS 623</td>
<td>Physical Agents</td>
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<tr>
<td>PTRS 540</td>
<td>Topics in Pathophysiology II</td>
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<td>PTRS 639</td>
<td>Motor Learning</td>
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<td>PTRS 615</td>
<td>Clinical Practice III</td>
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<td>NEUR 508</td>
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<tr>
<td>PTRS 621</td>
<td>Orthopedic Physical Therapy: Lower Extremity</td>
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<td>PTRS 627</td>
<td>Cardiopulmonary Physical Therapy I</td>
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<td>PTRS 641</td>
<td>Neurological Exam and Intervention I</td>
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<td><strong>Fall</strong></td>
<td>PTRS 634</td>
<td>Life Span Development I</td>
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<td>PTRS 634</td>
<td>Health Professional Roles</td>
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<td>Wound Care Management</td>
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<td>Prosthesis Management</td>
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<td>Issues in Pharmacotherapy</td>
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<tr>
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<tr>
<td><strong>Summer</strong></td>
<td>PTRS 538</td>
<td>Clinical Correlations II</td>
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<tr>
<td>PTRS 632</td>
<td>Pediatric Physical Therapy</td>
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<td>PTRS 643</td>
<td>Applied Biomechanics</td>
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<td>PTRS 653</td>
<td>Life Span Development II</td>
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<tr>
<td>PTRS 654</td>
<td>Topics in Health Policy Services</td>
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<td>PTRS 753</td>
<td>Evaluation of Research in Physical Therapy</td>
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<td><strong>Fall</strong></td>
<td>PTRS 777</td>
<td>Clinical Education III</td>
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<td>PTRS 655</td>
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<tr>
<td><strong>Winter</strong></td>
<td>PTRS 778</td>
<td>Clinical Internship</td>
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<tr>
<td>PTRS 617</td>
<td>Professional Project II</td>
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<td></td>
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</table>

**Total Credit: 128.0**

*Conducted online.*

### Clinical Education

A strong history of comprehensive clinical education exists for our professional students. The clinical education for the DPT program is integrated into the didactic portions of the curriculum so that knowledge obtained in the classroom is readily put into practice. The DPT program has contracts with hundreds of clinical sites across the nation, representing all facets of professional practice. Students are required to complete four clinical education experiences that offer various levels of acuity in different clinical environments. The first clinical education experience is 6 weeks in length, clinical education II and III are 10 weeks long, and the fourth experience, the clinical internship, is 12 weeks.

Students may select from clinical sites that offer experiences in pediatrics, adult rehabilitation, geriatrics, orthopedics, sports medicine, and industrial and occupational rehabilitation.

For more information visit the Physical Therapy and Rehabilitation Sciences Overview page on the College of Nursing and Health Professions web site.

### Facilities

**Teaching Facilities**

Most classes are held in lecture halls, classrooms, or laboratories on the Center City (Health Sciences) Campus of Drexel University. The entire campus has wireless capability for easy internet access. The Department of Physical Therapy and Rehabilitation Sciences has two state-of-the-art dedicated laboratories where the clinical components of the professional curriculum are taught. In these laboratories equipment reflects current physical therapy practice and is part of a multi-disciplinary clinical learning and resource center. Included as part of the resource center is a standardized patient lab that utilizes paid actors to simulate various clinical situations while students’ interactions with those “patients” are monitored by supervising faculty. This center provides a rich environment for student learning.

Our teaching resources also include supported distance learning technology. Instructional materials are provided through text, graphics, audio and video formats and are available online through a course management system 24 hours a day. Our online courses are highly interactive through the use of web discussion boards and audio chat tools.

Additionally, the Professional DPT program uses its own faculty-staffed clinical sites as well as various clinical sites in the area to enhance the educational experience of the student. The department operates outpatient physical therapy sites in the Drexel Recreation Center on the University City campus, as part of the multidisciplinary Parkway Health and Wellness Center on the Center City campus and a pro-bono practice in the 11th Street Family Health Center. Students rotate through these facilities getting individualized mentoring while connecting classroom content with clinical practice. These experiences are in addition to the 38 weeks of clinical education the student will experience throughout the curriculum.
Research Facilities

The Department conducts hypothesis-driven research in human movement, biomechanics, motor control, community-based practice and family-centered care. Some of this research is conducted in a 23,000 square foot multidisciplinary center on the Center City Campus. The center has a gait and motion analysis lab containing a video-based motion analysis system with in-floor force plates, and neuromuscular performance labs equipped with custom-built force measuring systems, 16-channel EMG system and electromagnetic tracking systems. Other research is conducted via partnerships with organizations locally, nationally, and internationally. Other departments involved in the research center include Nutrition Sciences and Nursing which provides fertile ground for collaboration. Professional DPT students have the opportunity to work with faculty and PhD students on ongoing laboratory projects through optional research practica or as part of the final project, a capstone experience for the curriculum.

Physical Therapy and Rehabilitation Sciences Faculty

Maria Benedetto, DPT (University of Puerto Rico; Columbia University). Associate Clinical Professor. Motor learning and motor control in pediatrics; timed ambulation; obstacle course for children with and without motor disabilities.

Lisa Ann Chiarello, PT, PhD, PCS (Hahnemann University; Ithaca College) Director, PhD Program. Professor. Models of service delivery in early intervention; parent-child relationship and the use of play; family-centered care.

David Ebaugh, PT, PhD (Drexel University). Assistant Professor. Quantitative analysis of movement in patients with shoulder pathology; differential diagnosis of shoulder problems; orthopedic examinations and interventions.

Jane Fedorczyk, PT, PhD, CHT, ATC (Beaver College) Director, Post-Professional Clinical Programs. Associate Clinical Professor. Hand and upper extremity injuries related to repetitive movement including tendinopathies and nerve compression syndromes.

Kevin E. Gard, DPT, OCS (Temple University) Vice-Chair, Department of Physical Therapy and Rehabilitation Sciences and Director, Professional Doctor of Physical Therapy Program. Associate Clinical Professor. Orthopedics; sports medicine.

Noel Goodstadt, DPT, OCS, CSCS (Pennsylvania State University; Hahnemann University; Temple University). Assistant Clinical Professor. Orthopedics, musculoskeletal disorders.

Jan Meiers, PT, DPT, GCS (Temple University) Assistant Director of Clinical Education. Assistant Clinical Professor. Wellness in the geriatric population.

Kathryn D. Mitchell, PT, DPT, NCS (Temple University) Assistant Director of Clinical Education. Assistant Clinical Professor. Adult neuromuscular rehabilitation, vestibular rehabilitation, and balance and falls; clinical health informatics.

Margaret O'Neil, PT, PhD, MPH (MCP Hahnemann University; Duke University; University of North Carolina at Chapel Hill). Associate Professor. Measurement of and interventions to improve physical activity and fitness levels and promote participation in children and youth with who are overweight/obese and those with physical disabilities (especially cerebral palsy).

Margo Orlin, PT, PhD (Drexel University) Interim Chair, Department of Physical Therapy and Rehabilitation Sciences. Associate Professor. Gait and function in children with developmental disabilities, evaluation of musculoskeletal interventions for children with cerebral palsy; enhancing participation for children and adolescents with cerebral palsy.


Deborah Rose, PT, DPT, PCS (Drexel University). Adjunct Instructor. Pediatric clinical specialist.

Patricia Rubertone, MSW, MPT (Temple University; Hahnemann University) Director of Clinical Education. Assistant Clinical Professor. Student learning; course design.

Patricia A. Shewokis, PhD (University of Georgia). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy(NIRS) and electroencephalography (EEG) and methodology and research design.

Sheri Silfies, PT, PhD (MCP Hahnemann University) Research Lab Coordinator. Associate Professor. Identification and treatment of impairments in neuromuscular control of trunk mobility and postural stability in patients with low back pain; focusing on mechanism of recurrent low back pain.

Susan Smith, PT, PhD (University of Connecticut, Texas Woman's University) Associate Dean for Research and Health Professions, Graduate Education, CNHP. Associate Professor. Health promotion and interventions for manifestations of low bone mass in women; quantitative evaluation and interventions in orthopedic physical therapy with an emphasis on spinal pain and dysfunction.

Sarah Wenger, PT, DPT, OCS (Arcadia University; Temple University) Coordinator of Experiential Learning. Assistant Clinical Professor. Health, wellness and fitness, models for preventative physical therapy.

Interdepartmental Faculty

Joseph A. Rubertone, MPT, PhD (West Virginia University). Associate Clinical Professor. Connectivity of vestibular nuclear complex, brain tumor imaging, and clinical studies pertaining to the effectiveness of stroke rehabilitation.

Family/Individual Across the Lifespan Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Post-Master's Certificate
Number of Credits to Completion: 38.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Program of Study

All incoming post-master’s students in nurse practitioner tracks have the opportunity for previous course work to be evaluated on an individual basis for transfer or credit. Pharmacology for family nurse practitioners is required prior to beginning the clinical courses. Students should check with the program coordinator for the exact schedule.

Admission Requirements

- A Master’s degree with a major in nursing (MSN) from a regionally accredited program with a cumulative grade point average of at least 3.0 on a scale of 4.0.
- A copy of your current, unrestricted United States RN license or eligibility for licensure as a registered nurse. License verification from your nursing license registry website are acceptable. Once accepted, applicants must have a current RN license in the state of Pennsylvania. In addition, students are required to have a RN Nursing License for the state in which the clinical practicum rotations are being completed.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online through a password secured link or website (use our email address, customerservice@drexel.com). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts. Click here to use our Transcript Look-up Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions. If you attended a Diploma School of Nursing and the school was affiliated with a college/university, the official transcript must be submitted from the college for any non-nursing courses for which you received credit.
- Current Curriculum vitae and/or resume detailing work experience, including specific job responsibilities and departments.
- Two professional letters of recommendation (from either a previous or immediate supervisor and/or a former nursing faculty member who can attest to the applicant's clinical knowledge, skill and potential aptitude for graduate study). References will not be accepted from colleagues or family members. Drexel University Online now accepts electronic letters of recommendation. Click here (http://www.drexel.edu/apply/recommend) for instructions regarding their submission. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
- Personal statement (800-1,600 words) that will give the Admissions Committee a better understanding of why you are choosing this particular program of study, your plans upon completion of this program, and how your current work experience will enhance your experience in this program.
- Applicants seeking admission into the Family/Individual Across the Lifespan Post-Master's Certificate Program must complete 640 clinical practicum hours. Accepted students will need to be issued a Pennsylvania RN license in addition to their current RN license if it is not from Pennsylvania.
- International applicants: Please click here (http://www.drexel.com/online-degrees/nursing-degrees/cert-pm-apmhpnp/international.aspx) to view additional requirements.
- Once the student is accepted into the program, a GAP analysis may be completed to determine credit eligibility for previously faculty supervised clinical hours. Note: The Gap Analysis is not mandatory for acceptance into the program. If the prospective student chooses to have a Gap Analysis completed, it is performed after confirmed admissions.
- A personal interview may be required (online or telephone options will be available).

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 548</td>
<td>Advanced Pathophysiology</td>
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<tr>
<td>NURS 549</td>
<td>Advanced Pharmacology</td>
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<tr>
<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
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Concentration Courses

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<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>NURS 534</td>
<td>FNP I: Primary Care of the Emerging Family</td>
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<tr>
<td>NURS 535</td>
<td>FNP II: Primary and Episodic Care of Infants, Children and Adolescents</td>
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<tr>
<td>NURS 536</td>
<td>FNP III: Primary Care of Adults and Older Adults Across the Adult Age Spectrum I</td>
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<td>NURS 537</td>
<td>FNP IV: Primary Care of Adults and Older Adults Across the Adult Age Spectrum II</td>
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<tr>
<td>NURS 538</td>
<td>FNP V: Integrative Practicum in Family Practice Across the Lifespan</td>
<td>4.0</td>
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<tr>
<td>NURS 556</td>
<td>Pharmacology for Family Nurse Practitioners</td>
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<tr>
<td>NURS 664</td>
<td>Professional Issues for Nurse Practitioners</td>
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Total Credits 38.0

Sample Plan of Study

First Year

Term 1

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<tr>
<th>Course</th>
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<tbody>
<tr>
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<td>NURS 549</td>
<td>Advanced Pharmacology</td>
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<td>NURS 664</td>
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Term Credits 7.0

Term 2

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<td>NURS 556</td>
<td>Pharmacology for Family Nurse Practitioners</td>
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Term Credits 3.0

Term 3
Human Trafficking is an issue of academic and professional importance. A number of organizations, academic and otherwise, are taking the initiative to provide students, service providers, and those working in this area, with a variety of trainings, some of which are general and others more specific to the participants’ professional backgrounds and needs. Aside from law enforcement and social service disciplines, the medical and healthcare fields are incorporating a variety of courses and trainings into their curriculum, particularly those with an interest in service learning and social justice issues.

This certificate, which consists of three courses, will provide students with the knowledge and foundation regarding the who, what, when, where, why and how of human trafficking, the role they can play in identifying and supporting victims and what they can do to combat this growing and global phenomenon.

Issues in Human Trafficking Certificate

Certificate Level: Graduate
Admission Requirements: Bachelor’s degree
Certificate Type: Graduate
Number of Credits to Completion: 9.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 34.0199
Standard Occupational Classification (SOC) Code: 21.1019

Human Trafficking is an issue of academic and professional importance. A number of organizations, academic and otherwise, are taking the initiative to provide students, service providers, and those working in this area, with a variety of trainings, some of which are general and others more specific to the participants’ professional backgrounds and needs. Aside from law enforcement and social service disciplines, the medical and healthcare fields are incorporating a variety of courses and trainings into their curriculum, particularly those with an interest in service learning and social justice issues.

This certificate, which consists of three courses, will provide students with the knowledge and foundation regarding the who, what, when, where, why and how of human trafficking, the role they can play in identifying and supporting victims and what they can do to combat this growing and global phenomenon.

Admission Requirements

- Bachelor’s degree from a fully accredited program.
- 3.0 GPA or above on all previous coursework or last 60 credits completed.
- Official transcripts from all previous educational institutions required.
- Personal statement describing interest in certificate program.
- Curriculum Vitae or Resume.
- One professional letter of recommendation.

International applicants, as well as immigrants to the United States and US permanent residents whose native language is not English and who have not received a bachelor’s degree or higher in the US, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If the TOEFLiBT exam is taken, a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher must be obtained.
- If the TOEFL is taken, a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher must be obtained.

Program Requirements

Required Courses

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<th>Course</th>
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<tr>
<td>IPS 545</td>
<td>Introduction to Human Trafficking</td>
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<tr>
<td>IPS 546</td>
<td>Psychosocial Dimensions of Human Trafficking</td>
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<td>IPS 547</td>
<td>Human Trafficking: Domestic and Global Trends</td>
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Additional Information

For more information about this program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu (fr53@drexel.edu)
267.359.5691

Additional information is also available on Drexel's College of Nursing and Health Professions Issues in Human Trafficking web page and on Drexel University Online's Issues in Human Trafficking web page

MSN "Bridge" Program

Bridge to the Master of Science in Nursing (MSN): 4.0 quarter credits (no degree awarded at this time)

MSN for Nurses with a Non-Nursing BA or BS

About the Program

Drexel University’s RN-MSN “bridge” program is available for nurses who have a bachelor’s degree in a field other than nursing and now wish to pursue an MSN degree. Applicants to this program must complete the
admission process to the MSN program and seek initial advisement from
the MSN program academic advisors. The bridge program is available
only to students applying for the MSN Advance Role programs. It is
not available for students wishing to pursue an MSN Nurse Practitioner
degree. To learn more about alternative pathways to becoming a nurse
practitioner, contact Ms. Amy Pelak or Mr. Redian Furxhiu (see contact
information below).

The graduate program department chair reviews the applicant’s file for
program eligibility and prerequisites are established on an individual
basis.

The “bridge” consists of one undergraduate course. Individuals with
extensive professional experience may request to waive the bridge
course. Contact Mr. Redian Furxhiu (rf53@drexel.edu) or Ms. Amy Pelak
Rothstein (ajp347@drexel.edu) for more information. The required “bridge
course” in the MSN Advance Role Track is NURS 330 [WI (p. 134)]
Research Basis of Nursing (4.0 quarter credits). This class is available
entirely online, is delivered in 10-week, quarter term session and includes
a required field experience. This course is offered in any given term, and
includes mandatory synchronous class meetings.

After successfully completing all requirements and admission to the MSN
program, students progress directly into graduate-level courses. (Note:
The BSN is not awarded in this program.)

Bridge to MSN Requirements

NURS 330 [WI Research Basis of Nursing (p. 134)] 4.0

See the College’s Nursing: MSN-Bridge Program (https://www.drexel.edu/
cnhp/academics/graduate/MSN-Bridge) web page for more details about
the program, and visit the Drexel University Online MSN Bridge Program
(http://www.drexel.com/online-degrees/nursing-degrees/rn-msn-bridge)
web page for information about the online delivery format.

Additional Information

For more information about MSN Advance Roles Track program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu (fr53@drexel.edu)
267.359.5691

Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu (ajp347@drexel.edu)
267.359.5692

About the Program

Note: Effective Fall Term 2015, students are no longer being accepted
into this program. This MSN program has been updated and revised and
is now offered as MSN in Nursing Innovation (p. 153).

The MSN in Innovation and Intra/Entrepreneurship in Advanced Nursing
Practice is designed for the graduate nursing student who seeks to re-
invent and innovate nursing practice in a variety of roles: as clinician,
educator, administrator, clinical scientist, or in the business of healthcare.
This is the first program of its kind in the nation for inquisitive, innovative
nurses who have ideas to improve and change healthcare delivery.

The program offers an entrepreneurial focus and curriculum flexibility to
support completion of a substantive capstone project that demonstrates
innovation and the extension of the creative boundaries in nursing
education, nursing administration, nursing practice or entrepreneurial
business.

This program:

- Gives students the ability to make ideas a reality
- Teaches students new skills to support changing ideas into reality
- Develops students as a creative and inventive nurses who can make
  meaningful and unique contributions to the healthcare industry
- Is right for students if their career objectives may not be met by a
  traditional graduate nursing curriculum or career path

Students may elect to use the 3 electives to obtain a post-baccalaureate
certificate in a specialty area of interest

- Forensic Trends and Issues in Contemporary Healthcare
- Leadership in Health Systems Management
- Nursing Education and Faculty Role
- Issues in Human Trafficking
- Substance Use Disorders Counseling
- Veterans’ Healthcare

Additional Information

For more information about this program, contact:

Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu (ajp347@drexel.edu)
267.359.5692

For information about the online delivery format of the new revised MSN
in Nursing Innovation program, visit the Drexel University Online MSN
in Nursing Innovation (http://www.drexel.com/online-degrees/nursing-
degrees/MSN-INNOV) web page.

Admission Requirements

- BSN from a program fully accredited by NLN and or CCNE.
- 3.0 or above on all previous coursework or the last 60 credits
  completed. Applications from RN’s with GPA < 3.0 may be considered
  on an individual basis.
- Official transcripts from all previous educational institutions are
  required.
- Two professional references required from colleagues or supervisors
  who can attest to the applicant’s knowledge, skill, and potential
  aptitude for graduate study.

MSN in Innovation and Intra/Entrepreneurship in Advanced Nursing Practice Concentration

Major: Nursing Education
Degree Awarded: Master of Science in Nursing (MSN)
Calendar Type: Quarter
Total Credit Hours: 46.0
Classification of Instructional Programs (CIP) code: 51.3801
Standard Occupational Classification (SOC) code: 29-1141
• Personal Statement describing why the student is interested in this MSN Degree, specifically indicating their idea for an innovative intra/entrepreneurial project/business.
• Curriculum Vitae or Resume
• Copy of Current US RN license required. Copies of any Advanced Practice Nursing Licensure and Certification Documents.
• While specific experience is not required for applicants to the track, previous related work experience may make an applicant more competitive.

International Students: International applicants must possess a BSN (or it’s equivalent) and current US RN license. International Applicants, as well as Immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor’s degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and show proficiency in English speaking as well as listening, writing and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

If you take the TOEFLiBT exam you are required to have a minimum combined score for the listening, writing and reading sections of 79 Plus a speaking section score of 26 or higher.

If you take the TOEFL, you are required to have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Additional Information
For more information about this program, contact:

Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu (fr53@drexel.edu)
267.359.5692

Degree Requirements

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<tr>
<th>MSN Core Courses</th>
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<tr>
<td>NURS 500</td>
<td>Confronting Issues in Contemporary Health Care Environments</td>
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<tr>
<td>NURS 502</td>
<td>Advanced Ethical Decision Making in Health Care</td>
<td>3.0</td>
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<tr>
<td>RSCH 503</td>
<td>Research Methods and Biostatistics</td>
<td>3.0</td>
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<td>RSCH 504</td>
<td>Evaluation and Translation of Health Research</td>
<td>3.0</td>
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<td>NURS 544</td>
<td>Quality and Safety in Healthcare</td>
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<tr>
<td>NURS 586</td>
<td>Innovation in Advanced Nursing Practice: Theory and Application</td>
<td>3.0</td>
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<td>NURS 587</td>
<td>Case Studies in Intra/Entrepreneurship and Innovation in Nursing</td>
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<th>Practicum/Capstone Projects</th>
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<tr>
<td>NURS 652</td>
<td>Innovation Capstone Project</td>
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<tr>
<td>NURS 564</td>
<td>The Business of Healthcare</td>
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<td>PROJ 501</td>
<td>Introduction to Project Management</td>
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<th>Electives (by advisement with track coordinator)</th>
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Total Credits 45.0-48.0

**Interdepartmental Faculty**

Kristen Altdoerffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

Susan M. Burke, PhD, RN, CPNP-BC (The Catholic University of America). Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Paul Thomas Clements, RN (University of Pennsylvania). Associate Clinical Professor. Forensic, child, adolescent and family mental health nursing.

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Frances H. Cornelius, PhD, MSN (Drexel University; Wayne State University) Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Diane DePew, DSN, RN (University of Alabama, Birmingham). Assistant Clinical Professor. Evaluation, competency, test development and item writing, continuing education, accreditation, educational design, leadership management.


H. Michael Dreher, PhD, RN, FAAN (Widener University). Professor. Sleep, sleep in HIV illness, practice knowledge development, legal issues in nursing education.

Alecia Schneider Fox, PhD (Candidate) (Widener University) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

Karyn Holt, PhD, RN, CNM (Georgetown University; Touro University) Director of Online Quality, CNHP, Division of Nursing. Associate Clinical Professor.

Jean S. MacFadyen, PhD, RN (University of Pennsylvania). Assistant Clinical Professor. Intra-Entrepreneurship in advance practice nursing, gerontology, leadership, transcultural nursing.

Kimberley McClellan, MSN, WHNP-BC, FNP-BC, CRNP (Drexel University). Assistant Clinical Professor. Nursing, women’s health, family practice.

Marylou K. McHugh, RN, EdD (Teachers College; Columbia University). Associate Clinical Professor. Nursing, contemporary nursing faculty track.

Kristen McLaughlin, MSN, RN, CPNP-PC (University of Pennsylvania). Assistant Clinical Professor. Pediatric nurse practitioner.

Cheryl Mele, MSN, CRNP (University of Pennsylvania). Assistant Clinical Professor. Pediatric critical care clinical specialist, pediatric nurse practitioner, acute-chronic and neonatal nurse practitioner.

Jally K. Miller, PhD, CRNP (Walden University). Clinical Professor. Adult-gerontology primary and acute care nurse practitioner, family nurse practitioner, advanced pathophysiology, advanced pharmacology.
### MSN in Nurse Anesthesia

**Major:** Nurse Anesthesia  
**Degree Awarded:** Master of Science in Nursing (MSN)  
**Calendar Type:** Quarter  
**Total Credit Hours:** 90.0  
**Classification of Instructional Programs (CIP) code:** 51.3804  
**Standard Occupational Classification (SOC) code:** 29.1151

### About the Program

The Master of Science in Nursing in nurse anesthesia is a 28-month, 90.0 quarter credit, full-time program. The program offers 18 theoretical nursing and research credits, a 15.0 quarter credit basic science component, a 31.0 quarter credits didactic anesthesia component and a 25.0 credit clinical component. Upon successful completion of the program's outcomes the student is awarded an MSN in nurse anesthesia and is eligible to take the national certification examination offered by the NBCRNA Council on Certification of Nurse Anesthetists.

The Nurse Anesthesia Program is accredited by the: Council on Accreditation of Nurse Anesthesia Educational Programs 222 South Prospect Avenue, Suite 304 Park Ridge, IL 60068 847.692.7050

**PMC in Nurse Anesthesia**

The College of Nursing and Health Professions also offers a post-master's certificate in nurse anesthesia (p. 196) option. Upon successful completion of the program's outcomes the student is awarded a certificate in nurse anesthesia and is eligible to take the national certification examination offered by the NBCRNA Council on Certification of Nurse Anesthetists.

### Additional Information

For more information, contact the Academic Advisor of the Nurse Anesthesia Program:  
**MSN Programs Academic Advisor**  
1601 Cherry St.  
267.359.5786

Additional information is also available on Drexel's College of Nursing and Health Professions Nurse Anesthesia Program (https://www.drexel.edu/cnhp/academics/graduate/MSN-Nursing-Nurse-Anesthesia) web page.

### Admission Requirements

The nurse anesthesia program begins annually in January. Applications are reviewed continually. Applications should be made 12-18 months in advance of the anticipated January start date. Interviews are conducted throughout the year. Prospective applicants must demonstrate their ability to pursue graduate work, as exemplified by high scholastic achievement, high aptitude-test scores, and letters of recommendation. Applicants for the nurse anesthesia programs may submit scores from the Miller Analogies Test (MAT) in lieu of the GRE.

For detailed admission requirements, visit the College's MSN in Nurse Anesthesia Admission Requirements (http://www.drexel.edu/gradnursing/msn/nurseAnesthesia/admissions) web page.
An application form and additional requirements and deadline information is available on the the Nurse Anesthesia (http://www.drexel.edu/grad/programs/cnhp/nurse-anesthesia) page of Drexel Admissions website.

## Degree Requirements

### MSN Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 500</td>
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<td>3.0</td>
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</tr>
<tr>
<td>RSCH 504</td>
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### Nurse Anesthesia Core

<table>
<thead>
<tr>
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<th>Course Title</th>
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<tr>
<td>NURS 503</td>
<td>Basic Principles of Nurse Anesthesia</td>
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<tr>
<td>NURS 504</td>
<td>Overview of Nurse Anesthesia</td>
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<td>NURS 505</td>
<td>Chemistry and Physics</td>
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<tr>
<td>NURS 507</td>
<td>Nurse Anesthesia Pharmacology I</td>
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<td>NURS 510</td>
<td>Advanced Principles of Nurse Anesthesia I</td>
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<td>NURS 511</td>
<td>Nurse Anesthesia Pharmacology II</td>
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<td>NURS 515</td>
<td>Advanced Principles of Nurse Anesthesia II</td>
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<tr>
<td>NURS 518</td>
<td>Advanced Principles of Nurse Anesthesia III</td>
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<td>NURS 530</td>
<td>Anesthesia Seminar</td>
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<td>NURS 659</td>
<td>Advanced Principles of Nurse Anesthesia IV</td>
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<td>NURS 688</td>
<td>Clinical Correlative Seminars</td>
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<td>NURS 508</td>
<td>Nurse Anesthesia Clinical Practicum I</td>
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<tr>
<td>NURS 512</td>
<td>Nurse Anesthesia Clinical Practicum II</td>
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<td>NURS 516</td>
<td>Nurse Anesthesia Clinical Practicum III</td>
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<td>Nurse Anesthesia Clinical Practicum IV</td>
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<td>NURS 683</td>
<td>Nurse Anesthesia Clinical Practicum V</td>
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<td>NURS 684</td>
<td>Nurse Anesthesia Clinical Practicum VI</td>
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<td>NURS 687</td>
<td>Clinical Residency I</td>
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<td>NURS 689</td>
<td>Clinical Residency II</td>
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### Physiological Science Courses

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<th>Course Code</th>
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<tbody>
<tr>
<td>NURS 520</td>
<td>Advanced Physiology</td>
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</tr>
<tr>
<td>NURS 521</td>
<td>Advanced Pathophysiology I</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 522</td>
<td>Advanced Pathophysiology II</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 523</td>
<td>Advanced Pathophysiology III</td>
<td>3.0</td>
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</tbody>
</table>

**Total Credits: 90.0**

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### Interdepartmental Faculty

**Lew Bennett, CRNA, MSN (Temple University) Chair, Nurse Anesthesia Department.** Assistant Clinical Professor. Clinical and didactic education of nurse anesthesia students.

**Ferne Cohen, CRNA, EdD (Drexel University) Associate Chair, Nurse Anesthesia Department.** Assistant Clinical Professor. Clinical and didactic education of nurse anesthesia students.

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**MSN: Nursing Leadership in Health Systems Management Concentration**

Major: Nursing Leadership in Health Systems Management
Degree Awarded: Master of Science in Nursing (MSN)
Calendar Type: Quarter
Total Credit Hours: 48.0
Classification of Instructional Programs (CIP) code: 51.3801
Standard Occupational Classification (SOC) code: 29-1141

### About the Program

The MSN in Nursing Leadership in Health Systems Management program, designed for part-time attendance by working nurses, prepares students to become nursing leaders in today’s rapidly changing health care environment. This online master's degree program will prepare students for a senior role in a fast-changing, increasingly demanding healthcare environment.

The MSN program focuses on the development of a leadership style and the skill set essential for individuals in or seeking administrative roles, including:

- fiscal and organizational management,
- strategic planning,
- integrated quality outcomes measurement,
- organizational structures,
- marketing, and
- management of human resources within organizations.

The program also provides the student with information and strategies to problem solve, make decisions, resolve conflict, address legal/ethical issues and operationalize the mission and goals of the health care delivery organization.

Coursework for the MSN program can be completed online. The MSN also requires two terms of practicum.

The program is fully accredited by the Commission on Collegiate Nursing Education (CCNE).

### Additional Information

For more information about this program, contact:

Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu (fr53@drexel.edu)
267.359.5692

Additional information is also available on the Drexel's College of Nursing and Health Professions Nursing Leadership in Health Systems Management (https://www.drexel.edu/cnhp/academics/graduate/MSN-Nursing-Leadership-in-Health-Systems-Management) web page and Drexel University Online's Nursing Leadership in Health Systems Management (http://www.drexel.com/online-degrees/nursing-degrees/msn-lead) web page.
Admission Requirements

- BSN from a program fully accredited by NLN and or CCNE.
- 3.0 or above on all previous coursework or the last 60 credits completed. Applications from RN’s with GPA < 3.0 may be considered on an individual basis.
- Official transcripts from all previous educational institutions are required.
- Two professional references required from colleagues or supervisors who can attest to the applicant’s knowledge, skill, and potential aptitude for graduate study.
- Personal Statement describing why the student is interested in this MSN Degree, specifically indicating their idea for an innovative intra/entrepreneurial project/business.
- Curriculum Vitae or Resume
- While specific experience is not required for applicants to the track, previous related work experience may make an applicant more competitive.

International Students: International applicants must possess a BSN (or it’s equivalent) and current US RN license. International Applicants, as well as Immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor’s degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and show proficiency in English speaking as well as listening, writing and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

If you take the TOEFL exam you are required to have a minimum combined score for the listening, writing and reading sections of 79 Plus a speaking section score of 26 or higher.

If you take the TOEFL, you are required to have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Degree Requirements

The content addresses the four key areas of organizations: leading the human side of the enterprise, managing resources, managing operations, and managing information. Two threads are incorporated throughout all courses: the importance of professional image in written and live presentations and the use of technology to support and enhance management and care delivery outcomes.

MSN Core Courses

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Support Course

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<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>INFO 526</td>
<td>Information, Innovation &amp; Technology in Advanced</td>
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<tr>
<td>or NURS 553</td>
<td>Nursing Practice</td>
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or Data Analysis for Decision-Making in HC Management

Elective

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>NURS 557</td>
<td>Leadership and Stewardship in the Health Professions</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 558</td>
<td>Economics of Healthcare Management &amp; Policy</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 547</td>
<td>Communication and Self-Awareness for Leading and Managing in Healthcare</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 564</td>
<td>The Business of Healthcare</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 562</td>
<td>Workforce Management in Healthcare Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 559</td>
<td>Operations Management in Contemporary Healthcare Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 567</td>
<td>Strategic Management: Power, Politics and Influence in Healthcare Systems</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Additional Information

For more information about this program, contact:

Ms. Amy Pelak Rothstein
Student Services Manager
alp347@drexel.edu (fr53@drexel.edu)
267.359.5692

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Interdepartmental Faculty

Kristen Aldoerffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

Susan M. Burke, PhD, RN, CPNP-BC (The Catholic University of America). Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

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Frances H. Cornelius, PhD, MSN (Drexel University; Wayne State University) Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Diane DePew, DSN, RN (University of Alabama, Birmingham). Assistant Clinical Professor. Evaluation, competency, test development and
About the Program

One of the major healthcare challenges of the 21st century will include the delivery of quality, comprehensive, cost effective care for a rapidly increasing number of older adults. With the elderly population in the U.S. expected to double, if not triple, by 2030 it is imperative that there is an educated workforce of health professionals able to deliver high-quality care; advance practice nursing; medical-surgical, critical care, and neonatal intensive care; distance learning; leadership management; health policy.

Bobbie Posmontier, PhD, CNM, PMHNP-BC (University of Pennsylvania). Assistant Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Alice Marie Poyss, PhD, MSN (University of Pennsylvania). Associate Clinical Professor. Nursing intervention/outcome studies and nursing treatment/outcome studies; program evaluation, and effects of alternate teaching styles with student learning.

Elizabeth Tomaszewski, DNP, CCRN, CRNP, ACNP-BC, ACNPC (Chatham University). Assistant Clinical Professor. Critical care; end of life care; advance practice nursing.

Regina Willard, MSN, RN (Drexel University). Assistant Clinical Professor. Nursing, cardiology, acute care nurse practitioner.

Linda Wilson, PhD, RN, CPAN, CAPA, BC, CNE, CHSE (Rutgers University) Assistant Dean for Special Projects, Simulation & CNE Accreditation. Associate Clinical Professor. Simulation informatics and technology, perianesthesia, pain management, critical care, trauma, emergency preparedness.

Janet Zimmerman, MSN, BSN (University of Colorado). Assistant Clinical Professor. Clinical trials, nursing care of veterans.

Patti Rager Zuzelo, EdD, RN, ACNS-BC, ANP-BC, FAAN (Widener University). Clinical Professor. Advanced practice nursing, leadership, management, nursing education, clinical nurse specialist (adult health) and adult nurse practitioner.
health conditions. The AGPC is specifically trained to focus on health and wellness, disease prevention, and quality of life in the aging population. The purpose of our AGPC program is to educate and prepare competent and compassionate AGPC graduates to provide comprehensive, quality and cost effective care founded in evidence-based practice to adults across the lifespan on the continuum of health and illness.

All graduates will be eligible to sit for the ANCC Adult Gerontology Primary Care Nurse Practitioner Board Certification examination.

Admission Requirements

• A baccalaureate degree with a major in nursing from a National League of Nursing–accredited program.
• A GPA of 3.0 or above on all previous coursework or 3.25 or above on the last 60 credits of the BSN is required.
• Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing your application will be delayed until you have submitted the remaining transcripts.
• A copy of your current, unrestricted United States RN license/s or eligibility for licensure as a registered nurse. License verification from your nursing license registry website is acceptable.
• Resume or CV (Note: Resume/CV should be detailed regarding work experience, including specific job experiences, responsibilities, and departments).
• Two professional letters of recommendation.
• Personal statement (under 1,000 words) that will give the admissions committee a better understanding of:
  • Why you are choosing this particular program of study,
  • Your plans upon completion of the graduate degree, and
  • How your current work experience will enhance your experience in this MSN program.
• A personal interview by phone or in person may be required.
• International Students: View additional requirements (http://www.drexel.com/online-degrees/nursing-degrees/womenshealthnp/international.aspx) for international students.

Degree Requirements

Core Courses

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<td>NURS 549</td>
<td>Advanced Pharmacology</td>
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<tr>
<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
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<tr>
<td>NURS 641</td>
<td>Advanced Pharmacology for Adult-Gerontology Primary Care Nurse Practitioners</td>
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<td>NURS 664</td>
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Clinical Courses

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<td>NURS 660</td>
<td>Adult-Gero Primary Care I: Introduction to Adult-Gero Primary Care and Care of the Young-Adult</td>
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<td>NURS 661</td>
<td>Adult-Gerontology Primary Care II: Management and Care of Adult Patients in Primary Care</td>
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<tr>
<td>NURS 662</td>
<td>Adult-Gerontology Primary Care III: Management and Care of the Older-Adult Patient in Primary Care</td>
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<tr>
<td>NURS 663</td>
<td>Adult-Gerontology Primary Care IV: Gerontology Management and Care</td>
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</tbody>
</table>

Elective 3.0

Total Credits 52.0

Interdepartmental Faculty

Kristen Altadoerffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

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Marylou K. McHugh, RN, EdD (Teachers College; Columbia University). Associate Clinical Professor. Nursing, contemporary nursing faculty track.

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Cheryl Mele, MSN, CRNP (University of Pennsylvania). Assistant Clinical Professor. Pediatric critical care clinical specialist, pediatric nurse practitioner, acute-chronic and neonatal nurse practitioner.

Sally K. Miller, PhD, CRNP (Walden University). Clinical Professor. Adult-gerontology primary and acute care nurse practitioner, family nurse practitioner, advanced pathophysiology, advanced pharmacology.

Kymberlee Montgomery, DrNP, CRNP (Drexel University) Chair, NP Programs. Assistant Clinical Professor. Medicine, women's health nurse practitioner, education, interprofessional education.

Dana Murphy-Parker, MS, CRNP, PMHNP-BC (University of Colorado) Track Director, Psychiatric Nurse Practitioner Program. Assistant Clinical Professor.

Louise G. Murray, MSN, CRNP, FNP-BC (Drexel University). Assistant Clinical Professor. Family nurse practitioner.

Jennifer Olszewski, MSN CRNP (LaSalle University) Director of the Adult-Gerontology Primary Nurse Practitioner Program. Assistant Clinical Professor. Critical care, patient safety, interdisciplinary education

Alis Kotler Panzera, DrNP, WHNP-BC, RN (Drexel University). Assistant Clinical Professor. Nursing, women’s health nurse practitioner.

Carol M. Patton, PhD, RN, FNP-BC, CRNP, CNE (University of Pittsburgh School of Public Health)). Associate Clinical Professor. Family nurse practitioner; health promotion/disease prevention across the life span, primary, secondary and tertiary health promotion across the lifespan; health outcomes, health policy, ethics, quality and safety initiatives, QSEN, high reliability organizations.

Cheryl Portwood, MSN, RN, CNAA-BC (University of Pennsylvania). Clinical Assistant Professor. Medical-surgical, critical care, and neonatal intensive care; distance learning; leadership management; health policy.

Bobbie Posmontier, PhD, CNM, PMHNP-BC (University of Pennsylvania). Assistant Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Alice Marie Poyss, PhD, MSN (University of Pennsylvania). Associate Clinical Professor. Nursing intervention/outcome studies and nursing treatment/outcome studies; program evaluation, and effects of alternate teaching styles with student learning.

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AtNena Tucker, DNP, FNP-BC (University of South Alabama). Assistant Clinical Professor. Research in emergency medicine, critical care, health care administration.

Regina Willard, MSN, RN (Drexel University). Assistant Clinical Professor. Nursing, cardiology, acute care nurse practitioner.

Linda Wilson, PhD, RN, CPAN, CAPA, BC, CNE, CHSE (Rutgers University) Assistant Dean for Special Projects, Simulation & CNE

### MSN: Adult-Gerontology Acute Care Nurse Practitioner

**Major:** Nurse Practitioner, Adult-Gerontology Acute Care

**Degree Awarded:** Master of Science in Nursing (MSN)

**Calendar Type:** Quarter

**Total Credit Hours:** 57.0 quarter credits; 800 clinical hours

**Classification of Instructional Programs (CIP) code:** 51.3801

**Standard Occupational Classification (SOC) code:** 29-1171

### About the Program

The online Adult-Gerontology Acute Care Nurse Practitioner (AG-ACNP) program is designed to prepare practitioners for professional practice in the management of medical, surgical, and critical-care adult patient populations. Concurrent theory and clinical courses provide a knowledge base for the management of adult complex acute, critical, and chronic health care conditions. Clinical practicum rotations allow students to put the principles they have learned into practice in medical, surgical, and critical care settings. Upon completing the program, graduates pursue practice roles across the continuum of acute care services ranging from high-acute hospital based emergency or intensive care settings to specialty based practices. Graduates are eligible to sit for the ANCC’s Adult Gerontology Acute Care Nurse Practitioner Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. **Mandatory on-campus visits are essential to students transitioning into the NP role.** These mandatory on-campus visits occur during the following times:

- **2nd Year, Summer Term** – students come to campus during the first clinical course for the On-Campus Intensives (OCI).
- **3rd Year, Fall Term** – students come to campus during the second clinical course for 2-3 days for a standardized patient lab experience (SPL) and/or human patient simulation (HPS) experience, depending on the program.
- **3rd Year, Spring Term** – students come to campus during the fourth clinical course for the On-Campus Intensives (OCI).

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (https://www.drexel.edu/cnnp/academics/graduate/MSN-Nurse-Practitioner-Adult-Gerontology-Acute-Care) web page.

### Core Courses

<table>
<thead>
<tr>
<th>COURSE</th>
<th>DESCRIPTION</th>
<th>CREDITS</th>
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</thead>
<tbody>
<tr>
<td>NURS 500</td>
<td>Confronting Issues in Contemporary Health Care Environments</td>
<td>3.0</td>
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</tbody>
</table>
NURS 502 Advanced Ethical Decision Making in Health Care 3.0
NURS 544 Quality and Safety in Healthcare 3.0
RSCH 503 Research Methods and Biostatistics 3.0
RSCH 504 Evaluation and Translation of Health Research 3.0

Support Courses
NURS 548 Advanced Pathophysiology 3.0
NURS 549 Advanced Pharmacology 3.0
NURS 550 Advanced Clinical Assessment & Diagnostic Reasoning Across the Lifespan 4.0
NURS 554 Pharmacology for Adult-Gerontology Acute Care Nurse Practitioners 3.0
NURS 664 Professional Issues for Nurse Practitioners 1.0

Clinical Courses
NURS 570 Adult Gerontology Acute Care NP I: Introduction to Adult Gerontology Acute Care Medicine 5.0
NURS 571 Adult Gerontology Acute Care Nurse Practitioner II: Mgmt/Care of Patients in Acute/Crit Care Med Set 5.0
NURS 572 Adult Gerontology Acute Care Nurse Practitioner III: Mgmt/Care of Patients in Acute Surgical Setting 5.0
NURS 573 Adult Gerontology Acute Care NP IV: Management of Care of Patients in Critical Care Settings 5.0
NURS 580 Adult Gero Acute Care NP V: Mgmt/Care of Clients in Acute, Critical Care, Med or Surg Settings 5.0

Elective 3.0

Total Credits 57.0

Interdepartmental Faculty

Kristen Aldtoeffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

Susan M. Burke, PhD, RN, CPNP-BC (The Catholic University of America). Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Paul Thomas Clements, RN (University of Pennsylvania). Associate Clinical Professor. Forensic, child, adolescent and family mental health nursing.

Jennifer Coates, MSN, MBA, CRNP, BC (The University of Pennsylvania). Assistant Clinical Professor. Critical care nurse practitioner.

Frances H. Cornelius, PhD, MSN (Drexel University; Wayne State University) Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

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Marylou K. McHugh, RN, EdD (Teachers College; Columbia University). Associate Clinical Professor. Nursing, contemporary nursing faculty track.

Kristen McLaughlin, MSN, RN, CPNP-PC (University of Pennsylvania). Assistant Clinical Professor. Pediatric nurse practitioner.

Cheryl Mele, MSN, CRNP (University of Pennsylvania). Assistant Clinical Professor. Pediatric critical care clinical specialist, pediatric nurse practitioner, acute-chronic and neonatal nurse practitioner.

Sally K. Miller, PhD, CRNP (Walden University). Clinical Professor. Adult-gerontology primary and acute care nurse practitioner, family nurse practitioner, advanced pathophysiology, advanced pharmacology.

Kymberlee Montgomery, DrNP, CRNP (Drexel University) Chair, NP Programs. Assistant Clinical Professor. Medicine, women’s health nurse practitioner, education, interprofessional education.

Dana Murphy-Parker, MS, CRNP, PMHNP-BC (University of Colorado) Track Director, Psychiatric Nurse Practitioner Program. Assistant Clinical Professor.

Louise G. Murray, MSN, CRNP, FNP-BC (Drexel University). Assistant Clinical Professor. Family nurse practitioner.

Jennifer Olszewski, MSN CRNP (University of Pennsylvania). Clinical Assistant Professor. Critical care, patient safety, interdisciplinary education.

Alis Kotler Panzera, DrNP, WHNP-BC, RN (Drexel University). Assistant Clinical Professor. Nursing, women’s health nurse practitioner.

Carol M. Patton, PhD, RN, FNP-BC, CRNP, CNE (University of Pittsburgh School of Public Health). Associate Clinical Professor. Family nurse practitioner; health promotion/disease prevention across the life span, primary, secondary and tertiary health promotion across the lifespan; health outcomes, health policy, ethics, quality and safety initiatives, QSEN, high reliability organizations.

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Linda Wilson, PhD, RN, CPAN, CAPA, BC, CNE, CHSE (Rutgers University) Assistant Dean for Special Projects, Simulation & CNE Accreditation. Associate Clinical Professor. Simulation informatics and technology, perianesthesia, pain management, critical care, trauma, emergency preparedness.

Janet Zimmerman, MSN, BSN (University of Colorado). Assistant Clinical Professor. Clinical trials, nursing care of veterans.

Patti Rager Zuzelo, EdD, RN, ACNS-BC, ANP-BC, FAAN (Widener University). Clinical Professor. Advanced practice nursing, leadership and management, nursing education, clinical nurse specialist (adult health) and adult nurse practitioner.

**MSN: Clinical Nurse Leader Concentration**

*Major: Clinical Nurse Leader*

*Degree Awarded: Master of Science in Nursing (MSN)*

*Calendar Type: Quarter*

*Total Credit Hours: 48.0*

*Classification of Instructional Programs (CIP) code: 51.3801*

*Standard Occupational Classification (SOC) code: 29-1141*

**About the Program**

The MSN Clinical Nurse Leader program is designed to prepare nurses for an evolving advanced generalist role which incorporates advanced knowledge and skill, clinical expertise in an evidence-and-quality-driven context, accountability for outcomes of care, integration of health care services, and clinical leadership for the care of clients, who may be individuals or clinical populations such as those found on a clinical unit or in other settings. The program emphasizes the development of competencies related to the use of technology, evidence-based practice, customization of care, health team and interdisciplinary leadership, and outcome and risk assessment.

This online masters program prepares nurses for advanced clinical roles in a quickly-changing, increasingly complex clinical care environment. Students have the opportunity to develop advanced competencies and depth of knowledge as clinical nurse leaders in adult health. The program emphasizes evidence-based approaches to the solution of clinical problems, assessment of nursing and health care outcomes, clinical decision-making and the design of nursing care for clinical populations at the clinical unit or similar small system level, lateral care integration, and clinically-based leadership.

Clinical practicum experiences provide opportunities for students to deepen clinical skills and develop additional competencies for the management of clients' health care needs at the point-of-care. Precepted clinical experiences will include activities such as modeling of care, assessment and evaluation of aggregate patient outcomes, case management and service integration, unit and interdisciplinary team leadership, teaching and mentoring of staff.

In this as well as other MSN tracks, students build upon the MSN core courses and then move into support courses and specialized coursework. The curriculum also permits students to enroll part-time by spreading the required clinical hours over three terms.

The program is accredited by the Commission on Collegiate Nursing Education.

**Additional Information**

For more information about this program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu (rf53@drexel.edu)
267.359.5691

Additional information is also available on Drexel's College of Nursing and Health Professions MSN in Clinical Nurse Leader (https://www.drexel.edu/cnhp/academics/graduate/MSN-Clinical-Nurse-Leader) web page and on Drexel University Online MSN Clinical Nurse Leader (http://www.drexel.com/online-degrees/nursing-degrees/msn-clinical) web page.

**Degree Requirements**

**MSN Core Courses**

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<td>NURS 549</td>
<td>Advanced Pharmacology</td>
<td>3.0</td>
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<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
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<td>NURS 564</td>
<td>The Business of Healthcare</td>
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**Track Courses**

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<tr>
<td>NURS 531</td>
<td>Epidemiology in Action: Tracking Health &amp; Disease</td>
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</tr>
<tr>
<td>NURS 532</td>
<td>Evaluation of Health Outcomes</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 602</td>
<td>Foundations for Clinical Nurse Leader</td>
<td>4.0</td>
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<tr>
<td>NURS 603</td>
<td>Clinical Nurse Leader Capstone Immersion I</td>
<td>5.0</td>
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<tr>
<td>NURS 604</td>
<td>Clinical Nurse Leader Capstone Immersion II</td>
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</table>

**Total Credits**

48.0

**Additional Information**

For more information about this program, contact:

Mr. Redian Furxhiu
Admission Requirements

- BSN from a program fully accredited by NLN and or CCNE.
- 3.0 or above on all previous coursework or the last 60 credits completed. Applications from RN’s with GPA < 3.0 may be considered on an individual basis.
- Official transcripts from all previous educational institutions are required.
- Two professional references required from colleagues or supervisors who can attest to the applicant’s knowledge, skill, and potential aptitude for graduate study.
- Personal Statement describing why the student is interested in this MSN Degree, specifically indicating their idea for an innovative intra/entrepreneurial project/business.
- Curriculum Vitae or Resume
- While specific experience is not required for applicants to the track, previous related work experience may make an applicant more competitive.

International Students: International applicants must possess a BSN (or it’s equivalent) and current US RN license. International Applicants, as well as Immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor’s degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and show proficiency in English speaking as well as listening, writing, and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

If you take the TOEFLiBT exam you are required to have a minimum combined score for the listening, writing and reading sections of 79 Plus a speaking section score of 26 or higher.

If you take the TOEFL, you are required to have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

Interdepartmental Faculty

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Dana Murphy-Parker, MS, CRNP, PMHNP-BC (University of Colorado) Track Director, Psychiatric Nurse Practitioner Program. Assistant Clinical Professor.

Louise G. Murray, MSN, CRNP, FNP-BC (Drexel University). Assistant Clinical Professor. Family nurse practitioner.
Clinical Nurse Leader Post-Graduate Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Post-Master's Certificate
Number of Credits to Completion: 30.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible

About the Program

The Clinical Nurse Leader (CNL) oversees care coordination of a distinct group of patients, is a resources for clinical decision making, and serves as a lateral integrator of care. This clinical leader puts evidence-based practice into action to ensure that patients benefit from the latest innovations in care delivery. The CNL collects and evaluates patient outcomes, assesses cohort risk, and has the decision-making authority to change care plans when necessary. This clinician functions as part of an interdisciplinary team by communicating, planning, and implementing care directly with other health care professionals including physicians, pharmacists, social workers, therapists, clinical nurse specialists, and nurse practitioners. The CNL is a leader in the health care delivery system across all settings in which health care is delivered.

Students in this certificate program have the opportunity to learn about healthcare management, policy and quality improvement at the point of care with individuals seeking health care, while obtaining knowledge of healthcare systems, finance and economics. In addition, students will be given the opportunity to learn about advanced clinical assessment, pathophysiology, and advanced pharmacology, if not taken as part of their original MSN.

Students will also learn about designing and redesigning client care based on evidence-based knowledge and analysis of outcomes, as well as gain knowledge of healthcare reimbursement and issues in planning care across the lifespan, as well as the following:

- Application of tools for risk analysis
- Utilize epidemiological methodology to collect data and knowledge acquisition in planning community health promotion programs
- Manage, develop therapeutic partnerships
- Develop, monitor disease management programs promoting healthy lifestyles

Admission Requirements

- Masters degree (MSN) from a program fully accredited by NLN and/or CCNE
- Official transcripts from all previous educational institutions required
- Personal statement describing interest in certificate program and particular specialty
- Curriculum Vitae or resume
- GPA of 2.75 or above on all previous coursework or last 60.0 credits completed

International applicants, as well as immigrants to the United States and US permanent residents whose native language is not English and who have not received a bachelor's degree or higher in the United States, Australia, Canada, Ireland, New Zealand, or the United Kingdom, must show proficiency in English speaking as well as listening, writing, and reading. American citizens born on U.S. military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

- If you take the TOEFLiBT exam, you must have a minimum combined score for the listening, writing, and reading sections of 79 plus a speaking section score of 26 or higher.
• If you take the TOEFL, you must have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

The 3 P's (Advanced Pharm, Advanced Pathophysiology and Advanced Clinical Physical Assessment) may be waived if taken within 5 years.

NURS 531 Epidemiology in Action: Tracking Health & Disease 3.0
NURS 532 Evaluation of Health Outcomes 3.0
NURS 548 Advanced Pathophysiology 3.0
NURS 549 Advanced Pharmacology 3.0
NURS 550 Advanced Clinical Assessment & Diagnostic Reasoning Across the Lifespan 4.0
NURS 602 Foundations for Clinical Nurse Leader 4.0
NURS 603 Clinical Nurse Leader Capstone Immersion I 5.0
NURS 604 Clinical Nurse Leader Capstone Immersion II 5.0

Total Credits 30.0

Additional Information
For more information about this program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu
267.359.5691

Additional information is also available on Drexel's College of Nursing and Health Professions MSN in Clinical Nurse Leader (https://www.drexel.edu/cnhp/academics/graduate/MSN-Clinical-Nurse-Leader) web page and on Drexel University Online's MSN in Clinical Nurse Leader (http://www.drexel.com/online-degrees/nursing-degrees/msn-clinical) web page.

MSN: Clinical Trials Research Concentration

Major: Clinical Trials Research
Degree Awarded: Master of Science in Nursing (MSN)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 51.0719
Standard Occupational Classification (SOC) code: 11-9111

About the Program

The Online Clinical Trials Research Program is designed for nurses who wish to be involved in clinical trials and research in a variety of roles and settings. Graduates of this program will be qualified to assume roles such as research coordinator, clinical scientist, developer and clinical trials manager or coordinator.

The program provides knowledge and skills in several critical areas:
• Applying Federal Drug Administration rules and regulations
• Phases of clinical research investigation
• New drug-approval processes
• Drug protocol development
• Budgeting for clinical trials
• Informed consent

• Patient and family issues
• Business management and marketing for clinical trials.

Many potential employers exist outside the hospital environment — in the community or private practices and with the pharmaceutical and other scientific companies that produce, test, and market new products. The clinical trials field is a hot field for nursing employment — especially seasoned nurses who have expertise in one or more clinical areas.

Admission Requirements

• BSN from a program fully accredited by NLN and or CCNE.
• 3.0 or above on all previous coursework or the last 60 credits completed. Applications from RN’s with GPA < 3.0 may be considered on an individual basis.
• Official transcripts from all previous educational institutions are required.
• Two professional references required from colleagues or supervisors who can attest to the applicant’s knowledge, skill, and potential aptitude for graduate study.
• Personal Statement describing why the student is interested in this MSN Degree, specifically indicating their idea for an innovative intra/entrepreneurial project/business.
• Curriculum Vitae or Resume
• Copy of Current US RN license required. Copies of any Advanced Practice Nursing Licensure and Certification Documents.
• While specific experience is not required for applicants to the track, previous related work experience may make an applicant more competitive.

International Students: International applicants must possess a BSN (or it's equivalent) and current US RN license. International Applicants, as well as Immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor’s degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and show proficiency in English speaking as well as listening, writing and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

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Degree Requirements

The curriculum is based on the following principles:

- All areas of specialization have in common a core of advanced nursing knowledge.
- Every graduate must have knowledge and skill in research and the ability to evaluate and apply research findings.
- The nursing profession anticipates and responds to changing societal, health care and professional needs.
- The foundation for specialization in professional nursing practice is graduate-level education that builds on undergraduate education.

Core Courses

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Major Courses

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<tbody>
<tr>
<td>NURS 582</td>
<td>Foundation of Good Clinical Practice in Clinical Trials Mngmt</td>
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<tr>
<td>NURS 583</td>
<td>Operational Leadership in Clinical Trials Management</td>
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</tr>
<tr>
<td>NURS 584</td>
<td>Current Topics in Clinical Trials</td>
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</tr>
<tr>
<td>NURS 585</td>
<td>Clinical Trials Research Practicum</td>
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<table>
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<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
</table>

Total Credits 45.0

Additional Information

For more information about this program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu (rf53@drexel.edu)
267.359.5691

Additional information is also available on Drexel’s College of Nursing and Health Professions MSN in Clinical Trials Research (https://www.drexel.edu/cnhp/academics/graduate/MSN-Clinical-Trials-Research) web page and on Drexel University Online’s MSN in Clinical Trials Research (http://www.drexel.com/online-degrees/nursing-degrees/msn-trials) web page.

Interdepartmental Faculty

Kristen Altdorffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

Susan M. Burke, PhD, RN, CPNP-BC (The Catholic University of America). Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

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Sally K. Miller, PhD, CRNP (Walden University). Clinical Professor. Adult-gerontology primary and acute care nurse practitioner, family nurse practitioner, advanced pathophysiology, advanced pharmacology.
Certificate in Nursing Innovation

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.3801
Standard Occupational Classification (SOC) Code: 29.1141

This Nursing Innovation Certificate program is for individuals who want to understand the theories of innovation, examine some successful and failed innovations, as well as learn what it takes to be a successful intra/entrepreneur. This program is ideal for the student who seeks to re-invent and innovate in nursing practice in a variety of roles, as clinician, educator, administrator, clinical scientist, or in the business environment of healthcare. This certificate is available for individuals that hold a Bachelor’s degree.

This program provides a five-course grouping of classes focusing on re-inventing and promoting innovative nursing practice in a variety of roles, as clinician, educator, administrator, clinical scientist or in the business environment of healthcare. Courses are chosen from the MSN in Nursing Innovation. It is designed to emphasize entrepreneurial and intrapreneurial approaches to advanced nursing practice.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>NURS 564</td>
<td>The Business of Healthcare</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 586</td>
<td>Innovation in Advanced Nursing Practice: Theory and Application</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 587</td>
<td>Case Studies in Intra/Entrepreneurship and Innovation in Nursing</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 652</td>
<td>Innovation Capstone Project</td>
<td>6.0</td>
</tr>
<tr>
<td>PROJ 501</td>
<td>Introduction to Project Management</td>
<td>3.0</td>
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Total Credits: 18.0

MSN: Family/Individual Across the Lifespan Nurse Practitioner

Major: Nursing, Family/Individual Across the Lifespan
Degree Awarded: Master of Science in Nursing (MSN)
Calendar Type: Quarter
Total Credit Hours: 56.0 quarter credits; 720 clinical hours
Classification of Instructional (CIP) code: 51.3801
Standard Occupational Classification (SOC) code: 29-1171

About the Program

The Family/Individual Across the Lifespan Nurse Practitioner (FNP) online program focuses on the application of advanced-practice nursing knowledge—including physical, psychosocial, and environmental assessment skills—to manage common health and illness problems of clients of all ages and their families. It emphasizes health promotion and disease prevention. Family nurse practitioners primarily practice in ambulatory-care settings, such as primary care clinics, physician offices, HMOs, outpatient clinics, schools, nursing centers, emergency departments, long-term care facilities, industry, the armed services, public
health departments, correctional institutions, and home health agencies. Graduates of the program are eligible to sit for the ANCC’s Family Nurse Practitioner Examination and/or the AANP’s Family Nurse Practitioner Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Mandatory on-campus visits are essential to students transitioning into the NP role. The NP programs provide two on-campus clinical orientations to prepare students for clinical practice rotation. Following clinical orientation, these mandatory on-campus visits occur during the following times:

- 2nd Year, Summer Term – students come to campus during the first clinical course for the On-Campus Intensives.
- 3rd Year, Fall Term – students come to campus during the second clinical course for 2-3 days for a standardized patient lab experience (SPL) and/or human patient simulation experience (HPS).
- 3rd Year, Winter Term – students come to campus during the third clinical course for 2-3 days for a second standardized patient lab experience (SPL) and/or human patient simulation experience (HPS).
- 3rd Year, Spring Term – students come to campus during the fourth clinical course for the On-Campus Intensives.

For more information about this program, visit Drexel’s MSN Nurse Practitioner Programs (https://www.drexel.edu/cnhp/academics/graduate/MSN-Nurse-Practitioner-Family-Individual-Across-Lifespan) web page.

## Degree Requirements

**Master of Science in Nursing (MSN):** 56.0 quarter credits; 720 clinical hours

**MSN - Family/Individual Across the Lifespan Nurse Practitioner Track**

### Core Courses

<table>
<thead>
<tr>
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<tbody>
<tr>
<td>NURS 500</td>
<td>Confronting Issues in Contemporary Health Care Environments</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 502</td>
<td>Advanced Ethical Decision Making in Health Care</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 544</td>
<td>Quality and Safety in Healthcare</td>
<td>3.0</td>
</tr>
<tr>
<td>RSCH 503</td>
<td>Research Methods and Biostatistics</td>
<td>3.0</td>
</tr>
<tr>
<td>RSCH 504</td>
<td>Evaluation and Translation of Health Research</td>
<td>3.0</td>
</tr>
</tbody>
</table>

### Support Courses

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>NURS 548</td>
<td>Advanced Pathophysiology</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 549</td>
<td>Advanced Pharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
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<tr>
<td>NURS 556</td>
<td>Pharmacology for Family Nurse Practitioners</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 664</td>
<td>Professional Issues for Nurse Practitioners</td>
<td>1.0</td>
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### Clinical Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>NURS 534</td>
<td>FNP I: Primary Care of the Emerging Family</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 535</td>
<td>FNP II: Primary and Episodic Care of Infants, Children and Adolescents</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 536</td>
<td>FNP III: Primary Care of Adults and Older Adults Across the Adult Age Spectrum I</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 537</td>
<td>FNP IV: Primary Care of Adults and Older Adults Across the Adult Age Spectrum II</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 538</td>
<td>FNP V: Integrative Practicum in Family Practice Across the Lifespan</td>
<td>4.0</td>
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</tbody>
</table>

### Elective

<table>
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<tr>
<th>Title</th>
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<tbody>
<tr>
<td></td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits**

56.0

## Interdepartmental Faculty

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Kymberlee Montgomery, DrNP, CRNP (Drexel University) Chair, NP Programs. Assistant Clinical Professor. Medicine, women's health nurse practitioner, education, interprofessional education.

Dana Murphy-Parker, MS, CRNP, PMHNP-BC (University of Colorado) Track Director, Psychiatric Nurse Practitioner Program. Assistant Clinical Professor.

Louise G. Murray, MSN, CRNP, FNP-BC (Drexel University). Assistant Clinical Professor. Family nurse practitioner.

Jennifer Olszewski, MSN CRNP (LaSalle University) Director of the Adult-Gerontology Primary Nurse Practitioner Program. Assistant Clinical Professor. Critical care, patient safety, interdisciplinary education

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Patti Rager Zuzelo, EdD, RN, ACNS-BC, ANP-BC, FAAN (Widener University). Clinical Professor. Advanced practice nursing, leadership and management, nursing education, clinical nurse specialist (adult health) and adult nurse practitioner.

**MSN: Nursing Education Concentration**

**Major: Nursing Education**

**Degree Awarded:** Master of Science in Nursing (MSN)

**Calendar Type:** Quarter

**Total Credit Hours:** 46.0

**Classification of Instructional Programs (CIP) code:** 51.3817

**Standard Occupational Classification (SOC) code:** 25-1072

**About the Program**

The MSN in Nursing Education program prepares students to work as nursing educators, nursing faculty, or nursing professors in all types of programs, at all levels, in a variety of settings. This program has a special focus on preparing students with the required competencies to be successful on the new certified nursing educator exam. With such a severe and critical nursing faculty shortage in the United States (and even globally)—this program provides students with cutting-edge content essential for today’s contemporary nurse educator.

The program integrates theories specific to adult learning, curriculum design and evaluation of courses and programs, critical thinking, both clinical and classroom techniques, and the preparation for the role of the nursing professor. The program also includes opportunities to explore contemporary and leading-edge educational modalities. Knowledge and skills gained through this program are applicable in a variety of settings.

This unique program even instructs students on how to teach online and use technology to teach nursing in innovative ways. The culminating practicum, which runs over two terms, provides students with opportunities to put what has been learned into practice. Participants complete a role practicum experience in teaching, providing ample opportunity to apply theory to practice. In addition, students are required to attend an immersive on-campus simulation residency when taking Practicum. The residency hours will count as part of the required 160 total practicum hours (24 practicum hours earned). The residency is offered biannually in January or July.

**Additional Information**

For more information about this program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu
267.359.5691

Additional information is also available on Drexel's College of Nursing and Health Professions MSN in Nursing Education (https://www.drexel.edu/cnhp/academics/graduate/MSN-Nursing-Education-Faculty-Role) web page and on Drexel University Online's MSN in Nursing Education (http://www.drexel.com/online-degrees/nursing-degrees/msn-ed) web page.

**Admission Requirements**

- BSN from a program fully accredited by NLN and or CCNE.
- 3.0 or above on all previous coursework or the last 60 credits completed. Applications from RN’s with GPA < 3.0 may be considered on an individual basis.
International Students: International applicants must possess a BSN (or its equivalent) and current US RN license. International Applicants, as well as Immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor's degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and show proficiency in English speaking as well as listening, writing and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

If you take the TOEFLIBT exam you are required to have a minimum combined score for the listening, writing and reading sections of 79 Plus a speaking section score of 26 or higher.

If you take the TOEFL, you are required to have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

### Degree Requirements

#### About the Curriculum
The program integrates theories specific to adult learning, curriculum design and evaluation of courses and programs. It combines theory, research and practice from the disciplines of education, management and leadership. Knowledge and skills gained through this program are applicable in a variety of settings in both the academic and clinical arenas.

Please note: NURS 632 runs over two quarters.

#### Required Courses

<table>
<thead>
<tr>
<th>Core Courses</th>
<th>Support Courses</th>
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<tbody>
<tr>
<td>NURS 532 Information, Innovation &amp; Technology in Advanced Nursing Practice</td>
<td>NURS 542 Advanced Pathophysiology</td>
</tr>
<tr>
<td>or NURS 544 Quality and Safety in Healthcare</td>
<td>NURS 549 Advanced Pharmacology</td>
</tr>
<tr>
<td>NURS 550 Confronting Issues in Contemporary Health Care Environments</td>
<td>NURS 550 Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
</tr>
<tr>
<td>NURS 502 Advanced Ethical Decision Making in Health Care</td>
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<tr>
<td>RSCH 503 Research Methods and Biostatistics</td>
<td></td>
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<td>RSCH 504 Evaluation and Translation of Health Research</td>
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**Total Credits: 46.0**

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MSN: Nursing Innovation Concentration

Major: Nursing Innovation
Degree Awarded: Master of Science in Nursing (MSN)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 51.3801
Standard Occupational Classification (SOC) code: 29-1141

About the Program

The online MSN in Nursing Innovation is designed for the graduate nursing student who seeks to re-invent and transform the nursing practice in today’s tumultuous health care system. Graduates of this accredited program fill innovative and problem-solving roles as clinicians, educators, administrators and clinical scientists; some students choose to move toward and succeed in the business environment of healthcare.

This pioneering master’s degree emphasizes problem-solving and creative approaches to advance nursing practice, improve and change healthcare delivery and focuses on models, methods, environments and processes that will give students the tools to transform ideas into reality. It offers a flexible, but rigorous, curriculum, including a substantial capstone project that demonstrates innovation and pushing the creative boundaries to promote real and substantive change.

This program:

- Gives students the ability to make ideas a reality
- Teaches students new skills to support changing ideas into reality
- Develops students as a creative and inventive nurses who can make meaningful and unique contributions to the healthcare industry
- Is right for students if their career objectives may not be met by a traditional graduate nursing curriculum or career path

Students may elect to use the 4-5 electives to obtain a post-baccalaureate certificate in a specialty area of interest including but not limited to the list
below. Or may, with approval, design an individualized plan of study to meet the program requirements.

- Forensic Trends and Issues in Contemporary Healthcare
- Leadership in Health Systems Management
- Nursing Education and Faculty Role
- Issues in Human Trafficking
- Substance Use Disorders Counseling
- Veterans' Healthcare
- Project Management
- Healthcare Informatics

**Additional Information**

For more information about this program, contact:

Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu  (fr53@drexel.edu)
267.359.5692

Additional information is also available on the Drexel’s College of Nursing and Health Professions Nursing Innovation (https://www.drexel.edu/cnhp/academics/graduate/MSN-Innovation-and-Intra-Entrepreneurship-Nursing-Practice) web page and Drexel University Online’s Nursing (http://www.drexel.com/online-degrees/nursing-degrees/msn-lead) Innovation (http://www.drexel.com/online-degrees/nursing-degrees/msn-innov) web page.

**Admission Requirements**

- BSN from a program fully accredited by NLN and or CCNE.
- 3.0 or above on all previous coursework or the last 60 credits completed. Applications from RN’s with GPA < 3.0 may be considered on an individual basis.
- Official transcripts from all previous educational institutions are required.
- Two professional references required from colleagues or supervisors who can attest to the applicant’s knowledge, skill, and potential aptitude for graduate study.
- Personal Statement describing why the student is interested in this MSN Degree, specifically indicating their idea for an innovative intra/entrepreneurial project/business.
- Curriculum Vitae or Resume
- While specific experience is not required for applicants to the track, previous related work experience may make an applicant more competitive.

International Students: International applicants must possess a BSN (or it’s equivalent) and current US RN license. International Applicants, as well as immigrants to the US and US Permanent Residents, whose native language is not English, and who have not received a Bachelor’s degree or higher in the US, Australia, Canada, Ireland, New Zealand or the United Kingdom, and show proficiency in English speaking as well as listening, writing and reading. US citizens born on US military bases abroad may be waived from the TOEFL requirement after providing documentation of this status. Otherwise, applicants must meet one of the following requirements:

If you take the TOEFL exam you are required to have a minimum combined score for the listening, writing and reading sections of 79 Plus a speaking section score of 26 or higher.

If you take the TOEFLiBT exam you are required to have a minimum score of 550 or higher and a Test of Spoken English score (TSE) of 55 or higher.

**Additional Information**

For more information about this program, contact:

Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu  (fr53@drexel.edu)
267.359.5692

Additional information is also available on the Drexel’s College of Nursing and Health Professions Nursing Innovation (https://www.drexel.edu/cnhp/academics/graduate/MSN-Innovation-and-Intra-Entrepreneurship-Nursing-Practice) web page and Drexel University Online’s Nursing (http://www.drexel.com/online-degrees/nursing-degrees/msn-lead) Innovation (http://www.drexel.com/online-degrees/nursing-degrees/msn-innov) web page.

**Degree Requirements**

**Core MSN Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 500</td>
<td>Confronting Issues in Contemporary Health Care Environments</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 502</td>
<td>Advanced Ethical Decision Making in Health Care</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 544</td>
<td>Quality and Safety in Healthcare</td>
<td>3.0</td>
</tr>
<tr>
<td>RSCH 503</td>
<td>Research Methods and Biostatistics</td>
<td>3.0</td>
</tr>
<tr>
<td>RSCH 504</td>
<td>Evaluation and Translation of Health Research</td>
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</table>

**Required Track Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 586</td>
<td>Innovation in Advanced Nursing Practice: Theory and Application</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 587</td>
<td>Case Studies in Intra/Entrepreneurship and Innovation in Nursing</td>
<td>3.0</td>
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**Support Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 564</td>
<td>The Business of Healthcare</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 501</td>
<td>Introduction to Project Management</td>
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**Practicum/Capstone Projects**

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>NURS 652</td>
<td>Innovation Capstone Project</td>
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**Electives (by advisement with track coordinator)**

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<th>Credits</th>
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**Total Credits**

<table>
<thead>
<tr>
<th>Credits</th>
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<tr>
<td>45.0-48.0</td>
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**Healthcare Informatics Concentration**

<table>
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<th>Course Title</th>
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<tbody>
<tr>
<td>PROJ 502</td>
<td>Project Planning &amp; Scheduling</td>
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</tr>
<tr>
<td>INFO 648</td>
<td>Healthcare Informatics</td>
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<tr>
<td>INFO 731</td>
<td>Organization &amp; Social Issues in Healthcare Informatics</td>
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<tr>
<td>INFO 732</td>
<td>Healthcare Informatics: Planning &amp; Evaluation</td>
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**Veterans’ Healthcare Concentration**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>IPS 549</td>
<td>The Military and Veteran Culture</td>
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<tr>
<td>IPS 550</td>
<td>The Unique Health Care Needs of our Military and Veterans</td>
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<tr>
<td>IPS 551</td>
<td>Veteran Advocacy</td>
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<tr>
<td>IPS 552</td>
<td>Veteran Healthcare Policy</td>
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</table>
or CIT 552  Integrative Advanced Relaxation Techniques (I-ART)
or NURS 552  Integrative Advanced Relaxation Techniques

**Complementary & Integrative Therapies Concentration**

<table>
<thead>
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<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>CIT 501</td>
<td>Foundations of Phytotherapy</td>
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<tr>
<td>CIT 502</td>
<td>Foundations of Complementary and Integrative Therapies</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 503</td>
<td>Holistic Living For The Caregiver</td>
<td>3.0</td>
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<tr>
<td>or One CIT 500 or 600 level course</td>
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**Holistic Hospice & Palliative Care Concentration**

<table>
<thead>
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<th>Course</th>
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<tbody>
<tr>
<td>CIT 503</td>
<td>Holistic Living For The Caregiver</td>
<td>3.0</td>
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<tr>
<td>CIT 621</td>
<td>Spirituality in Hospice and Palliative Care</td>
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<tr>
<td>CIT 622</td>
<td>Holistic Therapies in Hospice and Palliative Care</td>
<td>3.0</td>
</tr>
<tr>
<td>CIT 623</td>
<td>Cross Cultural Issues</td>
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**Leadership in Health Systems Management Concentration**

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<tbody>
<tr>
<td>NURS 557</td>
<td>Leadership and Stewardship in the Health Professions</td>
<td>3.0</td>
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<tr>
<td>NURS 558</td>
<td>Economics of Healthcare Management &amp; Policy</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 559</td>
<td>Operations Management in Contemporary Healthcare Organizations</td>
<td>3.0</td>
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<tr>
<td>NURS 562</td>
<td>Workforce Management in Healthcare Organizations</td>
<td>3.0</td>
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<tr>
<td>or NURS 564</td>
<td>The Business of Healthcare</td>
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<tr>
<td>or NURS 567</td>
<td>Strategic Management: Power, Politics and Influence in Healthcare Systems</td>
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**Forensic Trends & Issues in Contemporary Healthcare Concentration**

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<tr>
<td>PROJ 502</td>
<td>Project Planning &amp; Scheduling</td>
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<td>NURS 519</td>
<td>Forensic Science Foundations</td>
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<tr>
<td>NURS 528</td>
<td>Victimology – Contemporary Trend</td>
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<td>NURS 533</td>
<td>Forensic Mental Health</td>
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**Integrative Addiction Therapies**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CIT 503</td>
<td>Holistic Living For The Caregiver</td>
<td>3.0</td>
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<tr>
<td>CIT 624</td>
<td>Foundations of Integrative Addiction Therapy</td>
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<tr>
<td>CIT 625</td>
<td>Spirituality, Empowerment, and Transformation</td>
<td>3.0</td>
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<tr>
<td>CIT 631</td>
<td>Introduction to Nutritional Neuroscience</td>
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</tbody>
</table>

**Additional Information**

For more information about this program, contact:

Ms. Amy Pelak Rothstein
Student Services Manager
ajp347@drexel.edu (fr53@drexel.edu)
267.359.5692

Additional information is also available on the Drexel’s College of Nursing and Health Professions Nursing Innovation (https://www.drexel.edu/cnhp/academics/graduate/MSN-Innovation-and-Intra-Entrepreneurship-Nursing-Practice) web page and Drexel University Online’s Nursing (http://www.drexel.com/online-degrees/nursing-degrees/msn-lead) Innovation page.

**Nursing Faculty**

Lisa B. Aiello-Laws, RN, MSN, AOCNS, APN-C (University of Pennsylvania). Assistant Clinical Professor. Adult oncology and cancer genetics.

Scott D. Alcott, MSN (Drexel University). Assistant Clinical Professor. Nursing informatics, leadership, technology, and on-line learning.

Kristen Altdoerffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

Barbara Amendolia, DrNP, NNP, APN-BC (Drexel University). Assistant Clinical Professor. Neonatology, specifically feeding difficulties and respiratory diseases of the newborn.

Katherine Kaby Anselmi, PhD, JD, CRNP (University of Pennsylvania) Assistant Dean of Accreditation/Regulatory Affairs & Online Innovation. Associate Clinical Professor. Nursing, law, family nurse practitioner, women’s health nurse practitioner.

Lew Bennett, CRNA, MSN (Temple University) Chair, Nurse Anesthesia Department. Assistant Clinical Professor. Clinical and didactic education of nurse anesthesia students.

Suzan Blacher, MSN, CARN, CCIT (Drexel University) RN-BSN Program. Assistant Clinical Professor.

Joan Rosen Bloch, PhD, CRNP (University of Pennsylvania). Associate Professor. Maternal and infant health outcomes with a particular focus on racial and ethnic perinatal health disparities.

Susan M. Burke, PhD, RN, CPNP-BC (The Catholic University of America). Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Barbara Celia, MSN, EdD (University of Pennsylvania; Rutgers University). Assistant Clinical Professor. Pain management and access to health care.

Paul Thomas Clements, RN (University of Pennsylvania). Associate Clinical Professor. Forensic, child, adolescent and family mental health nursing.

Jennifer Coates, MSN, MBA, CRNP, BC (The University of Pennsylvania). Assistant Clinical Professor. Critical care nurse practitioner.

Ferne Cohen, CRNA, EdD (Drexel University) Associate Chair, Nurse Anesthesia Department. Assistant Clinical Professor. Clinical and didactic education of nurse anesthesiology students.

John T. Cornele, MSN, RN, CNE, EMT-P (Drexel University) Director CICSP. Instructor. Airway management, nursing and paramedic educational issues, PDA implementation topics, simulation development, use of standardized patients and the art and science of moulage.

Frances H. Cornelius, PhD, MSN (Drexel University; Wayne State University) Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.
Linda Dayer-Berenson, PhD, MSN, CRNP, CNE, FAANP (Rutgers University - formally UMDNJ-SHRP). Associate Clinical Professor. Adult health, pharmacology, cultural competence and pain management.

Diane DePew, DSN, RN (University of Alabama, Birmingham). Assistant Clinical Professor. Evaluation, competency, test development and item writing, continuing education, accreditation, educational design, leadership management.


Rose Ann DiMaria-Ghalili, PhD, MSN, BSN, CNSC (New York University, School of Education, Division of Nursing). Associate Professor. Nutrition and surgical recovery to improve the care of older adults undergoing surgery; nutrition assessment, inflammation, and health outcomes.

Gloria Donnelly, PhD (Bryn Mawr College) Dean of the College of Nursing & Health Professions. Professor. Nursing education and a variety of mental health topics including assertiveness, stress and change.

Jane Donovan, MSN, RNC (Villanova University). Assistant Clinical Professor. Women’s health

H. Michael Dreher, PhD, RN, FAAN ( Widener University). Professor. Sleep, sleep in HIV illness, practice knowledge development, legal issues in nursing education.

Brian Fasolka, MSN, RN, CEN (DeSales University). Assistant Clinical Professor. Emergency nursing, adult health nursing, and nursing education.


Kathleen Fisher, PhD, CRNP (Pennsylvania State University). Associate Clinical Professor. Health care for vulnerable populations, decision making in vulnerable populations (i.e. individuals with intellectual disability.)

Alecia Schneider Fox, PhD (Candidate) (Widener University) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

Sandra A. Friedman, MSN, CNM (Yale University). Assistant Clinical Professor. Interdisciplinary team simulation and debriefing, health assessment and health promotion, nurse midwifery with specialty in adolescent health, nurse managed health center administration.

Mary Gallagher-Gordon, PhD, MSN, RN, CNE (Drexel University) Senior Director of Contracts, Compliance and Academic Community Initiatives. Assistant Clinical Professor. Informatics, patient safety and nursing education, NCLEX review.


Karen Goldschmidt, MSN, RNC (Wilmington University) Department Chair, RN-BSN Completion Department. Assistant Clinical Professor. Professional issues, nursing education, staff development, scholarly writing.

Maureen Gonzales, MSN, CRNP (University of Pennsylvania) Public Health Nurse. Assistant Clinical Professor. Women’s health.

Elizabeth Gonzalez, PhD, PMHCNS-BC (New York University) Department Chair, Doctoral Nursing Program. Associate Clinical Professor. Chronic stress, geropsychiatry, depression among the elderly, minority health issues and cross-cultural research among family caregivers of relatives with Alzheimer’s disease.

Mary K. Green, MSN, RN, BC (Drexel University). Assistant Clinical Professor. Community public health nursing, maternal child health nursing.

Donna Gribbin, RN, DNP, CNE (Duquesne University). Assistant Clinical Professor. Medical-surgical nursing, simulation, nursing education.

Cynthia Hambach, MSN, RN, CCRN (Widener University). Assistant Clinical Professor. Critical care nursing.

Elizabeth Hammond-Ritschard, RN, MSN (Cedar Crest College). Assistant Clinical Professor. Adult health nursing, nursing education.

Thomas L. Hardie, EdD, RN, PMHCNS-BC (Columbia University, Teachers College). Associate Professor. Psychiatric nursing, cancer survivorship, treatment research outcomes in substance abuse

Margaret M. Harkins, DNP, MBE, MSN, GNP-BC (Chatham University). Assistant Clinical Professor. Gerontology, hospice/palliative care, clinical bioethics.

Angela C. Hawes, MSN, RN (University of Pennsylvania). Assistant Clinical Professor. Child and family health nursing.

Karyn Holt, PhD, RN, CNM (Georgetown University; Touro University) Director of Online Quality, CNHP, Division of Nursing. Associate Clinical Professor.

Lisa Johnson, DrNP, CRNP, ACNP (Drexel University). Assistant Clinical Professor. Surrogate end-of-life decision making within minority populations in the acute care setting; ethnourishing.

Dana C. Kemery, RN, MSN (Drexel University). Assistant Clinical Professor. Emergency nursing (adult and pediatric), nursing education.

Michelle Kensey, MSN, RN (University of Pennsylvania) Chair of Undergraduate Women’s Health, Perinatal Clinical Nurse Specialist. Assistant Clinical Professor.

Priscilla Killian, MSN, RNC, MHPNP (LaSalle University). Assistant Clinical Professor. Global and public health, health promotion, disease prevention in a community setting and the integration of psychiatric and primary care services to the persistently mentally ill living in the community setting.

Cindy M. Little, PhD, WHNP, CNS (Virginia Commonwealth University in Richmond, VA). Assistant Clinical Professor. Women’s health, obstetrics and clinical genetics.

Jean S. MacFadyen, PhD, RN (University of Pennsylvania). Assistant Clinical Professor. Intra-Entrepreneurship in advance practice nursing, gerontology, leadership, transcultural nursing.
Cheryl Mele, MSN, CRNP (University of Pennsylvania). Assistant Clinical Professor. Family health, faith community nursing, health promotion/disease prevention and mindfulness-based stress reduction.

Kimberley McClellan, MSN, WHNP-BC, FNP-BC, CRNP (Drexel University). Assistant Clinical Professor. Nursing, women’s health, family practice.

Pamela McGee, MSN, FNP-BC, CNE (University of Pennsylvania). Assistant Clinical Professor. Medical/surgical nursing, gerontology, primary care, family nurse practitioner.

Marylou K. McHugh, RN, EdD (Teachers College; Columbia University). Associate Clinical Professor. Nursing, contemporary nursing faculty track.

Kristen McLaughlin, MSN, RN, CPNP-PC (University of Pennsylvania). Assistant Clinical Professor. Pediatric nurse practitioner.

Carol M. Patton, PhD, RN, FNP-BC, CRNP, CNE (University of Pittsburgh School of Public Health). Associate Clinical Professor. Family nurse practitioner; health promotion/disease prevention across the lifespan, primary, secondary and tertiary health promotion across the lifespan; health outcomes, health policy, ethics, quality and safety initiatives, QSEN, high reliability organizations.

Cheryl Portwood, MSN, RN, CNAA-BC (University of Pennsylvania). Clinical Assistant Professor. Medical-surgical, critical care, and neonatal intensive care; distance learning; leadership management; health policy.

Bobbie Posmontier, PhD, CNM, PMHNP-BC (University of Pennsylvania). Assistant Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Alice Marie Poyss, PhD, MSN (University of Pennsylvania). Associate Clinical Professor. Nursing intervention/outcome studies and nursing treatment/outcome studies; program evaluation, and effects of alternate teaching styles with student learning.

Brenda Reap-Thompson, MSN, RN (Villanova University). Assistant Clinical Professor. Adult health/nursing education; safety and legal issues in nursing and test development.

Mary Jean Ricci, MSN, RN, BC (University of Pennsylvania) Adjunct Faculty Coordinator. Assistant Clinical Professor. Community public health, medical-surgical nursing.

Patricia A. Riccio, PhD, RN (University of California, Los Angeles). Assistant Clinical Professor. Research methods and biostatistics.

Leland Rockstraw, PhD, RN (Drexel University) Assistant Dean, Clinical Simulation and Practice. Associate Clinical Professor. Adult orthopedic/surgical, emergency care, critical care, and trauma/surgery intensive care.

Al Rundio, Jr., PhD, DNP, RN, APRN, NEA, BC (University of Pennsylvania) Interim Associate Dean for Advanced Practice Nursing Programs, Chair of DNP Program. Clinical Professor. Nursing graduate leadership and management track.


Jane Greene Ryan, PhD (Widener University). Assistant Clinical Professor. Nursing women's health.

Donna Sabella, PhD, MEd, MSN, PMHNP-BC (University of Pennsylvania) Director of Global Studies. Assistant Clinical Professor. Cultural competence, human trafficking, mental health, forensic nursing, working with vulnerable populations.

Deanna Lynn Schaffer, MSN, RN, CNE, ACNS-BC (MCP Hahnemann University) Chair of the BSN Co-Op Program. Assistant Clinical Professor. Joanne Schwartz, PhD, CRNP, CNE (Villanova University) Chair of the Accelerated BSN Department. Assistant Clinical Professor. Joanne Serembus, EdD, RN, CCRN (Alum), CNE (Widener University). Associate Clinical Professor. Critical care nursing, adult health nursing, nursing education, curriculum development and patient safety.

Susan Solecki, MSN (Hahnemann University). Assistant Clinical Professor. Nursing women's health, adult health, and occupational health.

Graduate Certificate in Nursing Education

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Graduate
Number of Credits to Completion: 18.0
Instructional Delivery: Online, Campus
Calendar Type: Quarter
Expected Time to Completion: 1 year

Donna Trinkaus, MSN, RN (DeSales University). Assistant Clinical Professor. Critical care nursing, adult health nursing, infection control and nursing education.

AtNena Tucker, DNP, FNP-BC (University of South Alabama). Assistant Clinical Professor. Research in emergency medicine, critical care, health care administration.

Jeannine Uribe, PhD, RN (University of Pennsylvania) Community Clinical Coordinator. Assistant Clinical Professor. Public health nursing; international, professional collaboration, philanthropic health care projects, urban public health issues and caring for immigrant populations.

Roberta Waite, EdD, MSN (Widener University; University of Pennsylvania) Assistant Dean of Academic Integration and Evaluation of Community Programs. Associate Professor. Psychiatric nursing; depression and ADHD in minority adults, and the effects of adverse childhood experiences on adult health in minority adults.

Louise Ward, PhD, CRNP, CNE (Binghamton University). Associate Clinical Professor. Public health nursing.

Lori Wheeler, MSN, RN (West Chester University). Assistant Clinical Professor. Adult health nursing, community health nursing, and nursing education.

Regina Willard, MSN, RN (Drexel University). Assistant Clinical Professor. Nursing cardiology, acute care nurse practitioner.

Linda Wilson, PhD, RN, CPAN, CAPA, BC, CNE, CHSE (Rutgers University) Assistant Dean for Special Projects, Simulation & CNE Accreditation. Associate Clinical Professor. Simulation informatics and technology, peri anesthesia, pain management, critical care, trauma, emergency preparedness.

Virginia Wilson, RN, MSN, NEA-BC, NE-BC (Widener University). Assistant Clinical Professor. Leadership and management.

Regina Wright, MSN, CEN (University of Pennsylvania). Assistant Clinical Professor. Care of the adult patient with complex health problems (medical/surgical concentration); professional role development; approaches to adult learning behaviors.

Mary Ann Zimmer, MSN, CPN (Villanova University). Assistant Clinical Professor. Pediatrics, adult medical-surgical nursing, nursing education.

Janet Zimmerman, MSN, BSN (University of Colorado). Assistant Clinical Professor. Clinical trials, nursing care of veterans.

Patti Rager Zuzelo, EdD, RN, ACNS-BC, ANP-BC, FAAN (Widener University). Clinical Professor. Advanced practice nursing, leadership and management, nursing education, clinical nurse specialist (adult health) and adult nurse practitioner.

## Additional Information

For more information about this program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu
267.359.5691

Additional information is also available on Drexel's College of Nursing and Health Professions Nursing Education Certificate (http://drexel.edu/cnhp/academics/post-baccalaureate/Certificate-PB-Nursing-Education-Faculty-Role) web page and on Drexel University Online's Nursing Education Certificate (http://www.drexel.com/online-degrees/nursing-degrees/cert-pm-cnf) web page.
**MSN: Pediatric Acute Care Nurse Practitioner**

*Major: Nurse Practitioner, Pediatric Acute Care*

*Degree Awarded: Master of Science in Nursing (MSN)*

*Calendar Type: Quarter*

*Total Credit Hours: 57.0; 800 clinical hours*

*Classification of Instructional Programs (CIP) code: 51.3809*

*Standard Occupational Classification (SOC) code: 29-1171*

**About the Program**

The online Pediatric Acute Nurse Practitioner (PNP-AC) program is designed to prepare practitioners for professional practice in the management of medical, surgical, and critical-care adult patient populations. Concurrent theory and clinical courses provide a knowledge base for the management of pediatric complex acute, critical, and chronic health care conditions. Clinical practicum rotations allow students to put the principles they have learned into practice in medical, surgical, and critical care settings. Upon completing the program, graduates pursue practice roles across the continuum of acute care services ranging from high-acuity hospital based emergency or intensive care settings to specialty based practices. Graduates are eligible to sit for the PNCB's Pediatric Acute Care Nurse Practitioner Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. Mandatory on-campus visits are essential to students transitioning into the NP role. These mandatory on-campus visits occur during the following times:

- **2nd Year, Summer Term** – students come to campus during the first clinical course for the On-Campus Intensives (OCI).
- **3rd Year, Fall Term** – students come to campus during the second clinical course for 2-3 days for a standardized patient lab experience (SPL) and/or human patient simulation (HPS) experience, depending on the program.
- **3rd Year, Spring Term** – students come to campus during the fourth clinical course for the On-Campus Intensives (OCI).

**Degree Requirements**

**Core Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 500</td>
<td>Confronting Issues in Contemporary Health Care Environments</td>
<td>3.0</td>
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<tr>
<td>NURS 502</td>
<td>Advanced Ethical Decision Making in Health Care</td>
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<td>Research Methods and Biostatistics</td>
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<tr>
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**Support Courses**

<table>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 548</td>
<td>Advanced Pathophysiology</td>
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<tr>
<td>NURS 549</td>
<td>Advanced Pharmacology</td>
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<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
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</tr>
<tr>
<td>NURS 646</td>
<td>Pharmacology for the Pediatric Nurse Practitioner</td>
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<tr>
<td>NURS 664</td>
<td>Professional Issues for Nurse Practitioners</td>
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**Clinical Courses**

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<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>NURS 642</td>
<td>PNP I: Primary Care of Infants, Children and Adolescents</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 643</td>
<td>PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 649</td>
<td>Ped Nurse Pract AC I: Acute-Chronic Care of Infants, Children and Adolescents Management</td>
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<td>NURS 650</td>
<td>Ped Nurse Pract AC II: Acute-Chronic Care of Infants, Children and Adolescents Management</td>
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<tr>
<td>NURS 651</td>
<td>PNP Management of the Medically Fragile and Technology Dependent Child in the Community</td>
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**Sample Plan of Study**

**First Year**

<table>
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<th>Term</th>
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<tbody>
<tr>
<td>Term 1</td>
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<tr>
<td>NURS 500</td>
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</tr>
<tr>
<td>RSCH 503</td>
<td>Research Methods and Biostatistics</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
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| Term 2 |         |
| NURS 502 | Advanced Ethical Decision Making in Health Care | 3.0 |
| RSCH 504 | Evaluation and Translation of Health Research | 3.0 |
| **Term Credits** | **6.0** |

| Term 3 |         |
| NURS 544 | Quality and Safety in Healthcare | 3.0 |
| **Term Credits** | **3.0** |

| Term 4 |         |
| Elective | 3.0 |
| NURS 548 | Advanced Pathophysiology | 3.0 |
| **Term Credits** | **3.0** |

| Term 5 |         |
| NURS 549 | Advanced Pharmacology | 3.0 |
| NURS 664 | Professional Issues for Nurse Practitioners | 1.0 |
| **Term Credits** | **4.0** |

| Term 6 |         |
| NURS 646 | Pharmacology for the Pediatric Nurse Practitioner | 3.0 |
| **Term Credits** | **3.0** |

| Term 7 |         |
| NURS 550 | Advanced Clinical Assessment Diagnostic Reasoning Across the Lifespan | 4.0 |
| **Term Credits** | **4.0** |

| Term 8 |         |
| NURS 642 | PNP I: Primary Care of Infants, Children and Adolescents | 5.0 |
| **Term Credits** | **5.0** |
Third Year

<p>|</p>
<table>
<thead>
<tr>
<th>Term 9</th>
<th>NURS 643</th>
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<td>Term Credits</td>
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<tr>
<td>Term 10</td>
<td>NURS 649</td>
<td>Ped Nurse Pract AC I: Acute-Chronic Care of Infants, Children and Adolescents Management</td>
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<tr>
<td>Term Credits</td>
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<tr>
<td>Term 11</td>
<td>NURS 650</td>
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</table>

Interdepartmental Faculty

Kristen Altoeffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

Susan M. Burke, PhD, RN, CPNP-BC (The Catholic University of America). Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Paul Thomas Clements, RN (University of Pennsylvania). Associate Clinical Professor. Forensic, child, adolescent and family mental health nursing.

Jennifer Coates, MSN, MBA, CRNP, BC (The University of Pennsylvania). Assistant Clinical Professor. Critical care nurse practitioner.

Frances H. Cornelius, PhD, MSN (Drexel University; Wayne State University) Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Diane DePew, DSN, RN (University of Alabama, Birmingham). Assistant Clinical Professor. Evaluation, competency, test development and item writing, continuing education, accreditation, educational design, leadership management.


H. Michael Dreher, PhD, RN, FAAN (Widener University). Professor. Sleep, sleep in HIV illness, practice knowledge development, legal issues in nursing education.

Alecia Schneider Fox, PhD (Candidate) (Widener University) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

Karyn Holt, PhD, RN, CNM (Georgetown University; Touro University) Director of Online Quality, CNHP, Division of Nursing. Associate Clinical Professor.

Jean S. MacFadyen, PhD, RN (University of Pennsylvania). Assistant Clinical Professor. Intra-Entrepreneurship in advance practice nursing, gerontology, leadership, transcultural nursing.

Kimberley McClain, MSN, WHNP-BC, FNP-BC, CRNP (Drexel University). Assistant Clinical Professor. Nursing, women’s health, family practice.

Marylou K. McHugh, RN, EdD (Teachers College; Columbia University). Associate Clinical Professor. Nursing, contemporary nursing faculty track.

Cheryl Mele, MSN, CRNP (University of Pennsylvania). Assistant Clinical Professor. Pediatric critical care clinical specialist, pediatric nurse practitioner, acute-chronic and neonatal nurse practitioner.

Sally K. Miller, PhD, CRNP (Walden University). Clinical Professor. Adult-gerontology primary and acute care nurse practitioner, family nurse practitioner, advanced pathophysiology, advanced pharmacology.

Kymerlee Montgomery, DrNP, CRNP (Drexel University) Chair, NP Programs. Assistant Clinical Professor. Medicine, women’s health nurse practitioner, education, interprofessional education.

Dana Murphy-Parker, MS, CRNP, PMHNP-BC (University of Colorado) Track Director, Psychiatric Nurse Practitioner Program. Assistant Clinical Professor.

Louise G. Murray, MSN, CRNP, FNP-BC (Drexel University). Assistant Clinical Professor. Family nurse practitioner.

Jennifer Olszewski, MSN CRNP (LaSalle University) Director of the Adult-Gerontology Primary Nurse Practitioner Program. Assistant Clinical Professor. Critical care, patient safety, interdisciplinary education.

Alis Kotler Panzera, DrNP, WHNP-BC, RN (Drexel University). Assistant Clinical Professor. Nursing, women’s health nurse practitioner.

Carol M. Patton, PhD, RN, FNP-BC, CRNP, CNE (University of Pittsburgh School of Public Health). Associate Clinical Professor. Family nurse practitioner; health promotion/disease prevention across the life span, primary, secondary and tertiary health promotion across the lifespan; health outcomes, health policy, ethics, quality and safety initiatives, QSEN, high reliability organizations.

Cheryl Portwood, MSN, RN, CNAA-BC (University of Pennsylvania). Clinical Assistant Professor. Medical-surgical, critical care, and neonatal intensive care; distance learning; leadership management; health policy.

Bobbie Posmontier, PhD, CNM, PMHNP-BC (University of Pennsylvania). Assistant Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Alice Marie Poyss, PhD, MSN (University of Pennsylvania). Associate Clinical Professor. Nursing intervention/outcome studies and nursing...
MSN: Pediatric Primary Care Nurse Practitioner

Major: Nurse Practitioner, Pediatric Primary Care
Degree Awarded: Master of Science in Nursing (MSN)
Calendar Type: Quarter
Total Credit Hours: 52.0 quarter credits; 640 clinical hours
Classification of Instructional Programs (CIP) code: 51.3809
Standard Occupational Classification (SOC) code: 29-1171

About the Program
The online Pediatric Primary Care Nurse Practitioner (PNP) program is
directed toward preparing nurse practitioners who will take advanced
nursing roles as clinicians, educators, researchers, and leaders in the
rapidly changing, evidence-driven health care environment. The program
emphasizes evidence-based practice, interdisciplinary collaboration,
and critical use of evolving technology in the care of children and their families.
While most pediatric nurse practitioners practice in primary care settings,
the continuum of child healthcare spans the geographic settings of home
care, ambulatory care, specialty care, urgent care, and rehabilitative care.

Pediatric primary care nurse practitioners provide advanced nursing care
across the continuum of healthcare services to meet the specialized
physiologic and psychological needs of patients from infancy through adolescence,
and have competencies to manage well-child care as well as complex, acute, and chronic healthcare conditions within a family-
centered healthcare model. Graduates are eligible to sit for the ANCC’s
Pediatric Primary Care Nurse Practitioner Examination and/or the PNCC’s
Pediatric Primary Care Nurse Practitioner Examination.

The nurse practitioner faculty is committed to quality and excellence
in the nurse practitioner (NP) programs. Students meet on campus for
mandatory On Campus Intensive (OCI) learning experiences, simulations
and evaluation. Mandatory on-campus visits are essential to students
transitioning into the NP role. These mandatory on-campus visits occur
during the following times:

- 2nd Year, Summer Term – students come in during the first clinical
course for 2-3 days for a standardized patient lab experience (SPL)
and/or human patient simulation experience (HPS), depending on
the program.
- 3rd Year, Fall Term – students come in during the second clinical
course for 2-3 days for a standardized patient lab experience (SPL)
and/or human patient simulation experience (HPS), depending on
the program.
- 3rd Year, Spring Term – students come in during the fourth clinical
course for 2-3 days for a second standardized patient lab experience
(SPL) and/or human patient simulation experience (HPS), depending
on the program.

For more information about this program, visit Drexel’s MSN Nurse
Practitioner Programs (https://www.drexel.edu/cnhp/academics/graduate/
MSN-Nurse-Practitioner-Pediatric-Primary-Care) web page.

Degree Requirements

Core Courses

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<tr>
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<tbody>
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<tr>
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<td>RSCH 503</td>
<td>Research Methods and Biostatistics</td>
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<td>RSCH 504</td>
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Support Courses

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<tbody>
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<td>NURS 548</td>
<td>Advanced Pathophysiology</td>
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<td>NURS 549</td>
<td>Advanced Pharmacology</td>
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<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
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<td>NURS 646</td>
<td>Pharmacology for the Pediatric Nurse Practitioner</td>
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<tr>
<td>NURS 664</td>
<td>Professional Issues for Nurse Practitioners</td>
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Clinical Concentration Courses

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<thead>
<tr>
<th>Course</th>
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<tr>
<td>NURS 642</td>
<td>PNP I: Primary Care of Infants, Children and Adolescents</td>
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<tr>
<td>NURS 643</td>
<td>PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care</td>
<td>5.0</td>
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<tr>
<td>NURS 647</td>
<td>PNP III: Management and Care of Adolescents in the Primary Care Setting</td>
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<tr>
<td>NURS 648</td>
<td>PNP IV: Primary Care of Children with Special Health Care Needs</td>
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Elective

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<tbody>
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Total Credits 52.0

Sample Plan of Study

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Term Credits 6.0
**Term 2**

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<td>RSCH 504</td>
<td>Evaluation and Translation of Health Research</td>
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**Term Credits:** 6.0

**Term 3**

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**Term Credits:** 3.0

**Term 4**

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**Term 5**

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<td>NURS 548</td>
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**Term Credits:** 4.0

**Term 6**

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<th>Course Title</th>
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<tbody>
<tr>
<td>NURS 646</td>
<td>Pharmacology for the Pediatric Nurse Practitioner</td>
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**Term Credits:** 3.0

**Term 7**

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**Term Credits:** 4.0

**Term 8**

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<td>PNP I: Primary Care of Infants, Children and Adolescents</td>
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**Term Credits:** 5.0

**Term 9**

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**Term Credits:** 5.0

**Term 10**

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**Term Credits:** 5.0

**Term 11**

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<td>NURS 648</td>
<td>PNP IV: Primary Care of Children with Special Health Care Needs</td>
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**Term Credits:** 5.0

**Total Credit:** 52.0

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**About the Program**

The Pediatric Primary Care and Pediatric Acute Care Nurse Practitioner Program at Drexel University will prepare the Pediatric Nurse Practitioner to perform acts of medical diagnosis and treatment through didactic lectures, problem-based learning, clinical practice hours, standardized patient experiences and high-fidelity simulation.

This innovative dual option track coincides with the new models of healthcare delivery and the increasing demand for PNPs to provide care for children and their families across the entire continuum of health and illness, including acute critical conditions. The clinical practice settings for the dual certification track options provides students with a mixed inpatient/outpatient experience ranging from specialty clinics and primary care settings. Diverse clinical settings provide supervised clinical hours to allow the student advance practitioner to perform advance physical assessment, critical thinking, diagnostic reasoning and management of care in collaboration with licensed physician and APN's in accredited institutions. Students graduating from this track will be eligible to sit to both the Pediatric Primary Care and the Pediatric Acute Care Board Certifications through the PNCB.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensives (OCI) learning experiences, simulation, and evaluation. Mandatory on-campus visits each quarter are essential to students transitioning into the NP role. These mandatory on-campus visits occur during the following times:

- **2nd Year, Summer Term** – students come to campus during the first clinical course for the On-Campus Intensives.
- **3rd Year, Fall Term** – students come to campus during the second clinical course for 2-3 days for a standardized patient lab experience (SPL) and/or human patient simulation experience (HPS).
- **3rd Year, Spring Term** – students come to campus during the fourth clinical course for the On-Campus Intensives

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**Admission Requirements**

- A completed application.
- A bachelor's degree with a major in nursing (BSN) from a CCNE or NLN accredited program with a GPA of 3.0 or above on all previous coursework or 3.25 or above on the last 60 credits of the BSN.
- A minimum of one year nursing experience in a pediatric acute care setting.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Transcripts must be supplied regardless of the number of credits earned or the type of school attended. Instead of hard copy transcripts, post-secondary institutions can supply official electronic transcripts directly to Drexel University Online through a password secured link or website (email to: customerservice@drexel.com). If all post-secondary institutions are not listed on applications and these appear on transcripts received from other institutions, applications will not be reviewed until all remaining transcripts have been submitted. The Transcript Lookup Tool can be used to assist in contacting previous institutions.
- Two letters of recommendation. You may use our electronic letter of recommendation service. If a recommender prefers to submit an original, hard copy letter, please remind them that it must include an ink signature and be submitted in a sealed envelope.

---

**MSN: Pediatric Primary Care and Pediatric Acute Care Dual Option**

**Major:** Nurse Practitioner, Pediatric Primary Care and Pediatric Acute Care

**Degree Awarded:** Master of Science

**Calendar Type:** Quarter

**Total Credit Hours:** 62.0; 1000 clinical hours

**Classification of Instructional Programs (CIP) Code:** 51.3809

**Standard Occupational Classification (SOC) Code:** 29-1171
• Personal statement (800 - 1600 words) that will give the admissions committee a better understanding of:
  • Why you are choosing this particular program of study
  • Your plans upon completion of the degree
  • How your current work experience will enhance your experience in this program
• Resume
• A copy of your current, unrestricted United States RN license or eligibility for licensure as a registered nurse and any advanced practice nursing licensure and certification documents. License verification from your nursing license registry website is acceptable.
• A copy of your current PALS certification
• Additional requirements must be met for International Students

All submitted materials become the property of Drexel University.

**Degree Requirements**

**Core Courses**

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**Support Courses**

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**Clinical Courses**

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**Total Credits** 62.0

**Nursing Faculty**

Lisa B. Aiello-Laws, RN, MSN, AOCNS, APN-C *(University of Pennsylvania)*. Assistant Clinical Professor. Adult oncology and cancer genetics.

Scott D. Alcott, MSN *(Drexel University)*. Assistant Clinical Professor. Nursing informatics, leadership, technology, and on-line learning.

Kristen Altdoerffer, MSN, CRNP, BSN, RN *(Drexel University)*. Assistant Clinical Professor. Pediatric and adolescent nursing.

Barbara Amendolia, DrNP, NNP, APN-BC *(Drexel University)*. Assistant Clinical Professor. Neonatology, specifically feeding difficulties and respiratory diseases of the newborn.

Katherine Kaby Anselmi, PhD, JD, CRNP *(University of Pennsylvania)*. Assistant Dean of Accreditation/Regulatory Affairs & Online Innovation. Associate Clinical Professor. Nursing, law, family nurse practitioner, women's health nurse practitioner.

Lew Bennett, CRNA, MSN *(Temple University)* Chair, Nurse Anesthesia Department. Assistant Clinical Professor. Clinical and didactic education of nurse anesthesia students.

Suzan Blacher, MSN, CARN, CCIT *(Drexel University)* RN-BSN Program. Assistant Clinical Professor.

Joan Rosen Bloch, PhD, CRNP *(University of Pennsylvania)*. Associate Professor. Maternal and infant health outcomes with a particular focus on racial and ethnic perinatal health disparities.

Susan M. Burke, PhD, RN, CPNP-BC *(The Catholic University of America)*. Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Barbara Celia, MSN, EdD *(University of Pennsylvania; Rutgers University)*. Assistant Clinical Professor. Pain management and access to health care.

Paul Thomas Clements, RN *(University of Pennsylvania)*. Associate Clinical Professor. Forensic, child, adolescent and family mental health nursing.

Jennifer Coates, MSN, MBA, CRNP, BC *(The University of Pennsylvania)*. Assistant Clinical Professor. Critical care nurse practitioner.

Ferne Cohen, CRNA, EdD *(Drexel University)* Associate Chair, Nurse Anesthesia Department. Assistant Clinical Professor. Clinical and didactic education of nurse anesthesia students.

John T. Cornele, MSN, RN, CNE, EMT-P *(Drexel University)* Director CICSP. Instructor. Airway management, nursing and paramedic educational issues, PDA implementation topics, simulation development, use of standardized patients and the art and science of moulage.

Frances H. Cornelius, PhD, MSN *(Drexel University; Wayne State University)* Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Linda Dayer-Berenson, PhD, MSN, CRNP, CNE, FAANP *(Rutgers University - formally UMDNJ-SHRP)*. Associate Clinical Professor. Adult health, pharmacology, cultural competence and pain management.

Diane DePew, DSN, RN *(University of Alabama, Birmingham)*. Assistant Clinical Professor. Evaluation, competency, test development and item writing, continuing education, accreditation, educational design, leadership management.

Jill Derstine, EdD, RN, FAAN *(University of Pennsylvania)*. Associate Clinical Professor. Nursing education and rehabilitation nursing.
Rose Ann DiMaria-Ghalili, PhD, MSN, BSN, CNSC (New York University, School of Education, Division of Nursing). Associate Professor. Nutrition and surgical recovery to improve the care of older adults undergoing surgery; nutrition assessment, inflammation, and health outcomes.

Gloria Donnelly, PhD (Bryn Mawr College) Dean of the College of Nursing & Health Professions. Professor. Nursing education and a variety of mental health topics including assertiveness, stress and change.

Jane Donovan, MSN, RNC (Villanova University). Assistant Clinical Professor. Women’s health

H. Michael Dreher, PhD, RN, FAAN (Widener University). Professor. Sleep, sleep in HIV illness, practice knowledge development, legal issues in nursing education.

Brian Fasolka, MSN, RN, CEN (DeSales University). Assistant Clinical Professor. Emergency nursing, adult health nursing, and nursing education.


Kathleen Fisher, PhD, CRNP (Pennsylvania State University). Associate Clinical Professor. Health care for vulnerable populations, decision making in vulnerable populations (i.e. individuals with intellectual disability.)

Alecia Schneider Fox, PhD (Candidate) (Widener University) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

Sandra A. Friedman, MSN, CNM (Yale University). Assistant Clinical Professor. Interdisciplinary team simulation and debriefing, health assessment and health promotion, nurse midwifery with specialty in adolescent health, nurse managed health center administration.

Mary Gallagher-Gordon, PhD, MSN, RN, CNE (Drexel University) Senior Director of Contracts, Compliance and Academic Community Initiatives. Assistant Clinical Professor. Informatics, patient safety and nursing education, NCLEX review.


Karen Goldschmidt, MSN, RNC (Wilmington University) Department Chair, RN-BSN Completion Department. Assistant Clinical Professor. Professional issues, nursing education, staff development, scholarly writing.

Maureen Gonzales, MSN, CRNP (University of Pennsylvania) Public Health Nurse. Assistant Clinical Professor. Women’s health.

Elizabeth Gonzalez, PhD, PMHCNS-BC (New York University) Department Chair, Doctoral Nursing Program. Associate Clinical Professor. Chronic stress, geropsychiatry, depression among the elderly, minority health issues and cross-cultural research among family caregivers of relatives with Alzheimer’s disease.

Mary K. Green, MSN, RN, BC (Drexel University). Assistant Clinical Professor. Community public health nursing, maternal child health nursing.

Donna Gribbin, RN, DNP, CNE (Duquesne University). Assistant Clinical Professor. Medical-surgical nursing, simulation, nursing education.

Cynthia Hambach, MSN, RN, CCRN (Widener University). Assistant Clinical Professor. Critical care nursing.

Elizabeth Hammond-Ritschard, RN, MSN (Cedar Crest College). Assistant Clinical Professor. Adult health nursing, nursing education.

Thomas L. Hardie, EdD, RN, PMHCNS-BC (Columbia University, Teachers College). Associate Professor. Psychiatric nursing, cancer survivorship, treatment research outcomes in substance abuse

Margaret M. Harkins, DNP, MBE, MSN, GNP-BC (Chatham University). Assistant Clinical Professor. Gerontology, hospice/palliative care, clinical bioethics.

Angela C. Hawes, MSN, RN (University of Pennsylvania). Assistant Clinical Professor. Child and family health nursing.

Karyn Holt, PhD, RN, CNM (Georgetown University; Touro University) Director of Online Quality, CNHP, Division of Nursing. Associate Clinical Professor.

Lisa Johnson, DrNP, CRNP, ACNP (Drexel University). Assistant Clinical Professor. Surrogate end-of-life decision making within minority populations in the acute care setting; ethnonourishing.

Dana C. Kemery, RN, MSN (Drexel University). Assistant Clinical Professor. Emergency nursing (adult and pediatric), nursing education.

Michelle Kensey, MSN, RN (University of Pennsylvania) Chair of Undergraduate Women's Health. Perinatal Clinical Nurse Specialist. Assistant Clinical Professor.

Priscilla Killian, MSN, RNC, MHPNP (LaSalle University). Assistant Clinical Professor. Global and public health, health promotion, disease prevention in a community setting and the integration of psychiatric and primary care services to the persistently mentally ill living in the community setting.

Cindy M. Little, PhD, WHNP, CNS (Virginia Commonwealth University in Richmond, VA). Assistant Clinical Professor. Women’s health, obstetrics and clinical genetics.

Jean S. MacFadyen, PhD, RN (University of Pennsylvania). Assistant Clinical Professor. Intra-Entrepreneurship in advance practice nursing, gerontology, leadership, transcultural nursing.

Mary Kay Maley, RN, MSN, APN (University of Medicine and Dentistry of New Jersey). Assistant Clinical Professor. Family health, faith community nursing, health promotion/disease prevention and mindfulness-based stress reduction.

Kimberley McClellan, MSN, WHNP-BC, FNP-BC, CRNP (Drexel University). Assistant Clinical Professor. Nursing, women’s health, family practice.

Pamela McGee, MSN, FNP-BC, CNE (University of Pennsylvania). Assistant Clinical Professor. Medical/surgical nursing, gerontology, primary care, family nurse practitioner.
Marylou K. McHugh, RN, EdD (Teachers College; Columbia University). Associate Clinical Professor. Nursing, contemporary nursing faculty track.

Kristen McLaughlin, MSN, RN, CPNP-PC (University of Pennsylvania). Assistant Clinical Professor. Pediatric nurse practitioner.

Cheryl Mele, MSN, CRNP (University of Pennsylvania). Assistant Clinical Professor. Pediatric critical care clinical specialist, pediatric nurse practitioner, acute-chronic and neonatal nurse practitioner.

Faye (Pearlman) Meloy, PhD, MSN, MBA (Drexel University) Associate Dean, Precursen BSN Programs. Associate Clinical Professor. Clinical practice; education; health policy and planning; community service; human resources and health care administration.

Sally K. Miller, PhD, CRNP (Walden University). Clinical Professor. Adult-gerontology primary and acute care nurse practitioner, family nurse practitioner, advanced pathophysiology, advanced pharmacology.

Kymberlee Montgomery, DrNP, CRNP (Drexel University) Chair, NP Programs. Assistant Clinical Professor. Medicine, women's health nurse practitioner, education, interprofessional education.

Dana Murphy-Parker, MS, CRNP, PMHNP-BC (University of Colorado) Track Director, Psychiatric Nurse Practitioner Program. Assistant Clinical Professor.

Louise G. Murray, MSN, CRNP, FNP-BC (Drexel University). Assistant Clinical Professor. Family nurse practitioner.

Maura A. Nita, MSN, RN, CPN, APN (Drexel University). Assistant Clinical Professor. Pediatric nursing.

Carol Okupniak, MSN, RN (Thomas Jefferson University). Assistant Clinical Professor. Nursing women's health, nursing leadership, informatics.

Jennifer Olszewski, MSN CRNP (LaSalle University) Director of the Adult-Gerontology Primary Nurse Practitioner Program. Assistant Clinical Professor. Critical care, patient safety, interdisciplinary education

Alis Kotler Panzera, DrNP, WHNP-BC, RN (Drexel University). Assistant Clinical Professor. Nursing, women's health nurse practitioner.

Carol M. Patton, PhD, RN, FNP-BC, CRNP, CNE (University of Pittsburgh School of Public Health)). Associate Clinical Professor. Family nurse practitioner; health promotion/disease prevention across the life span, primary, secondary and tertiary health promotion across the lifespan; health outcomes, health policy, ethics, quality and safety initiatives, QSEN, high reliability organizations.

Cheryl Portwood, MSN, RN, CNA-BC (University of Pennsylvania). Clinical Assistant Professor. Medical-surgical, critical care, and neonatal intensive care; distance learning; leadership management; health policy.

Bobbie Posmontier, PhD, CNM, PMHNP-BC (University of Pennsylvania). Assistant Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Alice Marie Poyss, PhD, MSN (University of Pennsylvania). Associate Clinical Professor. Nursing intervention/outcome studies and nursing treatment/outcome studies; program evaluation, and effects of alternate teaching styles with student learning.

Brenda Reap-Thompson, MSN, RN (Villanova University). Assistant Clinical Professor. Adult health/nursing education; safety and legal issues in nursing and test development.

Mary Jean Ricci, MSN, RN, BC (University of Pennsylvania) Adjunct Faculty Coordinator. Assistant Clinical Professor. Community public health, medical-surgical nursing.

Patricia A. Riccio, PhD, RN (University of California, Los Angeles). Assistant Clinical Professor. Research methods and biostatistics.

Leland Rockstraw, PhD, RN (Drexel University) Assistant Dean, Clinical Simulation and Practice. Associate Clinical Professor. Adult orthopedic/surgical, emergency care, critical care, and trauma/surgery intensive care.

Al Rundio, Jr., PhD, DNP, RN, APRN, NEA, BC (University of Pennsylvania) Interim Associate Dean for Advanced Practice Nursing Programs, Chair of DNP Program. Clinical Professor. Nursing graduate leadership and management track.


Jane Greene Ryan, PhD (Widener University). Assistant Clinical Professor. Nursing women's health.

Donna Sabella, PhD, MEd, MSN, PMHNP-BC (University of Pennsylvania) Director of Global Studies. Assistant Clinical Professor. Cultural competence, human trafficking, mental health, forensic nursing, working with vulnerable populations.

Deanna Lynn Schaffer, MSN, RN, CNE, ACNS-BC (MCP Hahmemann University) Chair of the BSN Co-Op Program. Assistant Clinical Professor.

Joanne Schwartz, PhD, CRNP, CNE (Villanova University) Chair of the Accelerated BSN Department. Assistant Clinical Professor.

Joanne Serembus, EdD, RN, CCRN (Alum), CNE (Widener University). Associate Clinical Professor. Critical care nursing, adult health nursing, nursing education, curriculum development and patient safety.

Susan Solecki, MSN (Hahmemann University). Assistant Clinical Professor. Nursing women's health, adult health, and occupational health.

Ann Thiel-Barrett, DNP, RN, FNP-BC, CNE (Chatham University). Assistant Clinical Professor. Family health nursing.

Elizabeth Tomaszewski, DNP, CCRN, CRNP, ACNP-BC, ACNPC (Chatham University). Assistant Clinical Professor. Critical care; end of life care; advance practice nursing.

Donna Trinkaus, MSN, RN (DeSales University). Assistant Clinical Professor. Critical care nursing, adult health nursing, infection control and nursing education

A/Nena Tucker, DNP, FNP-BC (University of South Alabama). Assistant Clinical Professor. Research in emergency medicine, critical care, health care administration.

Jeannine Uribe, PhD, RN (University of Pennsylvania) Community Clinical Coordinator. Assistant Clinical Professor. Public health nursing; international, professional collaboration, philanthropic health care projects, urban public health issues and caring for immigrant populations.

Roberta Waite, EdD, MSN (Widener University; University of Pennsylvania) Assistant Dean of Academic Integration and Evaluation
of Community Programs. Associate Professor. Psychiatric nursing; depression and ADHD in minority adults, and the effects of adverse childhood experiences on adult health in minority adults.

Louise Ward, PhD, CRNP, CNE (Binghamton University). Associate Clinical Professor. Public health nursing.

Lori Wheeler, MSN, RN (West Chester University). Assistant Clinical Professor. Adult health nursing, community health nursing, and nursing education.

Regina Willard, MSN, RN (Drexel University). Assistant Clinical Professor. Nursing, cardiology, acute care nurse practitioner.

Linda Wilson, PhD, RN, CPAN, CAPA, BC, CNE, CHSE (Rutgers University) Assistant Dean for Special Projects, Simulation & CNE Accreditation. Associate Clinical Professor. Simulation informatics and technology, perianesthesia, pain management, critical care, trauma, emergency preparedness.

Virginia Wilson, RN, MSN, NEA-BC, NE-BC (Widener University). Assistant Clinical Professor. Leadership and management.

Regina Wright, MSN, CEN (University of Pennsylvania). Assistant Clinical Professor. Care of the adult patient with complex health problems (medical/surgical concentration); professional role development; approaches to adult learning behaviors.

Mary Ann Zimmer, MSN, CPN (Villanova University). Assistant Clinical Professor. Pediatrics, adult medical-surgical nursing, nursing education.

Janet Zimmerman, MSN, BSN (University of Colorado). Assistant Clinical Professor. Clinical trials, nursing care of veterans.

Patti Rager Zuzelo, EdD, RN, ACNS-BC, ANP-BC, FAAN (Widener University). Clinical Professor. Advanced practice nursing, leadership and management, nursing education, clinical nurse specialist (adult health) and adult nurse practitioner.

**MSN: Psychiatric Mental Health Nurse Practitioner**

**Major:** Nurse Practitioner, Psychiatric Mental Health

**Degree Awarded:** Master of Science in Nursing (MSN)

**Calendar Type:** Quarter

**Total Credit Hours:** 52.0 quarter credits; 640 clinical hours

**Classification of Instructional Programs (CIP) code:** 58.3810

**Standard Occupational Classification (SOC) code:** 29-1123

**About the Program**

The online Psychiatric Mental Health Nurse Practitioner (PMHNP) program prepares practitioners to provide a wide range of services to patients across the lifespan and their families. The program of study is based on a biopsychosocial model of care and includes the study and application of diagnostic and treatment modalities, and theories and approaches to practice. Graduates of this program practice in a wide variety of settings as this program enables them to provide direct (assessment, intervention) and indirect (consultation, case management, and supervision) advanced practice services to individuals who are at risk and those who need mental health services. Graduates are eligible to sit for the ANCC’s Psychiatric Mental Health Certification Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On-Campus Intensive (OCI) learning experiences, simulation, and evaluation. Mandatory on-campus visits each quarter are essential to students transitioning into the NP role. Following clinical orientation, these mandatory on-campus visits occur during the following times:

- **2nd Year, Summer Term** – students come to campus during the first clinical course for the On-Campus Intensives.
- **3rd Year, Fall Term** – students come to campus during the second clinical course for 2-3 days for a standardized patient lab experience (SPL) and/or human patient simulation experience (HPS).
- **3rd Year, Spring Term** – students come to campus during the fourth clinical course for the On-Campus Intensives.

For more information about this program, visit Drexel’s MSN Nurse Practitioner Programs (http://www.drexel.edu/gradnursing/msn/nursePractitioner) web page.

**Degree Requirements**

**Master of Science in Nursing (MSN):** 52.0 quarter credits; 640 clinical hours

**Core Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NURS 500</td>
<td>Confronting Issues in Contemporary Health Care Environments</td>
<td>3.0</td>
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<tr>
<td>NURS 502</td>
<td>Advanced Ethical Decision Making in Health Care</td>
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<tr>
<td>RSCH 503</td>
<td>Research Methods and Biostatistics</td>
<td>3.0</td>
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<tr>
<td>NURS 544</td>
<td>Quality and Safety in Healthcare</td>
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<tr>
<td>RSCH 504</td>
<td>Evaluation and Translation of Health Research</td>
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**Support Courses**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>NURS 548</td>
<td>Advanced Pathophysiology</td>
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<td>NURS 549</td>
<td>Advanced Pharmacology</td>
<td>3.0</td>
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<tr>
<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
<td>4.0</td>
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<tr>
<td>NURS 555</td>
<td>Psychopharmacology Across the Lifespan</td>
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<tr>
<td>NURS 664</td>
<td>Professional Issues for Nurse Practitioners</td>
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**Clinical Courses**

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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>NURS 592</td>
<td>PMHNP I: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology I</td>
<td>5.0</td>
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<tr>
<td>NURS 593</td>
<td>PMHNP II: Advanced Mental Health Nurse Practitioner Theoretical Foundations and Psychopathology II</td>
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<tr>
<td>NURS 594</td>
<td>PMHNP III: Adv Mental Hlth NP Treatment Modalities for Diverse Populations Across the Lifespan</td>
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<tr>
<td>NURS 595</td>
<td>PMHNP IV: Adv Mental Hlth NP Management and Care of Clients in Diverse Pop Across the Lifespan</td>
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**Elective**

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<td>3.0</td>
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</tbody>
</table>

**Total Credits**

| Total Credits | 52.0 |

**Interdepartmental Faculty**

Kristen Altdoerffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

Susan M. Burke, PhD, RN, CPNP-BC (The Catholic University of America). Associate Clinical Professor. Pediatric primary care, health
disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Paul Thomas Clements, RN (University of Pennsylvania). Associate Clinical Professor. Forensic, child, adolescent and family mental health nursing.

Jennifer Coates, MSN, MBA, CRNP, BC (The University of Pennsylvania). Assistant Clinical Professor. Critical care nurse practitioner.

Frances H. Cornelius, PhD, MSN (Drexel University; Wayne State University) Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Diane DePew, DSN, RN (University of Alabama, Birmingham). Assistant Clinical Professor. Evaluation, competency, test development and item writing, continuing education, accreditation, educational design, leadership management.


H. Michael Dreher, PhD, RN, FAAN (Widener University). Professor. Sleep, sleep in HIV illness, practice knowledge development, legal issues in nursing education.

Alecia Schneider Fox, PhD (Candidate) (Widener University) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

Karyn Holt, PhD, RN, CNM (Georgetown University; Touro University) Director of Online Quality, CNHP, Division of Nursing. Associate Clinical Professor.

Jean S. MacFadyen, PhD, RN (University of Pennsylvania). Assistant Clinical Professor. Intra-Entrepreneurship in advance practice nursing, gerontology, leadership, transcultural nursing.

Kimberley McClellan, MSN, WHNP-BC, FNP-BC, CRNP (Drexel University). Assistant Clinical Professor. Nursing, women’s health, family practice.

Marylou K. McHugh, RN, EdD (Teachers College; Columbia University). Associate Clinical Professor. Nursing, contemporary nursing faculty track.

Kristen McLaughlin, MSN, CNAA-BC (University of Pennsylvania). Assistant Clinical Professor. Pediatric nurse practitioner.

Cheryl Mele, MSN, CRNP (University of Pennsylvania). Assistant Clinical Professor. Pediatric critical care clinical specialist, pediatric nurse practitioner, acute-chronic and neonatal nurse practitioner.

Sally K. Miller, PhD, CRNP (Walden University). Clinical Professor. Adult-gerontology primary and acute care nurse practitioner, family nurse practitioner, advanced pathophysiology, advanced pharmacology.

Kymberlee Montgomery, DrNP, CRNP (Drexel University) Chair, NP Programs. Assistant Clinical Professor. Medicine, women’s health nurse practitioner, education, interprofessional education.

Dana Murphy-Parker, MS, CRNP, PMHNP-BC (University of Colorado) Track Director, Psychiatric Nurse Practitioner Program. Assistant Clinical Professor.

Louise G. Murray, MSN, CRNP, FNP-BC (Drexel University). Assistant Clinical Professor. Family nurse practitioner.

Jennifer Olszewski, MSN CRNP (LaSalle University) Director of the Adult-Gerontology Primary Nurse Practitioner Program. Assistant Clinical Professor. Critical care, patient safety, interdisciplinary education.

Alis Kotler Panzera, DrNP, WHNP-BC, RN (Drexel University). Assistant Clinical Professor. Nursing, women’s health nurse practitioner.

Carol M. Patton, PhD, RN, FNP-BC, CRNP, CNE (University of Pittsburgh School of Public Health). Associate Clinical Professor. Family nurse practitioner; health promotion/disease prevention across the life span, primary, secondary and tertiary health promotion across the lifespan; health outcomes, health policy, ethics, quality and safety initiatives, QSEN, high reliability organizations.

Cheryl Portwood, MSN, RN, CNAA-BC (University of Pennsylvania). Clinical Assistant Professor. Medical-surgical, critical care, and neonatal intensive care; distance learning; leadership management; health policy.

Bobbie Posmontier, PhD, CNM, PMHNP-BC (University of Pennsylvania). Assistant Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Alice Marie Poyss, PhD, MSN (University of Pennsylvania). Associate Clinical Professor. Nursing intervention/outcome studies and nursing treatment/outcome studies; program evaluation, and effects of alternate teaching styles with student learning.

Elizabeth Tomaszewski, DNP, CCRN, CRNP, ACNP-BC, ACNPC (Chatham University). Assistant Clinical Professor. Critical care; end of life care; advance practice nursing.

AtNena Tucker, DNP, FNP-BC (University of South Alabama). Assistant Clinical Professor. Research in emergency medicine, critical care, health care administration.

Regina Willard, MSN, RN (Drexel University). Assistant Clinical Professor. Nursing, cardiology, acute care nurse practitioner.

Linda Wilson, PhD, RN, CPAN, CAPA, BC, CNE, CHSE (Rutgers University) Assistant Dean for Special Projects, Simulation & CNE Accreditation. Associate Clinical Professor. Simulation informatics and technology, perianesthesia, pain management, critical care, trauma, emergency preparedness.

Janet Zimmerman, MSN, BSN (University of Colorado). Assistant Clinical Professor. Clinical trials, nursing care of veterans.

Patti Rager Zuzelo, EdD, RN, ACNS-BC, ANP-BC, FAAN (Widener University). Clinical Professor. Advanced practice nursing, leadership and management, nursing education, clinical nurse specialist (adult health) and adult nurse practitioner.

**MSN: Women's Health/Gender Related Nurse Practitioner**

*Major: Nurse Practitioner, Women's Health/Gender Related*
**About the Program**

The online Women’s Health/Gender Related Nurse Practitioner track offers didactic and clinical education via distance learning and concurrent clinical preceptorships. The courses offered throughout the track reflect the competencies and skill sets required for today’s women’s health nurse practitioner as knowledge expands, health care systems evolve, technology advances and practice changes in response to current needs and evidence-based research. Additionally, this track offers the opportunity for students to work in transdisciplinary simulated scenarios to promote a better understanding and respect of discipline-specific roles, improve existing communication and collaboration within disciplines, and initiate teamwork development in order to promote patient safety and high-quality patient care. Graduates are eligible to sit for the NCC’s Women’s Health/Gender Related Nurse Practitioner Examination.

The nurse practitioner faculty is committed to quality and excellence in the nurse practitioner (NP) programs. Students meet on campus for mandatory On Campus Intensive (OCI) learning experiences, simulation, and evaluation. Mandatory on-campus visits are essential to students transitioning into the NP role. These mandatory on-campus visits occur during the following times:

- **2nd Year, Summer Term** – students come to campus during the first clinical course for the On-Campus Intensives (OCI).
- **3rd Year, Fall Term** – students come to campus during the second clinical course for 2-3 days for a standardized patient lab experience (SPL) and/or human patient simulation (HPS) experience.
- **3rd Year, Winter Term** – students come to campus during the third clinical course for 2-3 days for a second standardized patient lab experience (SPL) and/or human patient simulation experience (HPS).
- **3rd Year, Spring Term** – students come to campus during the fourth clinical course for the On-Campus Intensives (OCI).

For more information about this program, visit Drexel's MSN Nurse Practitioner Programs (https://www.drexel.edu/cnhp/academics/graduate/MSN-Nurse-Practitioner-Womens-Health-Gender-Related) web page.

<table>
<thead>
<tr>
<th>Core Courses</th>
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<tbody>
<tr>
<td>NURS 500</td>
<td>Confronting Issues in Contemporary Health Care Environments 3.0</td>
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<td>Evaluation and Translation of Health Research 3.0</td>
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<tr>
<td>NURS 548</td>
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</tr>
<tr>
<td>NURS 549</td>
<td>Advanced Pharmacology 3.0</td>
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<tr>
<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan 4.0</td>
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<tr>
<td>NURS 664</td>
<td>Professional Issues for Nurse Practitioners 1.0</td>
</tr>
<tr>
<td>NURS 680</td>
<td>Primary Care for Women’s Health 3.0</td>
</tr>
<tr>
<td>NURS 682</td>
<td>Pharmacology for the Women’s Health Nurse Practitioner 3.0</td>
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<th>Clinical Concentration Courses</th>
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<tr>
<td>NURS 690</td>
<td>WHNP I: Mngmnt &amp; Care of the Common Gyn and Gender Related Issues throughout the Lifespan 5.0</td>
</tr>
<tr>
<td>NURS 691</td>
<td>WHNP II: Mngmnt &amp; Care of the Complex Gyn and Gender Related Issues of Women throughout the Lifespan 5.0</td>
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<tr>
<td>NURS 692</td>
<td>WHNP III: Management &amp; Care of the Low Risk Obstetrical and Post Partum Needs of Women and Families 5.0</td>
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<tr>
<td>NURS 693</td>
<td>WHNP IV: Mngmnt &amp; Care of the High Risk Obstetrical and Post Partum Needs of Women and Families 5.0</td>
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</table>

| Elective | 3.0 |

**Total Credits** 55.0

**Interdepartmental Faculty**

Kristen Aldoerffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

Susan M. Burke, PhD, RN, CPNP-BC (The Catholic University of America). Associate Clinical Professor. Pediatric primary care, health disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Paul Thomas Clements, RN (University of Pennsylvania). Associate Clinical Professor. Forensic, child, adolescent and family mental health nursing.

Jennifer Coates, MSN, MBA, CRNP, BC (The University of Pennsylvania). Assistant Clinical Professor. Critical care nurse practitioner.

Frances H. Cornelius, PhD, MSN (Drexel University; Wayne State University) Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Diane DePew, DNS, RN (University of Alabama, Birmingham). Assistant Clinical Professor. Evaluation, competency, test development and item writing, continuing education, accreditation, educational design, leadership management.


H. Michael Dreher, PhD, RN, FAAN (Widener University). Professor. Sleep, sleep in HIV illness, practice knowledge development, legal issues in nursing education.

Alecia Schneider Fox, PhD (Candidate) (Widener University) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

Karyn Holt, PhD, RN, CNM (Georgetown University; Touro University) Director of Online Quality, CNHP, Division of Nursing. Associate Clinical Professor.

Jean S. MacFadyen, PhD, RN (University of Pennsylvania). Assistant Clinical Professor. Intra-Entrepreneurship in advance practice nursing, gerontology, leadership, transcultural nursing.
Kimberley McClellan, MSN, WHNP-BC, FNP-BC, CRNP (Drexel University). Assistant Clinical Professor. Nursing, women's health, family practice.

Marylou K. McHugh, RN, EdD (Teachers College; Columbia University). Associate Clinical Professor. Nursing, contemporary nursing faculty track.

Kristen McLaughlin, MSN, RN, CPNP-PC (University of Pennsylvania). Assistant Clinical Professor. Pediatric nurse practitioner.

Cheryl Mele, MSN, CRNP (University of Pennsylvania). Assistant Clinical Professor. Pediatric critical care clinical specialist, pediatric nurse practitioner, acute-chronic and neonatal nurse practitioner.

Sally K. Miller, PhD, CRNP (Walden University). Clinical Professor. Adult-gerontology primary and acute care nurse practitioner, family nurse practitioner, advanced pathophysiology, advanced pharmacology.

Kymberlee Montgomery, DrNP, CRNP (Drexel University) Chair, NP Programs. Assistant Clinical Professor. Medicine, women's health nurse practitioner, education, interprofessional education.

Dana Murphy-Parker, MS, CRNP, PMHNP-BC (University of Colorado) Track Director, Psychiatric Nurse Practitioner Program. Assistant Clinical Professor.

Louise G. Murray, MSN, CRNP, FNP-BC (Drexel University). Assistant Clinical Professor. Family nurse practitioner.

Jennifer Olszewski, MSN CRNP (LaSalle University) Director of the Adult-Gerontology Primary Nurse Practitioner Program. Assistant Clinical Professor. Critical care, patient safety, interdisciplinary education.

Alis Kotler Panzera, DrNP, WHNP-BC, RN (Drexel University). Assistant Clinical Professor. Nursing, women’s health nurse practitioner.

Carol M. Patton, PhD, RN, FNP-BC, CRNP, CNE (University of Pittsburgh School of Public Health)). Associate Clinical Professor. Family nurse practitioner; health promotion/disease prevention across the life span, primary, secondary and tertiary health promotion across the lifespan; health outcomes, health policy, ethics, quality and safety initiatives, QSEN, high reliability organizations.

Cheryl Portwood, MSN, RN, CNAA-BC (University of Pennsylvania). Clinical Assistant Professor. Medical-surgical, critical care, and neonatal intensive care; distance learning; leadership management; health policy.

Bobbie Posmontier, PhD, CNM, PMHNP-BC (University of Pennsylvania). Assistant Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Alice Marie Poyss, PhD, MSN (University of Pennsylvania). Associate Clinical Professor. Nursing intervention/outcome studies and nursing treatment/outcome studies; program evaluation, and effects of alternate teaching styles with student learning.

Elizabeth Tomaszewski, DNP, CCRN, CRNP, ACNP-BC, ACNPC (Chatham University). Assistant Clinical Professor. Critical care; end of life care; advance practice nursing.

AtNena Tucker, DNP, FNP-BC (University of South Alabama). Assistant Clinical Professor. Research in emergency medicine, critical care, health care administration.

Regina Willard, MSN, RN (Drexel University). Assistant Clinical Professor. Nursing, cardiology, acute care nurse practitioner.

Linda Wilson, PhD, RN, CPAN, CAPA, BC, CNE, CHSE (Rutgers University) Assistant Dean for Special Projects, Simulation & CNE Accreditation. Associate Clinical Professor. Simulation informatics and technology, perianesthesia, pain management, critical care, trauma, emergency preparedness.

Janet Zimmerman, MSN, BSN (University of Colorado). Assistant Clinical Professor. Clinical trials, nursing care of veterans.

Patti Rager Zuzelo, EdD, RN, ACNS-BC, ANP-BC, FAAN (Widener University). Clinical Professor. Advanced practice nursing, leadership and management, nursing education, clinical nurse specialist (adult health) and adult nurse practitioner.

Art Therapy and Counseling

Major: Art Therapy and Counseling

Degree Awarded: Master of Arts (MA)

Calendar Type: Quarter

Total Credit Hours: 90.0

Classification of Instructional Programs (CIP) code: 51.2301
Standard Occupational Classification (SOC) code: 29-1129

About the Program

The graduate Art Therapy and Counseling Program offers a progressive curriculum that integrates didactic, experiential, supervisory, and clinical experiences to prepare students for providing art therapy services in a range of settings. Students learn theories applied to art therapy practice and contemporary approaches that support their understanding of the healing aspects of the creative process. Emphasis is placed on the complex interactions among the client, the therapist, and the art process that promote therapeutic change. Students apply this knowledge in practicum and internship experiences offered in a variety of behavioral health and community settings, such as psychiatric hospitals, medical facilities, schools, forensic settings, and shelters.

We provide educational experiences to promote professional development and multicultural competence conducive to the ethical, reflective, and social-awake practice of art therapy. Our aim is to prepare professional art therapists capable of critical thinking with regard to the therapeutic use of art and the creative process while promoting respect for the diversity of human experiences.

For additional information about the program, visit the College of Nursing and Health Professions’ Art Therapy and Counseling (https://www.drexel.edu/cnhp/academics/graduate/MA-Art-Therapy-Counseling) website.

Degree Requirements

Core Courses

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ARTS 606  Professional Orientation and Ethics II  3.0
ARTS 507  Group Dynamics and Therapy  2.0
ARTS 508  Introduction to Behavioral Research I  2.0
ARTS 515  Introduction to Behavioral Research II  2.0
ARTS 601  Theories of Psychotherapy I  2.0
ARTS 604  Career Counseling  4.0
ARTS 605  Theories of Psychotherapy II  2.0
ARTS 602  Multicultural Perspectives in Therapy I  2.0
ARTS 603  Clinical Appraisal and Assessment I  2.0
ARTS 607  Clinical Appraisal and Assessment II  2.0

Art Therapy Track Courses
ARTS 531  Art Therapy Assessment and Treatment for Adults I  2.0
ARTS 532  Art Therapy Assessment and Treatment for Adults II  2.0
ARTS 533  Art Therapy Assessment and Treatment for Children I  2.0
ARTS 534  Art Therapy Assessment and Treatment for Children II  2.0
ARTS 535  Art Therapy Theory and Symbolism I  2.0
ARTS 536  Art Therapy Theory and Symbolism II  2.0
ARTS 537  Art Therapy Group Supervision I  1.5
ARTS 538  Art Therapy Group Supervision II  1.5
ARTS 539  Art Therapy Group Supervision III  1.5
ARTS 540  Art Therapy Literature and Research  1.0
ARTS 541  Jungian Psychology for Art Therapists  2.0
ARTS 542  Group Dynamics: Art Therapy  2.0
ARTS 631  Processes and Materials in Art Therapy & Counseling  2.0
ARTS 634  Art Therapy Family Assessment  1.0
ARTS 635  Social and Cultural Foundations in Art Therapy and Counseling  2.0
ARTS 636  Studio Art for Art Therapists  1.5
ARTS 644  Art Therapy Approaches to Trauma Treatment  2.0
ARTS 645  Professional Identity in Art Therapy and Counseling  1.0
ARTS 647  Art Therapy and Counseling Adv Group Supervision I  2.0
ARTS 648  Art Therapy and Counseling Adv Group Supervision II  2.0
ARTS 649  Art Therapy and Counseling Adv Group Supervision III  2.0

Art Therapy Electives  1.0
Select one of the following:
ARTS 640  Medical Art Therapy
ARTS 641  Forensic Art Therapy
ARTS 642  Art Therapy in an Education Setting

Clinical Education Courses
ARTS 510  Clinical Practicum I: Observation  1.0
ARTS 511  Clinical Practicum II  1.0
ARTS 512  Clinical Practicum III  1.0
ARTS 610  Clinical Internship I  3.0
ARTS 611  Clinical Internship II  3.0
ARTS 612  Clinical Internship III  3.0

Thesis
ARTS 621  Thesis I  1.0
ARTS 622  Thesis II  1.0
ARTS 623  Thesis III  1.0
ARTS 624  Thesis IV  1.0

Additional Electives
ARTS 625  For Thesis Only
ARTS 699  Independent Study in Creative Arts Therapy

Total Credits  90.0

Sample Plan of Study

**Term 1**
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**Term Credits**  16.5

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Choose Art Therapy Elective
Creative Arts Therapies Department Faculty

Yasmine Awais, ATR-BC, ATCS, LCAT (Art Institute of Chicago). Assistant Clinical Professor. Multicultural art therapy, clinical supervision.

Joke Bradt, PhD, MT-BC (Temple University). Associate Professor. Research in music therapy, chronic pain, systematic reviews.

Gayle Gates, MA, BC-DMT (Immaculate Heart College, CA) Associate Director, Dance/Movement Therapy Programs. Assistant Clinical Professor. Early childhood development and mother-child interaction, intervention with at risk preschoolers.

Nancy Gerber, PhD, ATR-BC, LPC (Union Institute and University) Director, PhD Program in Creative Arts Therapies. Associate Clinical Professor. Art therapy assessment; treatment of adolescents, adults and geriatrics, modern psychoanalysis and art therapy, arts therapy education, doctoral education.

Sharon W. Goodill, PhD, BC-DMT, NCC, LPC (Union Institute and University) Chair, Department of Creative Arts Therapies. Clinical Professor. Dance/movement therapy for medically ill patients, mind/body studies, CAT research and leadership.

Florence Ierardi, MM, MT-BC, LPC (Temple University) Director of Field Education. Associate Clinical Professor. Effects of percussion playing on the nervous system; rhythm-based assessment models.

Girija Kaimal, EdD, MA (Harvard University). Assistant Professor. Art therapy research, art therapy with clients with substance abuse diagnoses; development of an art therapy assessment for evaluating attachment security.

Paul Nolan, MCAT, MT-BC, LPC (Hahnemann Medical College) Director of Music Therapy Programs. Associate Clinical Professor. Music and child development, outcome studies in music therapy; analysis of musical behaviors in music therapy; psychological responses to music therapy.

Ellen Schelly-Hill, MMT, BA (Antioch NE Graduate School) Director of Dance/Movement Therapy Programs. Associate Clinical Professor. Adults diagnosed with mood disorders, anxiety, and chronic pain; creative arts in therapy for at-risk adolescents.

Music Therapy and Counseling

Major: Music Therapy and Counseling
Degree Awarded: Master of Arts (MA)
Calendar Type: Quarter
Total Credit Hours: 90.0
Classification of Instructional Programs (CIP) code: 51.2305
Standard Occupational Classification (SOC) code: 29-1129

About the Program

The two-year music therapy program is designed to help students develop advanced music therapy clinical skills. The program is the only music therapy training model housed in an academic health center. It is unique in that faculty members include mental health and medical professionals who assist students in integrating music therapy with current developmental, neuroscience, mental health, and medical foundations.

Didactic and clinical aspects are balanced to provide a foundation of theoretical knowledge and practical application. The evidence-informed curriculum integrates knowledge of music therapy with current theoretical approaches to assessment and treatment. Experiential core and music therapy modality courses are designed to help students develop the use of the self within the music therapy relationship.

For additional information about program, visit the College of Nursing and Health Professions' Music Therapy (https://www.drexel.edu/cnhp/academics/graduate/MA-Music-Therapy-Counseling) web site.

Degree Requirements

Core Courses

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<td>ARTS 501</td>
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Sample Plan of Study

Term 1

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Total Credits: 15.0

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ARTS 676 Theories in Music Therapy II 2.0

Term Credits 12.0

Term 6
ARTS 603 Clinical Appraisal and Assessment I 2.0
ARTS 605 Theories of Psychotherapy II 2.0
ARTS 611 Clinical Internship II 3.0
ARTS 623 Thesis III 1.0
ARTS 671 Advanced Music Therapy Skills II 2.0
ARTS 672 Multicultural Perspectives in Music Therapy 2.0

Term Credits 12.0

Term 7
ARTS 606 Professional Orientation and Ethics II 3.0
ARTS 607 Clinical Appraisal and Assessment II 2.0
ARTS 612 Clinical Internship III 3.0
ARTS 624 Thesis IV 1.0
ARTS 677 Advanced Music Therapy Skills III - Group 2.0
ARTS 678 Clinical Internship Laboratory: Musical Analysis 2.0

Term Credits 13.0

Total Credit: 90.0

Creative Arts Therapies Department Faculty

Yasmine Awais, ATR-BC, ATCS, LCAT (Art Institute of Chicago). Assistant Clinical Professor. Multicultural art therapy, clinical supervision.

Joke Bradt, PhD, MT-BC (Temple University). Associate Professor. Research in music therapy, chronic pain, systematic reviews.

Gayle Gates, MA, BC-DMT (Immaculate Heart College, CA) Associate Director, Dance/Movement Therapy Programs. Assistant Clinical Professor. Early childhood development and mother-child interaction, intervention with at risk preschoolers.

Nancy Gerber, PhD, ATR-BC, LPC (Union Institute and University) Director, PhD Program in Creative Arts Therapies. Associate Clinical Professor. Art therapy assessment; treatment of adolescents, adults and geriatrics, modern psychoanalysis and art therapy, arts therapy education, doctoral education.

Sharon W. Goodill, PhD, BC-DMT, NCC, LPC (Union Institute and University) Chair, Department of Creative Arts Therapies. Clinical Professor. Dance/movement therapy for medically ill patients, mind/body studies, CAT research and leadership.

Florence Ierardi, MM, MT-BC, LPC (Temple University) Director of Field Education. Associate Clinical Professor. Effects of percussion playing on the nervous system; rhythm-based assessment models.

Girija Kaimal, EdD, MA (Harvard University). Assistant Professor. Art therapy, educational research, program evaluation, art therapy.

Donna H. Kaiser, PhD, ATR-BC, LPC, LMFT (The College of William and Mary) Director of Art Therapy Programs. Associate Clinical Professor. Art therapy research, art therapy with clients with substance abuse diagnoses; development of an art therapy assessment for evaluating attachment security.

Paul Nolan, MCAT, MT-BC, LPC (Hahnemann Medical College) Director of Music Therapy Programs. Associate Clinical Professor. Music and child development, outcome studies in music therapy; analysis of musical behaviors in music therapy; psychological responses to music therapy.

Ellen Schelly-Hill, MMT, BA (Antioch NE Graduate School) Director of Dance/Movement Therapy Programs. Associate Clinical Professor. Adults diagnosed with mood disorders, anxiety, and chronic pain; creative arts in therapy for at-risk adolescents.

Master of Family Therapy

Major: Family Therapy
Degree Awarded: Master of Family Therapy (MFT)
Calendar Type: Quarter
Total Credit Hours: 91.0
Classification of Instructional Programs (CIP) code: 51.1505
Standard Occupational Classification (SOC) code: 21.1013

About the Program

The Master of Family Therapy Program prepares couple and family therapy practitioners for clinical practice and is designed to meet the educational requirements for license eligibility in the state of Pennsylvania. It is a two-year full-time degree program and offers part-time evenings options accredited by the Commission on Accreditation for Marriage and Family Therapy Education (COAMFTE).

The program prepares students for the profession of couple and family therapy through academic and clinical training. It exposes students to broad areas of theory and practice and provides an intensive, supervised clinical experience. The program emphasizes the interdependence of individual experience and the relational context, extending from family of origin (including traditional and nontraditional families) to the global community. The program is committed to training students to be aware of and sensitive to cultural diversity. In addition, the person of the therapist, including the student’s own culture, is a major aspect of the clinical training.

For more information, visit Drexel’s College of Nursing and Health Professions Individual, Couple and Family Therapy Department (https://www.drexel.edu/cnhp/academics/departments/Couple-and-Family-Therapy) web page.

Degree Requirements

The MFT curriculum assists students in integrating theory and practice. Issues of cultural diversity such as race, class, gender, sexual orientation, and ethnicity and power and privilege are addressed throughout the program. Students are fully trained to assume clinical practice in couple and family therapy and meet the educational requirements for Clinical Fellow membership in the AAMFT.

Required Courses

Theoretical Foundations
CFTP 500 Introduction to Systems Theory 4.0
CFTP 501 Introduction to Family Therapy 4.0
CFTP 503 Historical and Sociocultural Influences 4.0

Clinical Practice
CFTP 505 Bowen Theory 4.0
CFTP 506 Contextual Theory and Therapy 4.0
CFTP 507 Collaborative Approaches 4.0
CFTP 508 Structural Family Therapy 4.0
CFTP 509 Couples Therapy 4.0
CFTP 510 Sex Therapy 4.0
CFTP 511 Object Relations Theory 4.0
CFTP 512 Behavioral Models of Family Therapy 4.0
CFTP 517 Addictions in the Family 4.0
CFTP 518 Medical Family Therapy 4.0
CFTP 519 Family Violence 4.0
CFTP 537 Nosology & Couple and Family Therapy Practice 4.0

Individual Development and Family Relations
CFTP 520 Family Life Cycle 4.0

Professional Identity and Ethics
CFTP 522 Legal and Ethical Implications in Couple and Family Therapy Practice 4.0

Research
CFTP 525 Research in Couple and Family Therapy 4.0

Additional Learning
CFTP 526 Person of the Therapist Experience I 2.0
CFTP 527 Person of the Therapist Experience II 2.0
CFTP 528 Person of the Therapist Experience III 2.0

Electives
CFTP 515 Introduction to Psychopharmacology 2.0
CFTP 521 Human Development 2.0
CFTP 529 Family Policy 2.0

Practicum
CFTP 530 Practicum I 2.0
CFTP 531 Practicum II 2.0
CFTP 532 Practicum III 2.0
CFTP 533 Practicum IV 1.0
CFTP 534 Practicum V 2.0
CFTP 535 Practicum VI 2.0
CFTP 536 Practicum VII 2.0

Total Credits 91.0

Clinical Practicum Experience
All interns must complete a continuous 12-month calendar year experience at one practicum site prior to graduation. Interns will be expected to spend 16-20 hours per week working at the approved program practicum site. Scheduling of specific times will be negotiated by the intern, site supervisor and CFT Director of Clinical Training. The practicum schedule must not conflict with class schedule.

Clinical practicum sites are located primarily in Philadelphia, Delaware, and New Jersey. Settings include addictions facilities, schools, family based and forensic family therapy treatment programs, hospitals, community health centers, juvenile justice treatment systems, and inpatient and outpatient behavioral health agencies.

For additional information, students should contact the Individual, Couple and Family Therapy Department (https://www.drexel.edu/cnhp/academics/ departments/Couple-and-Family-Therapy).

Couple and Family Therapy Faculty
Stephanie Brooks, PhD, LCSW, LMFT (Drexel University) Department Chair and Director, Post-Master's & Medical Family Therapy Certificate Programs. Associate Clinical Professor. Forensic family therapy, couple and family therapy supervision and training, person of the therapist, racism and stress and couples living with ADHD.

Maureen Davey, MFT, PhD, LMFT (Syracuse University). Associate Professor. Development of culturally sensitive family-based interventions for historically under-served populations.

Kenneth Hardy, PhD (Florida State University). Assistant Clinical Professor. Challenging society to think critically about the hidden but significant connections that often exist between trauma and issues of oppression.

Eric Johnson, PhD, MSW, MDiv (Rutgers University). Assistant Clinical Professor. Families of the mentally ill, forensic family therapy, post-divorce mediation.

Marlene F. Watson, PhD, LMFT (Virginia Polytechnic and State University). Associate Professor. Forensic family therapy, siblings, race, class, gender and health policy issues.

Master of Health Administration

Major: Health Administration

Degree Awarded: Master of Health Administration (MHA)

Calendar Type: Quarter

Total Credit Hours: 45.0

Classification of Instructional Programs (CIP) code: 51.0701

Standard Occupational Classification (SOC) code: 11-9111

About the Program

The Master of Health Administration program consists of 10 core courses, one on-site residency, and one elective course, for a total of 45.0 credits. All courses, except for the residency, will be conducted online through Drexel University Online (http://www.drexel.com/online-degrees/nursing-degrees/mha). The residency is designed to provide students with a full master’s level collaborative experience, with on-campus activities, and the experience of visiting and learning about some of the many healthcare facilities in Philadelphia.

Students will learn the extent of health disparities in urban areas based on current health indices, such as infant mortality rates, life expectancy and violence, and the policy, systems management, and epidemiological tools for addressing these.

The curriculum includes community orientation, financial skills, analytical thinking, and strategic orientation. The community orientation is expressed in the public health approach in courses such as the Introduction to Descriptive Epidemiology and Biostatistics, which is based in the tradition of social epidemiology.

Students collaborate to produce an Applied Management Project which will be assigned in groups as a culminating project for the program. In this project, students will apply management tools and/or research tools to address particular administrative challenges, assuring that students think at an organizational level and use particular strategies to respond to change. Set in Drexel's nationally recognized Center for Interdisciplinary Clinical Simulation and Practice (http://www.drexel.edu/cnhp/about/CICSP), students will be a part of a management scenario with experienced actors and state-of-the-art facilities.

In addition to the content of the workforce course, self-confidence and self-development are integrated in the management courses and the on-campus portion of the program, which encourages self-reflection, application of theoretical perspectives, and synthesis of data and
management tools. In the online portion of the course, students engage in threaded discussions with classmates about their completed projects.

The curriculum is designed to allow a student to graduate in two academic years, by taking two courses in the fall, winter, spring of year one; one course in the fall, two courses winter and spring terms of year two; and one five-day on-site residency. Students can also complete the program in three years by taking one course per term, including the summer term in Year 1 and Year 2. In this option, the five-day residency is in the summer of Year 2.

For additional information, please contact:
Susan Feinstein, BS
Administrative Coordinator
Health Administration Department
267-359-5543
slf52@drexel.edu (%20slf52@drexel.edu)

Degree Requirements
The Master of Health Administration program consists of 10 core courses (37.0 credits), one on-site residency (4.0 credits), and one elective course (4.0 credits), for a total of 45.0 credits.

REQUIRED COURSES

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSAD 500</td>
<td>Historical Influences on the US Healthcare System</td>
<td>4.0</td>
</tr>
<tr>
<td>PBHL 701</td>
<td>Introduction to Descriptive Epidemiology and Biostatistics</td>
<td>3.0</td>
</tr>
<tr>
<td>HSAD 505</td>
<td>Ethical and Legal Issues in Healthcare Management and Policy</td>
<td>4.0</td>
</tr>
<tr>
<td>HSAD 540</td>
<td>Resources, Recruitment and Retention in Healthcare</td>
<td>4.0</td>
</tr>
<tr>
<td>RSCH 519</td>
<td>Introduction to Biostatistics</td>
<td>3.0</td>
</tr>
<tr>
<td>HSAD 515</td>
<td>Practice issues in Healthcare Management</td>
<td>4.0</td>
</tr>
<tr>
<td>HSAD 522</td>
<td>Applied Management Project</td>
<td>4.0</td>
</tr>
<tr>
<td>HSAD 530</td>
<td>Politics and Policy of Healthcare Resources</td>
<td>4.0</td>
</tr>
<tr>
<td>HSAD 525</td>
<td>National Health Expenditures</td>
<td>4.0</td>
</tr>
<tr>
<td>HSAD 550</td>
<td>Planning in the Era of the Affordable Care Act</td>
<td>4.0</td>
</tr>
<tr>
<td>PBHL 603</td>
<td>Advanced Healthcare Financial Management</td>
<td>3.0</td>
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</tbody>
</table>

ELECTIVE COURSES (4 credits from the following list)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSAD 560</td>
<td>Advanced Healthcare Marketing</td>
</tr>
<tr>
<td>HSAD 561</td>
<td>Risk Management</td>
</tr>
<tr>
<td>HSAD 562</td>
<td>Group Dynamics in Health Care Management</td>
</tr>
<tr>
<td>HSAD 565</td>
<td>Global Health and Management Issues</td>
</tr>
</tbody>
</table>

Total Credits: 45.0

* HSAD 522 is taken during the first week of Summer term.

Sample Plan of Study

<table>
<thead>
<tr>
<th>Term 1</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>HSAD 500</td>
<td>Historical Influences on the US Healthcare System</td>
</tr>
<tr>
<td>PBHL 701</td>
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</table>

Term Credits: 7.0

Term 2

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>HSAD 505</td>
<td>Ethical and Legal Issues in Healthcare Management and Policy</td>
</tr>
<tr>
<td>HSAD 540</td>
<td>Resources, Recruitment and Retention in Healthcare</td>
</tr>
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Term Credits: 8.0

Term 3

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>RSCH 519</td>
<td>Introduction to Biostatistics</td>
</tr>
<tr>
<td>HSAD 515</td>
<td>Practice issues in Healthcare Management</td>
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</table>

Term Credits: 7.0

Term 4

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>HSAD 522</td>
<td>Applied Management Project</td>
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</table>

Term Credits: 4.0

Term 5

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>HSAD 530</td>
<td>Politics and Policy of Healthcare Resources</td>
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</tbody>
</table>

Term Credits: 4.0

Term 6

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>HSAD 525</td>
<td>National Health Expenditures</td>
</tr>
<tr>
<td>HSAD 550</td>
<td>Planning in the Era of the Affordable Care Act</td>
</tr>
</tbody>
</table>

Term Credits: 8.0

Term 7

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBHL 603</td>
<td>Advanced Healthcare Financial Management</td>
</tr>
<tr>
<td>HSAD 560</td>
<td>Advanced Healthcare Marketing</td>
</tr>
<tr>
<td>HSAD 561</td>
<td>Risk Management</td>
</tr>
<tr>
<td>HSAD 562</td>
<td>Group Dynamics in Health Care Management</td>
</tr>
<tr>
<td>HSAD 565</td>
<td>Global Health and Management Issues</td>
</tr>
</tbody>
</table>

Term Credits: 7.0

Total Credit: 45.0

Health-Services Administration Faculty

Michael Dahnke, PhD (Temple University). Assistant Clinical Professor. Health-care ethics, religion and health care, and media and health care.

David Hume Flood, PhD (University of Pennsylvania) Health Services Administration Program. Professor. Medical humanities: an examination of topics in medicine and health care from the perspectives of literature, the arts, and medical ethics.

Stephen F. Gambescia, PhD, MEd, MBA (Temple University) Assistant Dean of Academic and Student Affairs. Associate Clinical Professor. Health care policy, nonprofits and health care, and health care management and leadership.

Willard Poole Green, PhD (Temple University). Professor. Medical ethics, including the role of patient autonomy in the patient-health professional relationship and the interface with medical paternalism; the barriers to informed consent and strategies to overcome them; and the importance of confidentiality in t

Kristine A. Mulhorn, PhD (University of Delaware) Chair, Department of Health Administration. Assistant Professor. Disability and aging; cross-national methods of functioning.

Constance Karin Perry, PhD, EMT (University of Buffalo). Associate Professor. Biomedical ethics and ethical theory. Research interests
include autonomy, personhood, feminist ethics, the ethics of animal experimentation, and ethical issues in reproduction and pregnancy.

Michelle Sahl, PhD, MEd, MBA, MBE (The University of the Sciences in Philadelphia). Assistant Teaching Professor. Health management and policy: management and leadership of health services organizations, urban health, and the history of health care systems.

Spencer R. Ward, PhD (University of Nebraska). Assistant Professor. The use of behavioral techniques to reduce performance anxiety, improve the knowledge acquisition process and promote distance-learning models.

**Physician Assistant (PA) Certificate**

**Major: Physician Assistant**
**Degree Awarded: Master of Health Sciences (MHS)**
**Calendar Type: Quarter**
**Total Credit Hours: 119.0**
**Classification of Instructional Programs (CIP) code: 51.0912**
**Standard Occupational Classification (SOC) code: 29-1071**

**About the Program**

The Drexel University Physician Assistant Program provides graduates with a Master of Health Science degree with Physician Assistant Certificate, and eligibility to sit for the PANCE (Physician Assistant National Certifying Examination).

The physician assistant (PA) is a primary health care provider who, when graduated from an accredited program and national certified and state-licensed, is eligible to practice medicine with the legal supervision of a physician.

PAs perform many duties including, but not limited to, physical examinations, diagnosis and treatment of illnesses, ordering and interpretation of lab tests, assist in surgery, perform procedures, perform hospital rounds, prescribe medicines and provide patient education.

The mission of this program is to:

- Educate qualified primary care physician assistants
- Improve health care delivery in rural and urban medically under served areas
- Promote the physician assistant profession

**Additional Information**

For more information about this program, contact: paadmissions@drexel.edu

For more details about the program, visit the College of Nursing and Health Professions Physician Assistant (https://www.drexel.edu/cnhp/academics/graduate/MHS-Physician-Assistant) page.

**Degree Requirements**

The intensive curriculum consists of professionally related coursework taken during a continuous period (the part-time option requires an additional calendar year) and gives students an understanding of both the health care system within which they will work and the functions appropriate to the role of the physician assistant. The curriculum is divided into a full year of didactic courses followed by an additional 15 months of supervised clinical practice.

Training begins with four quarters of didactic education which integrates patient interaction throughout. The clinical training phase consists of six (6) five-credit, five week clinical rotations in medicine, surgery, women’s health, pediatrics, emergency medicine, and psychiatry. The clinical phase of the curriculum is completed on a full-time basis for both full and part-time students.

The final portion of the curriculum consists of two, 10-credit quarter-long, primary care practica (preceptorships). During the preceptorship phase, each student is assigned to two primary care sites for individualized clinical training with physician preceptors. Training sites during the clinical year are located throughout Pennsylvania and in other states. Students are expected to relocate during the clinical phase and are responsible for all associated financial costs, including transportation and living expenses.

The program is intensely challenging, both intellectually and physically, and requires stamina as well as personal and financial sacrifice on the part of the students. The program demands a high degree of integrity, self-sufficiency, motivation, and self-discipline, and highly developed study skills.

The Physician Assistant program utilizes electronic documentation and communications. Therefore, all students are required to have laptop computers with Web access capability.

Contact the Physician Assistant Program (https://www.drexel.edu/cnhp/academics/graduate/MHS-Physician-Assistant) for more information on the sequencing for the part-time option.

**Required Courses**

**First Year**

**Fall**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA 540</td>
<td>Clinical Anatomy</td>
<td>5.0</td>
</tr>
<tr>
<td>PA 545</td>
<td>Physician Assistant Practice</td>
<td>1.0</td>
</tr>
<tr>
<td>PA 543</td>
<td>Ethical Issues in Physician Assistant Practice</td>
<td>2.0</td>
</tr>
<tr>
<td>PA 542</td>
<td>Patient Communication</td>
<td>2.0</td>
</tr>
<tr>
<td>PA 544</td>
<td>Clinical Assessment</td>
<td>5.0</td>
</tr>
</tbody>
</table>

**Term Credits 15.0**

**Winter**

In this quarter, part-time students may take PA 546 Health Policy for Physician Assistance Practice and/or an elective in addition to the required courses. This will enable them to take the first summer quarter off. addition to the required courses.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA 548</td>
<td>Principles of Medical Science I</td>
<td>2.0</td>
</tr>
<tr>
<td>PA 556</td>
<td>Clinical Medicine I</td>
<td>5.0</td>
</tr>
<tr>
<td>PA 551</td>
<td>Pharmacology and Therapeutics I</td>
<td>3.0</td>
</tr>
<tr>
<td>PA 559</td>
<td>Clinical Skills I</td>
<td>2.0</td>
</tr>
<tr>
<td>PA 547</td>
<td>Evidence Based Medicine for Physicians</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits 15.0**

**Spring**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PA 549</td>
<td>Principles of Medical Science II</td>
<td>2.0</td>
</tr>
<tr>
<td>PA 557</td>
<td>Clinical Medicine II</td>
<td>5.0</td>
</tr>
<tr>
<td>PA 552</td>
<td>Pharmacology and Therapeutics II</td>
<td>2.0</td>
</tr>
<tr>
<td>PA 560</td>
<td>Clinical Skills II</td>
<td>2.0</td>
</tr>
</tbody>
</table>
Summer
In this quarter, part-time students may take PA 546 Health Policy for Physician Assistant Practice plus an elective if they wish to attend during the summer quarter.

PA 546  Health Policy for Physician Assistant Practice  2.0

Term Credits  10.0

Second Year
Fall
The Clinical Phase (Full-time for all students, 5 quarters)
Rotation I  5.0
Rotation II  5.0

Term Credits  10.0

Winter
Rotation III  5.0
Rotation IV  5.0
Graduate Project I  3.0

Term Credits  13.0

Spring
Rotation V  5.0
Rotation VI  5.0

Term Credits  10.0

Third Year
Summer
PA 635  Primary Care Practicum I  10.0
PA 638  Graduate Project II  3.0-6.0

Term Credits  13.0-16.0

Fourth Year
Fall
PA 637  Primary Care Practicum II  10.0

Term Credits  10.0

Total Credit: 117.0-120.0

*Clinical Year Rotation Courses
The sequencing of the six clinical rotations will vary for individual students, but all students must take all six rotations.

PA 629  Medicine Rotation  5.0
PA 630  Pediatrics Rotation  5.0
PA 631  Obstetrics and Gynecology Rotation  5.0
PA 632  Psychiatry and Behavioral Health Rotation  5.0
PA 633  Surgery Rotation  5.0
PA 634  Emergency Medicine Rotation  5.0

Admission Requirements
The Drexel University Physician Assistant Program utilizes the Central Application Service for Physician Assistants (CASPA). All applicants must complete the CASPA application process no later than October 1st of the year prior to expected date of matriculation. Applications must be e-submitted, complete (including the receipt by CASPA of all transcripts, reference forms, and other supporting documentation such as foreign transcript evaluations and TOEFL score) and verified by CASPA by the October 1st deadline. Applicants may not apply directly to the Drexel University Physician Assistant Program. Applications made directly to the Office of Enrollment Management (Admissions) of Drexel University will not be processed.

• For the 2015-2016 admissions cycle, applications must be verified by CASPA no later than October 1st, 2015.
• Applications remaining unverified by CASPA for any reason after the October 1st deadline will not be processed.

For additional details about the application process, visit the Physician Assistant Program’s Admissions web page.

Application Prerequisites
• A minimum grade point average of 3.0 on a 4.0 grading scale from all colleges and universities attended is required for the following three (3) categories: non-science courses, natural science courses, and combined overall courses. Applications will not be reviewed unless the applicant has attained these minimum requirements at time of application.
• Meet the technical standards for admission, progression, and graduation from the Physician Assistant Program. Each applicant is expected to review completely the “Technical Standards for PA Program” PDF at the end of this page. Individuals unable to meet these technical standards, with or without reasonable accommodation, are counseled to pursue alternate careers.
• Official transcripts from all colleges and universities attended sent directly to CASPA.
• Non-United States-based educational institutional transcripts must be evaluated by an approved agency (see the listing of acceptable agencies on the CASPA website at https://portal.caspaonline.org/faq/foreign_transcripts.htm). Evaluation fees are the responsibility of the applicant. Evaluations must be sent directly to CASPA.
• A personal statement recorded as part of the CASPA application. Preferred references are from individuals who have interacted with the applicant in a supervisory capacity or academic instructors who have personal knowledge of the applicant. Submission of references from friends, relatives, personal physicians, or instructors who do not possess a personal, supervisory knowledge of the applicants is discouraged.
• A personal statement recorded as part of the CASPA application.
• An applicant whose native language is not English must submit scores from the TOEFL iBT examination unless the applicant has graduated with a bachelor’s degree from a U.S. college or university. The minimum required score for the iBT (Internet Based Testing) is 79 and a minimum score of 26 is required for the speaking component. Find more detailed information at http://www.toeflgoanywhere.org/. Scores must be submitted directly to CASPA.
• Meet the minimum prerequisite coursework as detailed in the “Admission Requirements and Process” PDF below.

A minimum of 500 hours of clearly documented volunteer/paid direct hands-on patient contact accrued by the time of application and recorded as part of the official CASPA application is required. Ensure that all hours are accurately reported. Applicants may list the same position in multiple sections in order to account for multiple experiences (patient contact, related health care, research, shadowing, etc.) accrued in the same position as long as each hour is not reported in more than one experience category. Please review the “Patient Contact” PDF below for more information regarding acceptable forms of patient contact.

• Graduate Record Examination (GRE) scores are not required.
• The Physician Assistant Program does not grant advanced standing.

Physician Assistant Faculty

Patrick C. Auth, PhD, PA-C (Drexel University) Department Chair, Physician Assistant Department. Clinical Professor. Clinical reasoning of physician assistant students.

Adrian Banning, MMS, PA-C (Arcadia University). Assistant Clinical Professor. Dermatology, family practice, and evidence based medicine.

Geraldine A. Buck, DrPH, MHS, PA-C (Drexel University) Director, Physician Assistant Post-Professional Master’s Program. Associate Teaching Professor. Public health.

M. Rebecca Buckley, MHS, PA-C (Drexel University) Associate Director of Clinical Education. Assistant Clinical Professor. Psychiatry.

Rosalie Coppola, MHS, PA-C (Drexel University). Associate Clinical Professor. Standardized patients, simulation, clinical assessment and pharmacology.

G. John DiGregorio, MD, PhD (Hahnemann University) Medical Director of the Hahnemann Physician Assistant Program. Professor. Pharmacology.

Ellen D. Feld, MD, FACP (University of Cincinnati, College of Medicine). Associate Clinical Professor. Clinical medicine and ethical issues.

Gretchen L. Fox, MMSc, PA-C (St. Francis College) Associate Program Director. Associate Clinical Professor. Internal medicine/family practice.


Julie Kinzel, MEd, PA-C (Temple University). Assistant Clinical Professor. Long term care experiences, geriatrics, gastroenterology and liver disease.

Daniela C. Livingston, PA-C, MD (Medical School, Bucharest, Romania; University of Washington, Seattle). Assistant Clinical Professor. Pediatrics, primary care and working with underserved populations, with a special emphasis on preventative pediatrics.


Nina Multak, MPAS, PA-C (University of Nebraska). Associate Clinical Professor. Human patient simulators, standardized patients and healthcare informatics.

Diana D. Smith, MHS, PA-C (Drexel University). Clinical Instructor. Primary care and international health care; distance education.


Human Nutrition

Major: Human Nutrition
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 30.1901
Standard Occupational Classification (SOC) code: 29-1031

About the Program

The human nutrition major is designed to provide the didactic coursework necessary to prepare students to address the nutrition needs of individuals or groups, through prevention or management of illness or chronic disease. This major also encompasses nutrition science, the application of the principles of biochemistry, physiology, and biology to human nutritional needs. The major includes two tracks; the Didactic Program in Dietetics (DPD) track leading to becoming a registered dietitian nutritionist (RDN), and the Nutrition Sciences track leading to application in research or industry. Applicants to the program should indicate to which track they are applying.

Current research in human nutrition includes: the prevention of obesity and diabetes across the lifespan; community engagement to improve healthful food access, availability, and exposure in school and clinic-based settings; nutrition misinformation in the areas of diabetes, oncology and weight control; and effectiveness of nutrition education (particularly by the use of multimedia) on health and eating habits.

Current research in nutrition science includes: dopamine-mediated mechanisms of food intake regulation in humans and its impact on metabolic homeostasis, especially as it applies to obesity, eating disorders and aging; the relationship between human exposure to pesticides and oxidative stress by measuring biomarkers of oxidative stress in biological fluids and DNA damage in human cells; identifying potential unique food safety risks for minority racial/ethnic and low income populations; and, understanding whether novel dietary interventions can influence bone-regulating hormones, bone mineral density, pro-inflammatory cytokines and energy metabolism.

Graduate study in human nutrition is offered on both a full-time and part-time basis. Students are admitted only in the Fall or Winter terms. Students in the DPD track are required to complete a comprehensive exam at the end of the first year of study, and have the option to complete a research thesis. Students in the Nutrition Sciences track are required to complete a research thesis. In addition to the core curriculum, students select specialty courses relating to their major, as well as electives.

Visit the College’s MS in Human Nutrition web page (https://www.drexel.edu/cnhp/academics/graduate/MS-Human-Nutrition) for more information.

Program Prerequisites

The Human Nutrition program builds on a fundamental background in human behavior, written communication, and the sciences of biology, chemistry, physiology and nutrition.
Applicants may apply to the program at any point in time while completing prerequisites. However, if they are accepted, all prerequisite courses must be completed with a grade of B or better before students may enroll in the program.

- 1 year English composition and/or literature
- 1 semester general biology with lab to include cells and genetics
- 2 semesters general chemistry with lab, OR, 1 semester general chemistry with lab AND 1 semester organic chemistry with lab
- 1 semester upper-level (300-400 level) biochemistry
- 1 semester human physiology, OR, 2 semesters anatomy & physiology with lab
- 1 semester general psychology
- 1 semester statistics
- 1 semester nutrition

In addition, students completing the DPD track will be required to complete the following 2 courses either before entry to the program or while completing the degree program in order to receive a DPD verification statement.

- 1 semester basic food preparation (DPD track only)
- 1 semester quantity foods (DPD track only)

### Degree Requirements - Nutrition Sciences Track

Students are required to complete 21.0 credits of CORE courses and then select 24.0 credits of electives chosen from courses currently offered in Biology, Nutrition, Food Science, Environmental Science or Public Health after consulting with their advisor. Those students choosing the thesis option substitute 6 credits of research for two elective courses. Those students choosing the non-thesis option are required to pass a comprehensive exam before being granted their MS.

There are two tracks available for the MS in Human Nutrition.

The DPD track provides the coursework necessary to fulfill the didactic requirements of the Accreditation Council for Education in Nutrition and Dietetics (ACEND) for eligibility to become a registered dietitian.

The Nutrition Science track provides a foundation in the science of nutrition for those who are planning to pursue research, doctoral studies, or who are already a registered dietitian.

Students in both tracks are required to successfully complete a comprehensive exam or research thesis prior to graduation.

### Degree Requirements - Didactic Program in Dietetics (DPD) Track

The Didactic Program in Dietetics (DPD) (https://www.drexel.edu/cnhp/academics/graduate/MS-Human-Nutrition) provides the coursework that is required to become a Registered Dietitian/Nutritionist (RD/RDN). Students who want to become an RD/RDN must successfully complete course work approved by the Accreditation Council for Education in Nutrition and Dietetics (ACEND) of the Academy of Nutrition and Dietetics (AND). Drexel University was one of the first universities in the country to offer the DPD program on the graduate level. In 2022, all newly credentialed RD/RDN will be required to have a graduate degree.

The MS in Human Nutrition with the DPD option is a full- or part-time program with courses offered in the evening. The program is 45.0 credits with a written comprehensive exam and may be completed in 18 months to two years with full-time study. Students who enroll part time typically complete the program in three to four years. After completing the MS in Human Nutrition, students participating in this program will also receive a Verification Statement which shows successful completion of the DPD and allows them to apply for an accredited supervised practice experience (dietetic internship).

### Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>FDSC 506</td>
<td>Food Composition &amp; Behavior</td>
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<tr>
<td>NFS 510</td>
<td>Profession of Dietetics</td>
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<tr>
<td>NFS 525</td>
<td>Nutritional Assessment Through the Life Cycle</td>
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<td>NFS 530</td>
<td>Macronutrient Metabolism</td>
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<tr>
<td>NFS 531</td>
<td>Micronutrient Metabolism</td>
<td>3.0</td>
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<tr>
<td>NFS 543</td>
<td>Medical Nutrition Therapy I</td>
<td>3.0</td>
</tr>
<tr>
<td>NFS 544</td>
<td>Medical Nutrition Therapy II</td>
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</tr>
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<td>NFS 545</td>
<td>Nutrition in Critical Care</td>
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<td>NFS 546</td>
<td>World Nutrition</td>
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<td>NFS 601</td>
<td>Research Methods</td>
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<td>NFS 630</td>
<td>Nutrition Counseling</td>
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<td>NFS 550</td>
<td>Foodservice Systems Management</td>
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<td>NFS 690</td>
<td>Community Nutrition</td>
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<td>NFS 849</td>
<td>Readings in Therapeutic Nutrition</td>
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<td>Elective</td>
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<td><strong>Total Credits</strong></td>
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</table>

### Nutrition Sciences Faculty


Angelo Dei Parigi, MD (University of Bari, Italy) Courtesy Appointment. Visiting Research Professor.

Beth L. Leonberg, MS, MA, RD (Colorado State University, Rowan University) Director, Didactic Program in Dietetics. Instructor. Pediatric nutrition.

Brandy-Joe Milliron, PhD (Arizona State University). Assistant Professor. The development and evaluation of modifications in the natural environment to promote healthier living; farm to table school initiatives;

Donna H. Mueller, PhD (Temple University) Registered Dietitian. Nutrition and Foods. Associate Professor. Clinical nutrition; pediatric nutrition; nutrition in pulmonary diseases, especially cystic fibrosis; nutrition in developmental delay; dental nutrition; dietetic education and professional development.

Juan Muniz, PhD (Oregon State University) Laboratory Manager. Assistant Research Professor. Food microbiology; community-based research to assess pesticide levels in homes; prevention of health effects of pesticides for indigenous farmworkers.

Jennifer Nasser, PhD (Rutgers University). Associate Professor. Dopamine-mediated mechanisms of food intake regulation in humans and its impact on metabolic homeostasis, especially as it applies to obesity, eating disorders and aging.
Nursing Education and Faculty Role Post-Bachelor's Certificate

Jennifer Quinlan, PhD (North Carolina State University). Associate Professor. Food microbiology; microbiological quality and safety of produce, dairy and meat products in markets in high vs. low socioeconomics areas, Bacillus and Clostridium spores in food processing.

Barry Ritz, PhD (Drexel University) Courtesy Appointment. Visiting Research Professor.

Vicki Schwartz, MS (Drexel University) Nutrition and Foods. Assistant Clinical Professor. Advanced nutrition, clinical nutrition, nutrition support.

Alison Ventura, PhD (Pennsylvania State University). Assistant Professor. Factors that contribute to the development of eating behaviors and dietary preferences during infancy and early childhood.

Stella Lucia Volpe, PhD, RD, LDN, FACSM (Virginia Polytechnic Institute and State University) Chair, Nutrition Sciences. Professor. Prevention of obesity and diabetes across the lifespan; mineral metabolism and exercise; energy balance; sports nutrition.

Interdepartmental Faculty

Rose Ann DiMaria-Ghalili, PhD, MSN, BSN, CNSC (New York University, School of Education, Division of Nursing). Associate Professor. Nutrition and surgical recovery to improve the care of older adults undergoing surgery; nutrition assessment, inflammation, and health outcomes.

Michael Lowe, PhD (Boston College). Professor. Prevention and treatment of eating disorders and obesity; effects of appetitive responsiveness and dietary restraint on eating regulation; psychobiology of obesity-proneness; empirical foundations of unconscious processes.

Margaret O'Neil, PT, PhD, MPH (MCP Hahnemann University; Duke University; University of North Carolina at Chapel Hill). Associate Professor. Measurement of and interventions to improve physical activity and fitness levels and promote participation in children and youth with who are overweight/obese and those with physical disabilities (especially cerebral palsy).

Patricia A. Shewokis, PhD (University of Georgia). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy (NIR) and electroencephalography (EEG) and methodology and research design.

Nursing Education and Faculty Role Post-Bachelor's Certificate

Certificate Level: Graduate
Admission Requirements: Bachelor's Degree
Certificate Type: Post Baccalaureate
Number of Credits to Completion: 12.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.3809
Standard Occupational Classification (SOC) Code: 29-1171

This program provides a four-course grouping of classes that focus on knowledge and skills required for healthcare provider education roles. Courses are chosen from the MSN in Nursing Education and Faculty Role curriculum. Upon completion of this certificate program, the student will have 12.0 graduate credits from an NLN/CCNE-approved master's in nursing program.

Course List
Required Courses

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tr>
<td>NURS 591</td>
<td>Foundations of Nursing Education</td>
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</tr>
<tr>
<td>NURS 606</td>
<td>Curriculum Design for Higher Level Cognition</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 615</td>
<td>Assessment, Measurement and Evaluation</td>
<td>3.0</td>
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Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>NURS 613</td>
<td>The Role and Responsibility of the Nursing</td>
</tr>
<tr>
<td></td>
<td>Professor</td>
</tr>
<tr>
<td>or NURS 616</td>
<td>Teaching Methods in Nursing Education</td>
</tr>
</tbody>
</table>

Total Credits 12.0

For more information about this program, contact:

Mr. Redian Furxhiu
rf53@drexel.edu (fr53@drexel.edu)
215.762.3999

Pediatric Acute Care Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Post-Master's
Number of Credits to Completion: 39.0; 800 clinical hours
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.3809
Standard Occupational Classification (SOC) Code: 29-1171

About the Program

The Pediatric Acute Care Nurse Practitioner Certificate is an elite post-graduate program that prepares students to deliver advanced care to infants, children and adolescents with acute, critical, and complex health conditions. Students will build upon primary care experience through courses that emphasize evidence-based practice, interdisciplinary collaboration, and the critical use of new technology. The program's curriculum was developed and is taught by Drexel University's renowned faculty from the nationally ranked College of Nursing and Health Professions.

Admission Requirements

- A Master's degree with a major in nursing (MSN) from a regionally accredited program with a cumulative grade point average of at least 3.0 on a scale of 4.0.
- A copy of your current, unrestricted United States RN license or eligibility for licensure as a registered nurse. License verification from your nursing license registry website are acceptable. Once accepted, applicants must have a current RN license in the state of Pennsylvania. In addition, students are required to have a RN Nursing License for the state in which the clinical practicum rotations are being completed.
- A copy of your current PALS certification
• Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online through a password secured link or website (use our email address, customerservice@drexel.com). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts. Click here to use our Transcript Look-up Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions. If you attended a Diploma School of Nursing and the school was affiliated with a college/university, the official transcript must be submitted from the college for any non-nursing courses for which you received credit.

• Current Curriculum vitae and/or resume detailing work experience, including specific job responsibilities and departments.

• Two professional letters of recommendation (from either a previous or immediate supervisor and/or a former nursing faculty member who can attest to the applicant's clinical knowledge, skill and potential aptitude for graduate study). References will not be accepted from colleagues or family members. Drexel University Online now accepts electronic letters of recommendation. Click here (http://www.drexel.edu/apply/recommend) for instructions regarding their submission. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.

• Personal statement (800-1,600 words) that will give the Admissions Committee a better understanding of why you are choosing this particular program of study, your plans upon completion of this program, and how your current work experience will enhance your experience in this program.

• Applicants seeking admission into the Pediatric Acute Care Nurse Practitioner Post-Master's Certificate Program must complete 800 clinical practicum hours. Accepted students will need to be issued a Pennsylvania RN license in addition to their current RN license if it is not from Pennsylvania.

• International applicants: Please click here (http://www.drexel.edu/online-degrees/nursing-degrees/cert-pm-apmhnپ/international.aspx) to view additional requirements.

• Once the student is accepted into the program, a GAP analysis may be completed to determine credit eligibility for previously faculty supervised clinical hours. Note: The Gap Analysis is not mandatory for acceptance into the program. If the prospective student chooses to have a Gap Analysis completed, it is performed after confirmed admissions.

• A personal interview may be required (online or telephone options will be available).

### Required Courses

<table>
<thead>
<tr>
<th>Support Courses</th>
<th>Number of Credits</th>
</tr>
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<tbody>
<tr>
<td>NURS 548 Advanced Pathophysiology</td>
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<tr>
<td>NURS 549 Advanced Pharmacology</td>
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<tr>
<td>NURS 550 Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
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<tr>
<td>NURS 646 Pharmacology for the Pediatric Nurse Practitioner</td>
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<td>NURS 664 Professional Issues for Nurse Practitioners</td>
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### Clinical Courses

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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Number of Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 642</td>
<td>PNP I: Primary Care of Infants, Children and Adolescents</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 643</td>
<td>PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 649</td>
<td>Ped Nurse Pract AC I: Acute-Chronic Care of Infants, Children and Adolescents Management</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 650</td>
<td>Ped Nurse Pract AC II: Acute-Chronic Care of Infants, Children and Adolescents Management</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 651</td>
<td>PNP Management of the Medically Fragile and Technology Dependent Child in the Community</td>
<td>5.0</td>
</tr>
</tbody>
</table>

### Total Credits

| Total Credits | 39.0 |

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**Pediatric Primary Care and Pediatric Acute Care Dual Nurse Practitioner Post-Master’s Certificate**

*Certificate Level: Graduate*

*Admission Requirements: Master's degree*

*Certificate Type: Post-Graduate*

*Number of Credits to Completion: 44.0*

*Instructional Delivery: Online, Campus*

*Calendar Type: Quarter*

*Expected Time to Completion: 2 years*

*Financial Aid Eligibility: Not aid eligible*

*Classification of Instructional Program (CIP) Code: 51.3809*

*Standard Occupational Classification (SOC) Code: 29-1171*

The online Pediatric Primary Care and Pediatric Acute Care Dual Nurse Practitioner Post-Master’s Certificate program prepares students for advanced nursing roles as clinicians, educators, researchers, and leaders in pediatric health and wellness. Students will also become experts in delivering care to infants, children, and adolescents with acute and complex health disorders. The program’s curriculum was developed and is taught by Drexel University’s renowned faculty from the nationally ranked College of Nursing and Health Professions (http://drexel.edu/cnhp).

The certificate’s curriculum emphasizes evidence-based practice, interdisciplinary collaboration, and the critical use of new technology. Nurse practitioners specializing in pediatric primary and acute care will be able to meet the health care needs required by children and families with acute and chronic, complex care with a promotion of optimal wellness.

### On-Campus Requirements

This is a high-quality certificate program that demands a major commitment of time by advanced practice nurses. Because students are being educated to diagnose and treat patients, the program was designed to combine the convenience of online learning with the necessary rigor to become a highly competent and confident Pediatric Primary Care and Acute Care Nurse Practitioner upon graduation. Thus, while most courses are offered online, some facets of the program do require on-campus visits and clinical practicum rotations.

During enrollment in their clinical coursework, students are required to attend one-to-two day campus intensive experiences. Students will participate in simulated clinical learning experiences conducted in CNHP’s state-of-the-art, multidisciplinary patient simulation lab. These visits allow
professors to offer students direct support, guidance, and mentoring while providing students with the opportunity to interact with faculty members and collaborate with peers.

**Admission Requirements**

- A completed application
- A masters degree in nursing from a CCNE or NLN accredited program with a Graduate GPA of 3.0 or above
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Transcripts must be supplied regardless of the number of credits earned or the type of school attended. Instead of hard copy transcripts, post-secondary institutions can supply official electronic transcripts directly to Drexel University Online through a password secured link or website (use our email address, customerservice@drexel.com). If all post-secondary institutions are not listed on the application and these appear on transcripts received from other institutions, applications will not be reviewed until the remaining transcripts have been submitted. Use Drexel's Transcript Lookup Tool to assist with contacting your previous institutions.
- Two letters of recommendation. Use Drexel's electronic letter of recommendation service. If a recommender prefers to submit an original, hard copy letter, it must include an ink signature and be submitted in a sealed envelope.
- Personal statement (800 - 1600 words) that will give the admissions committee a better understanding of:
  - Why this particular program of study is being chosen
  - Plans upon completion of the certificate
  - How current work experience will enhance program experience
- Resume/CV
- A copy of your current, unrestricted United States RN license or eligibility for licensure as a registered nurse and any advanced practice nursing licensure and certification documents. License verification from your nursing license registry website is acceptable.
- A copy of your current PALS certification
- Additional requirements for International Students

**Program Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>NURS 548</td>
<td>Advanced Pathophysiology</td>
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<td>NURS 550</td>
<td>Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
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<td>NURS 642</td>
<td>PNP I: Primary Care of Infants, Children and Adolescents</td>
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<td>NURS 643</td>
<td>PNP II: Episodic Care of Infants, Children and Adolescents in Primary Care</td>
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<tr>
<td>NURS 646</td>
<td>Pharmacology for the Pediatric Nurse Practitioner</td>
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<tr>
<td>NURS 647</td>
<td>PNP III: Management and Care of Adolescents in the Primary Care Setting</td>
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<tr>
<td>NURS 649</td>
<td>Ped Nurse Pract AC I:Acute-Chronic Care of Infants, Children and Adolescents Management</td>
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<td>NURS 650</td>
<td>Ped Nurse Pract AC II:Acute-Chronic Care of Infants, Children and Adolescents Management</td>
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<tr>
<td>NURS 651</td>
<td>PNP Management of the Medically Fragile and Technology Dependent Child in the Community</td>
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Total Credit: 44.0

**Sample Plan of Study**

<table>
<thead>
<tr>
<th>Term</th>
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<tbody>
<tr>
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<tr>
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<td>Advanced Clinical Assessment Diagnostic Reasoning Across the Lifespan</td>
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<td>NURS 647</td>
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<tr>
<td>NURS 651</td>
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<tr>
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Total Credit: 44.0

**PhD in Creative Arts Therapies**

Major: Creative Arts Therapies
Degree Awarded: Doctor of Philosophy
Calendar Type: Quarter
Total Credit Hours: 66.0
Classification of Instructional Programs (CIP) code: 51.2399
Standard Occupational Classification (SOC) code: 29-1129
About the Program

The Creative Arts Therapies programs are based on specialized didactic and clinical education in art therapy, dance/movement therapy or music therapy. Admission criteria are specific to each of the three areas of concentration.

The curriculum contains core courses for all students in areas related to mental health sciences, creative arts in therapy theory and specialized courses for students of each arts therapy modality. The Department of Creative Arts Therapies offers both an MA degree with specialization as well as a PhD degree in Creative Arts Therapies.

The Creative Arts Therapies (https://www.drexel.edu/cnhp/academics/departments/Creative-Arts-Therapies) programs integrate knowledge of the creative arts therapies with current theoretical and practical approaches to assessment and treatment in mental health, medical, and educational contexts. Academic, clinical, and supervisory aspects are balanced and integrated, with an emphasis on developing competent and compassionate professionals who will contribute to our multicultural society in meaningful and creative ways. The programs are unique in that the faculty includes both creative arts therapists and mental health professionals with an interest in the arts who help students integrate the specialized creative arts therapy knowledge with trends and discoveries in the social and health sciences.

Admission criteria are specific to each of the three areas of concentration. For information about how to apply to the MA program, visit the Drexel University Admissions MA in Creative Arts Therapies (http://www.drexel.edu/grad/programs/cnhp) page.

PhD in Creative Arts Therapies

The PhD in Creative Arts Therapies program is a research degree for art therapists, dance/movement therapists, and music therapists who are interested in focusing their careers on scholarly pursuits and academic leadership in their specific discipline. The primary mission of the program is the cultivation of scholars and academic leaders for the purpose of generating and disseminating substantive, quality research that ultimately contributes to the bodies of knowledge, best clinical practices, and the efficacy of the arts therapies fields.

The mission of the PhD in Creative Arts Therapies program is to cultivate stewards of the professions who can preserve the traditions of the disciplines, promote scholarly and clinical advancement, and contribute to the legitimization of the fields. In pursuit of the program mission, the innovative curriculum includes four interactive learning modules that comprise a three-year full-time degree program:

- Interdisciplinary module
- Research module
- Self/other artistic module
- Practicum module

The learning culture, curriculum, and pedagogy of the PhD in Creative Arts Therapies are the primary components contributing to the comprehensiveness of this advanced research degree. The learning culture is one of creativity, innovation, initiative and support. The curriculum and pedagogy emphasize the interaction between intellectual, emotional, inter-subjective and artistic learning for the purpose of generating knowledge in the arts therapies.

The learning culture, curriculum and pedagogy are elaborated in the following constructs:

- A learning culture that supports the exploration and integration of intellectual, emotional, artistic, and self/other knowledge as parallel to the psychotherapeutic and creative processes.
- An educational philosophy, curricular structure, and innovative pedagogy which supports dynamic and creative inquiry into interdisciplinary and discipline specific bodies of knowledge.
- A comprehensive approach to traditional and innovative research methods that best support the ontological, epistemological, theoretical and applied practice in the arts therapies.
- The integration of theoretical, experiential, and pragmatic knowledge.
- A dialectic between didactic, intrinsic, and practical learning experiences.
- The cultivation of aptitudes and competencies in intellectual, subjective, inter-subjective and artistic inquiry for each student.

For additional information about the program, visit the College of Nursing and Health Professions' PhD in Creative Arts Therapies (https://www.drexel.edu/cnhp/academics/doctoral/PHD-Creative-Arts-Therapies) web site.

General Requirements

The following general requirements must be satisfied in order to complete the PhD in Creative Arts Therapies:

- 66.0 quarter credits of required courses
- Candidacy/Qualifying exam (administered after the completion of one year or 45 quarter credits)
- Approval of dissertation proposal
- Practicum in one of the following: teaching, research, clinical supervision or advanced clinical practice
- Completion of dissertation
- Final oral exam/oral defense of dissertation

The required courses in the curriculum are organized into four essential learning modules: 1) interdisciplinary; 2) research; 3) self/other and artistic knowledge; and 4) practical application. These courses comprise the key components of the doctoral program, along with the dissertation.

Interdisciplinary Seminars

| ARTS 703 | Interdisciplinary Seminar I | 3.0 |
| ARTS 704 | Interdisciplinary Seminar II | 3.0 |
| ARTS 705 | Interdisciplinary Seminar III | 3.0 |
| ARTS 706 | Interdisciplinary Seminar IV | 3.0 |

Research Courses

| ARTS 712 | Research I: Philosophy & Theory | 3.0 |
| RSCH 770 | Foundations in Research Methods | 3.0 |
| ARTS 714 | Research Methods III: Qualitative Methods | 3.0 |
| ARTS 715 | Innovative and Emergent Research Methods (RSCH 770 is eliminated because it is not yet an approved course. This course will be active next year.) | 3.0 |
| RSCH 759 | Foundations of Biostatistics | 3.0 |

Research Specialization

Select one of the following: 3.0

| ARTS 732 | Advanced Quantitative Research Seminar |
ARTS 733  Advanced Qualitative Research Seminar
ARTS 734  Innovative and Emergent Research Methods II

Self/Other Artistic Knowledge Studio Labs
ARTS 716  Studio Based Artistic Inquiry I  3.0
ARTS 717  Studio Based Artistic Inquiry II  3.0
ARTS 718  Studio Based Artistic Inquiry III  3.0
ARTS 719  Studio Based Artistic Inquiry IV  3.0

Practical Application Courses
Practicum in either research, teaching, clinical supervision, or advanced clinical practice.
ARTS 808  Practicum I  3.0
ARTS 809  Practicum II  3.0
ARTS 810  Practicum III  3.0

Dissertation Courses
Select 9 credits from the following variable credit courses:  9.0
ARTS 804  Dissertation Research I
ARTS 805  Dissertation Research II
ARTS 806  Dissertation Research III
ARTS 807  Dissertation Research IV

Electives
Students, with advisement and in accordance with their educational plan, can choose to take two electives in the same content area, or may choose to take one elective each in two different content areas.  6.0

Total Credits  66.0

The dissertation is an original research project, the content of which directly relates to the epistemology, theory, and/or practice of the student's creative arts therapy specialization.

All electives must be graduate courses and can be selected from those courses offered at Drexel University. In particular, doctoral level courses in the College of Nursing and Health Professions, School of Public Health, College of Arts and Sciences, and/or the School of Education may be the most relevant to students in this program. (The Creative Arts Therapies PhD program director will obtain permission for the student to take the elective from the relevant Dean of the College or School, and the relevant program director and course instructor.)

Content areas that are acceptable for electives include the following: anthropology, biology, creativity, culture and communication, ethics, health psychology, literature, neuroanatomy, neuropsychology, philosophy, psychology, psychoanalysis, sociology, advanced statistics. Additional content areas may be added by special request as approved by the supervising faculty advisor and program director.

PhD in Creative Arts Therapies Admission Requirements

Applicants for the Doctor of Philosophy (PhD) program in Creative Arts Therapies are screened based upon the required application documents plus a personal interview by the faculty. The application documents and interview are designed to assess the applicant's aptitudes and commitment to advanced academic achievement and the development of scholarship. Admission into the PhD program includes both firm and malleable requirements. The firm requirements include a Master's degree in Art, Dance/Movement, Music or Expressive Therapy, a minimum of three years post master's clinical experience, certification in the creative arts therapies field, and at least one research course. We encourage prospective students to inquire about applying to the PhD program even if they are uncertain that they meet all of the admission requirements. In many cases applicants are considered on a very individual basis and assessment. For this reason we look forward to speaking with applicants regarding eligibility and answering any questions.

Degree Requirements

Master's Degree in Art Therapy, Dance/Movement Therapy, Music Therapy, or Expressive Therapies.

Prerequisites (in addition to or included in Master’s degree)

- 6.0 semester (9.0 quarter) credits equivalent in graduate level research coursework.
- 3.0 semester (4.0 quarter) credits equivalent of graduate coursework in multiculturalism, anthropology, or sociology.

Research Education and Training

The PhD in Creative Arts Therapies is a research degree. Consequently it is essential that those entering the program demonstrate foundational education and experience in research.

- Documented research courses with a grade of no less than a 'B'.
- Documentation of having conducted one research project. This can be a master's thesis project or post-master's research.

Scores and GPA

- Graduate Record Examination (GRE) with minimum scores of 300 combined (150 Quantitative and 150 Verbal Reasoning) and 4.0 in analytic writing. or
- Miller Analogies Test (MAT) with scores of 396 or above
- MGPA of 3.5 or above from the master's degree education

Clinical Experience and Credentials

- A minimum of 3 years full-time equivalent post-master's degree creative arts therapy clinical practice.
- Professional credentials including board certification and/or registration in the applicant's Creative Arts Therapies discipline. A professional license is preferred but not required.

Academic Writing Proficiency

Central to success in the PhD program is the ability to write at a professional scholarly level. Even though this ability will develop as a result of being a doctoral student, it is essential that the applicant demonstrate an interest in, commitment to, and aptitude for scholarly writing. Academic Writing Proficiency is evaluated based upon the following criteria and documentation:

- Academic Writing Sample: Demonstration of scholarly writing proficiency from an academic writing sample. This could be a graded graduate writing sample or an independently authored publication. Applicants are also invited to generate a new writing sample specifically for this application. All scholarly writing samples should be selected to best represent the applicant's scholarly accomplishments and potential.
- Publication or manuscript for submission: Documentation of having submitted an article for a peer reviewed publication. The documentation should be in the form of a manuscript that was submitted to a journal or as a chapter in an edited book. This
manuscript can also be used for the academic writing sample if it was authored solely by the applicant. If it was co-authored, an additional independently authored sample is required to fulfill the requirement for demonstration of scholarly writing proficiency.

- Admissions Essay: The admissions essay is an important part of the application and writing proficiency assessment process. Since the PhD is the highest level of scholarly education, the expectation is for incoming students to possess and demonstrate competency in this area as reflected in their writing. The scholarly writing not only requires writing skill but also represents a thought process—the ability to review, organize, select and synthesize ideas of self and other. In addition, scholarly competence requires familiarity with acceptable writing styles. For those reasons we require an admissions essay which is in three parts:
  - Reasons for Application: In this section briefly describe your professional background, your clinical practice and interests and how these experiences coalesced in your decision to apply to the PhD Program (1 page).
  - Research Interests: In this section describe 1) two areas of interest for your own research; 2) a summary of current research in these areas; and, 3) the direction you hope to take your research (3 pages).
  - Academic and Career Goals: Conclude your essay with a summary of your academic and career goals (1 page).

- All writing samples should be submitted in APA format.

Letters of Recommendation

Three letters of recommendation are required as a part of the application process. The letters should be from individuals who can knowledgeably address the applicant’s aptitudes for scholarship and teaching. Recommenders should also address the applicant’s maturity, initiative, self-directed motivation, and commitment to higher education.

Interview

When the application is completed it will be reviewed by the faculty admissions committee to determine if the applicant meets the admission criteria. Following the initial screening, a determination is made of whether or not the applicant meets the admission criteria. If the determination is made that the applicant does meet the admission criteria, the applicant is scheduled for an interview with the faculty in the PhD program in Creative Arts Therapies. The interview protocol includes:

  - Review of application materials and associated questions to address scholarly competencies for the program.
  - Discussion regarding the theory and practice of the creative arts therapies and the applicant’s specific discipline.
  - Discussion of the applicant’s research interests, competencies, and ideas.
  - Discussion of the applicant’s reasons and motivation for applying for doctoral education.

Please contact Ms. Rachel Ward, Admissions Coordinator, for additional information about the admission requirements and the application process at (215) 762-6921 or rsw24@drexel.edu. (gdu23@drexel.edu)

Note: Admissions Schedule

The early priority deadline is January 15th, with rolling admissions through July 1st.

For additional information about how to apply, visit the Drexel Admissions page on PhD in Creative Arts Therapies (http://www.drexel.edu/grad/programs/cnhp/creative-arts-in-therapy).

Creative Arts Therapies Department Faculty

Yasmine Awais, ATR-BC, ATCS, LCAT (Art Institute of Chicago). Assistant Clinical Professor. Multicultural art therapy, clinical supervision.

Joke Bradt, PhD, MT-BC (Temple University). Associate Professor. Research in music therapy, chronic pain, systematic reviews.

Gayle Gates, MA, BC-DMT (Immaculate Heart College, CA) Associate Director, Dance/Movement Therapy Programs. Assistant Clinical Professor. Early childhood development and mother-child interaction, intervention with at risk preschoolers.

Nancy Gerber, PhD, ATR-BC, LPC (Union Institute and University) Director, PhD Program in Creative Arts Therapies. Associate Clinical Professor. Art therapy assessment; treatment of adolescents, adults and geriatrics, modern psychoanalysis and art therapy, arts therapy education, doctoral education.

Sharon W. Goodill, PhD, BC-DMT, NCC, LPC (Union Institute and University) Chair, Department of Creative Arts Therapies. Clinical Professor. Dance/movement therapy for medically ill patients, mind/body studies, CAT research and leadership.

Florence Ierardi, MM, MT-BC, LPC (Temple University) Director of Field Education. Associate Clinical Professor. Effects of percussion playing on the nervous system; rhythm-based assessment models.

Girija Kaimal, EdD, MA (Harvard University). Assistant Professor. Art therapy, educational research, program evaluation, art therapy.

Donna H. Kaiser, PhD, ATR-BC, LMFT (The College of William and Mary) Director of Art Therapy Programs. Associate Clinical Professor. Art therapy research, art therapy with clients with substance abuse diagnoses; development of an art therapy assessment for evaluating attachment security.

Paul Nolan, MCAT, MT-BC, LPC (Hahnemann Medical College) Director of Music Therapy Programs. Associate Clinical Professor. Music and child development, outcome studies in music therapy; analysis of musical behaviors in music therapy; psychological responses to music therapy.

Ellen Schelly-Hill, MMT, BA (Antioch NE Graduate School) Director of Dance/Movement Therapy Programs. Associate Clinical Professor. Adults diagnosed with mood disorders, anxiety, and chronic pain; creative arts in therapy for at-risk adolescents.

PhD in Nursing

Major: Nursing
Degree Awarded: Doctor of Philosophy
Calendar Type: Quarter
Total Credit Hours: 49.0
Classification of Instructional Programs (CIP) code: 51.3801
Standard Occupational Classification (SOC) code: 29-1141

About the Program

The College of Nursing and Health Professions (CNHP) offers a Doctor of Philosophy in Nursing Science, a research-based program, which aims to
prepare nurse researchers to design, conduct and lead research studies as emerging nurse scientists. The objective of the PhD in Nursing is to prepare professional nurses as scholars and researchers who will make a substantive contribution to the body of knowledge for the discipline of nursing and thereby improve health services for those who receive nursing care. Graduates are expected to plan and launch an independent program of research, seek needed support for initial phases of the research program, and begin to involve others (i.e., students, clinicians, and other researchers) in their activities.

The program of study builds on advanced preparation in nursing at the master’s level (MSN to PhD). In addition to structured coursework, the program builds upon a research mentorship model which recognizes that research skills are learned most effectively by working with a faculty mentor, who provides opportunities to use the tools to conduct research and design, and execute an original research within a focused program of study.

Innovation, leadership, and interdisciplinary collaboration are strong educational values which are reflected in the Drexel University emerging strategic plan. The PhD in nursing program represents leadership in the fields, with interdisciplinary collaboration as core administrative and curricular values basic to its philosophy and epistemology. Innovation is also central to this doctoral program as evidenced in its curriculum and research philosophy.

The College of Nursing and Health Professions (CNHP), Graduate Nursing Division in which the Doctoral Nursing Program is housed, is regarded as a forward thinking, progressive, and interdisciplinary healthcare school within the university as well as in the larger context of advanced healthcare education.

### Admission Requirements

Applicants must possess a master’s degree in nursing for admission consideration. Criteria for admission include:

- GPA of 3.5
- GRE scores
- OREs (and TOEFLs, if international)
- Letters of recommendation (3)
- Articulation of research interests, career goals and insight into important issues in the profession in essays
- Professional accomplishments
- Fit with faculty research interests and expertise

### Degree Requirements

The PhD curriculum requires 49.0 quarter credits of course work plus comprehensive examination and dissertation completion. Of the 49.0 credits, 15.0 credits are required interdisciplinary courses, and 21.0 credits in nursing science. In addition, there are three elective courses that form the student’s field of concentration related to their dissertation research. These elective courses can be taken anywhere within the university but must be approved by the student’s advisor and the Doctoral Curriculum Committee in advance of taking these courses. The student files a plan of Study outlining these courses in the winter of the first year which is approved by the Curriculum Committee.

#### Required Courses

- NURS 800  Theoretical Foundations of Nursing Inquiry 1  3.0
- NURS 819  Qualitative Methods in Clinical Nursing  3.0
- RSC 759  Foundations of Biostatistics  3.0
- NURS 801  Theoretical Foundations of Nursing Inquiry II  3.0
- RSC 811  Intermediate Biostatistics  3.0
- RSC 770  Foundations in Research Methods  3.0
- NURS 806  Scientific Appraisal and Knowledge Development  3.0
- RSC 812  Interpretation of Data  3.0
- NURS 803  Doctoral Seminar: Scientific Integrity  1.0
- RSC 813  Measurement Theory in Healthcare  3.0
- NURS 804  Doctoral Seminar: Creating Intellectual Community  1.0

#### Required Research Apprenticeship (total of 3 credits)  3.0

- NURS 850  Research Apprenticeship (Must be repeated 2 times)
- NURS 820  The Science of Therapeutics  3.0
- NURS 805  Doctoral Seminar: Grantsmanship  1.0
- Dissertation Research (minimum of 4 credits)  4.0
- NURS 899  Dissertation (May be repeated up to 7 times)

#### Electives  9.0

- NURS 860  Integration of Genetics/Genomics in a Research Agenda
- NURS 861  Interdisciplinary Approaches in Aging Research
- NURS 862  Reproductive Epidemiology
- NURS 863  Mixed-Methods Research
- NURS 899  Independent Study

### Total Credits  49.0

### Nursing Faculty

Lisa B. Aiello-Laws, RN, MSN, AOCNS, APN-C (University of Pennsylvania). Assistant Clinical Professor. Adult oncology and cancer genetics.

Scott D. Alcott, MSN (Drexel University). Assistant Clinical Professor. Nursing informatics, leadership, technology, and on-line learning.

Kristen Aldoorffer, MSN, CRNP, BSN, RN (Drexel University). Assistant Clinical Professor. Pediatric and adolescent nursing.

Barbara Amendolia, DrNP, NNP, APN-BC (Drexel University). Assistant Clinical Professor. Neonatology, specifically feeding difficulties and respiratory diseases of the newborn.

Katherine Kaby Anselmi, PhD, JD, CRNP (University of Pennsylvania) Assistant Dean of Accreditation/Regulatory Affairs & Online Innovation. Associate Clinical Professor. Nursing, law, family nurse practitioner, women's health nurse practitioner.

Lew Bennett, CRNA, MSN (Temple University) Chair, Nurse Anesthesia Department. Assistant Clinical Professor. Clinical and didactic education of nurse anesthesia students.

Suzan Blacher, MSN, CARN, CCIT (Drexel University) RN-BSN Program. Assistant Clinical Professor.

Joan Rosen Bloch, PhD, CRNP (University of Pennsylvania). Associate Professor. Maternal and infant health outcomes with a particular focus on racial and ethnic perinatal health disparities.

Susan M. Burke, PhD, RN, CPNP-BC (The Catholic University of America). Associate Clinical Professor. Pediatric primary care, health
disparities in children, families under stress, children with special health care needs transitioning to adulthood.

Barbara Celia, MSN, EdD (University of Pennsylvania; Rutgers University). Assistant Clinical Professor. Pain management and access to health care.

Paul Thomas Clements, RN (University of Pennsylvania). Associate Clinical Professor. Forensic, child, adolescent and family mental health nursing.

Jennifer Coates, MSN, MBA, CRNP, BC (The University of Pennsylvania). Assistant Clinical Professor. Critical care nurse practitioner.

Ferne Cohen, CRNA, EdD (Drexel University) Associate Chair, Nurse Anesthesia Department. Assistant Clinical Professor. Clinical and didactic education of nurse anesthesia students.

John T. Cornele, MSN, RN, CNE, EMT-P (Drexel University) Director CICSP. Instructor. Airway management, nursing and paramedic educational issues, PDA implementation topics, simulation development, use of standardized patients and the art and science of moulage.

Frances H. Cornelius, PhD, MSN (Drexel University; Wayne State University) Chair, MSN Department. Clinical Professor. Environmental justice, community and public health instructional technology, distance learning, mobile learning, informatics.

Linda Dayer-Berenson, PhD, MSN, CRNP, CNE, FAANP (Rutgers University). Associate Clinical Professor. Adult health, pharmacology, cultural competence and pain management.

Diane DePew, DSN, RN (University of Alabama, Birmingham). Assistant Clinical Professor. Evaluation, competency, test development and item writing, continuing education, accreditation, educational design, leadership management.


Rose Ann DiMaria-Ghalili, PhD, MSN, BSN, CNSC (New York University, School of Education, Division of Nursing). Associate Professor. Nutrition and surgical recovery to improve the care of older adults undergoing surgery; nutrition assessment, inflammation, and health outcomes.

Gloria Donnelly, PhD (Bryn Mawr College) Dean of the College of Nursing & Health Professions. Professor. Nursing education and a variety of mental health topics including assertiveness, stress and change.

Jane Donovan, MSN, RNC (Villanova University). Assistant Clinical Professor. Women’s health.

H. Michael Dreher, PhD, RN, FAAN (Widener University). Professor. Sleep, sleep in HIV illness, practice knowledge development, legal issues in nursing education.

Brian Fasolka, MSN, RN, CEN (DeSales University). Assistant Clinical Professor. Emergency nursing, adult health nursing, and nursing education.


Kathleen Fisher, PhD, CRNP (Pennsylvania State University). Associate Clinical Professor. Health care for vulnerable populations, decision making in vulnerable populations (i.e. individuals with intellectual disability).

Alecia Schneider Fox, PhD (Candidate) (Widener University) Senior Director Nursing Faculty Affairs and Clinical Education. Assistant Clinical Professor. Emergency, critical care, trauma, organ transplant and advanced nursing practice. Serves as the Faculty Advisor for the Drexel Chapter of the Student Nurses Association of Pennsylvania.

Sandra A. Friedman, MSN, CNM (Yale University). Assistant Clinical Professor. Interdisciplinary team simulation and debriefing, health assessment and health promotion, nurse midwifery with specialty in adolescent health, nurse managed health center administration.

Mary Gallagher-Gordon, PhD, MSN, RN, CNE (Drexel University) Senior Director of Contracts, Compliance and Academic Community Initiatives. Assistant Clinical Professor. Informatics, patient safety and nursing education, NCLEX review.


Karen Goldschmidt, MSN, RNC (Wilmington University) Department Chair, RN-BSN Completion Department. Assistant Clinical Professor. Professional issues, nursing education, staff development, scholarly writing.

Maureen Gonzales, MSN, CRNP (University of Pennsylvania) Public Health Nurse. Assistant Clinical Professor. Women’s health.

Elizabeth Gonzalez, PhD, PMHCNS-BC (New York University) Department Chair, Doctoral Nursing Program. Associate Clinical Professor. Chronic stress, geropsychiatry, depression among the elderly, minority health issues and cross-cultural research among family caregivers of relatives with Alzheimer’s disease.

Mary K. Green, MSN, RN, BC (Drexel University). Assistant Clinical Professor. Community public health nursing, maternal child health nursing.

Donna Gribbin, RN, DNP, CNE (Duquesne University). Assistant Clinical Professor. Medical-surgical nursing, simulation, nursing education.

Cynthia Hambach, MSN, RN, CCRN (Widener University). Assistant Clinical Professor. Critical care nursing.

Elizabeth Hammond-Ritschard, RN, MS (Cedar Crest College). Assistant Clinical Professor. Adult health nursing, nursing education.

Thomas L. Hardie, EdD, RN, PMHCNS-BC (Columbia University, Teachers College). Associate Professor. Psychiatric nursing, cancer survivorship, treatment research outcomes in substance abuse.

Margaret M. Harkins, DNP, MBE, MSN, GNP-BC (Chatham University). Assistant Clinical Professor. Gerontology, hospice/palliative care, clinical bioethics.

Angela C. Hawes, MSN, RN (University of Pennsylvania). Assistant Clinical Professor. Child and family health nursing.
Karyn Holt, PhD, RN, CNM (Georgetown University; Touro University) Director of Online Quality, CNHP, Division of Nursing. Associate Clinical Professor.

Lisa Johnson, DrNP, CRNP, ACNP (Drexel University). Assistant Clinical Professor. Surrogate end-of-life decision making within minority populations in the acute care setting; ethnonursing.

Dana C. Kemery, RN, MSN (Drexel University). Assistant Clinical Professor. Emergency nursing (adult and pediatric), nursing education.

Michelle Kensey, MSN, RN (University of Pennsylvania) Chair of Undergraduate Women's Health, Perinatal Clinical Nurse Specialist. Assistant Clinical Professor.

Priscilla Killian, MSN, RNC, MHPNP (LaSalle University). Assistant Clinical Professor. Global and public health, health promotion, disease prevention in a community setting and the integration of psychiatric and primary care services to the persistently mentally ill living in the community setting.

Cindy M. Little, PhD, WHNP, CNS (Virginia Commonwealth University in Richmond, VA). Assistant Clinical Professor. Women's health, obstetrics and clinical genetics.

Jean S. MacFadyen, PhD, RN (University of Pennsylvania). Assistant Clinical Professor. Intra-Entrepreneurship in advance practice nursing, gerontology, leadership, transcultural nursing.

Mary Kay Maley, RN, MSN, APN (University of Medicine and Dentistry of New Jersey). Assistant Clinical Professor. Family health, faith community nursing, health promotion/disease prevention and mindfulness-based stress reduction.

Kimberley McClellan, MSN, WHNP-BC, FNP-BC, CRNP (Drexel University). Assistant Clinical Professor. Nursing, women's health, family practice.

Pamela McGee, MSN, FNP-BC, CNE (University of Pennsylvania). Assistant Clinical Professor. Medical/surgical nursing, gerontology, primary care, family nurse practitioner.

Marylou K. McHugh, RN, EdD (Teachers College; Columbia University). Associate Clinical Professor. Nursing, contemporary nursing faculty track.

Kristen McLaughlin, MSN, RN, CPNP-PC (University of Pennsylvania). Assistant Clinical Professor. Pediatric nurse practitioner.

Cheryl Mele, MSN, CRNP (University of Pennsylvania). Assistant Clinical Professor. Pediatric critical care clinical specialist, pediatric nurse practitioner, acute-chronic and neonatal nurse practitioner.

Faye (Pearlman) Meloy, PhD, MSN, MBA (Drexel University) Associate Dean, Prelicensure BSN Programs. Associate Clinical Professor. Clinical practice; education; health policy and planning; community service; human resources and health care administration.

Sally K. Miller, PhD, CRNP (Walden University). Clinical Professor. Adult-gerontology primary and acute care nurse practitioner, family nurse practitioner, advanced pathophysiology, advanced pharmacology.

Kymberlee Montgomery, DrNP, CRNP (Drexel University) Chair, NP Programs. Assistant Clinical Professor. Medicine, women's health nurse practitioner, education, interprofessional education.

Dana Murphy-Parker, MS, CRNP, PMHNP-BC (University of Colorado) Track Director, Psychiatric Nurse Practitioner Program. Assistant Clinical Professor.

Louise G. Murray, MSN, CRNP, FNP-BC (Drexel University). Assistant Clinical Professor. Family nurse practitioner.

Maura A. Nitka, MSN, RN, CPN, APN (Drexel University). Assistant Clinical Professor. Pediatric nursing.

Carol Okunpiak, MSN, RN (Thomas Jefferson University). Assistant Clinical Professor. Nursing women's health, nursing leadership, informatics.

Jennifer Olszewski, MSN CRNP (LaSalle University) Director of the Adult-Gerontology Primary Nurse Practitioner Program. Assistant Clinical Professor. Critical care, patient safety, interdisciplinary education

Alis Kotler Panzera, DrNP, WHNP-BC, RN (Drexel University). Assistant Clinical Professor. Nursing, women’s health nurse practitioner.

Carol M. Patton, PhD, RN, FNP-BC, CRNP, CNE (University of Pittsburgh School of Public Health). Associate Clinical Professor. Family nurse practitioner; health promotion/disease prevention across the life span, primary, secondary and tertiary health promotion across the lifespan; health outcomes, health policy, ethics, quality and safety initiatives, QSEN, high reliability organizations.

Cheryl Portwood, MSN, RN, CNAA-BC (University of Pennsylvania). Clinical Assistant Professor. Medical-surgical, critical care, and neonatal intensive care; distance learning; leadership management; health policy.

Bobbie Posmontier, PhD, CNM, PMHNP-BC (University of Pennsylvania). Assistant Professor. Labor and delivery, midwifery, postpartum care, neonatal intensive care, improving access to care for women with postpartum depression, family psychiatric nurse practitioner.

Alice Marie Poys, PhD, MSN (University of Pennsylvania). Associate Clinical Professor. Nursing intervention/outcome studies and nursing treatment/outcome studies; program evaluation, and effects of alternate teaching styles with student learning.

Brenda Reap-Thompson, MSN, RN (Villanova University). Assistant Clinical Professor. Adult health/nursing education; safety and legal issues in nursing and test development.

Mary Jean Ricci, MSN, RN, BC (University of Pennsylvania) Adjunct Faculty Coordinator. Assistant Clinical Professor. Community public health, medical-surgical nursing.

Patricia A. Riccio, PhD, RN (University of California, Los Angeles). Assistant Clinical Professor. Research methods and biostatistics.

Leland Rockstraw, PhD, RN (Drexel University) Assistant Dean, Clinical Simulation and Practice. Associate Clinical Professor. Adult orthopedic/surgical, emergency care, critical care, and trauma/surgery intensive care.

Al Rundio, Jr., PhD, DNP, RN, APRN, NEA, BC (University of Pennsylvania) Interim Associate Dean for Advanced Practice Nursing Programs, Chair of DNP Program. Clinical Professor. Nursing graduate leadership and management track.

Jane Greene Ryan, PhD (Widener University). Assistant Clinical Professor. Nursing women’s health.

Donna Sabella, PhD, MED, MSN, PMHNP-BC (University of Pennsylvania) Director of Global Studies. Assistant Clinical Professor. Cultural competence, human trafficking, mental health, forensic nursing, working with vulnerable populations.

Deanna Lynn Schaffer, MSN, RN, CNE, ACNS-BC (MCP Hahnemann University) Chair of the BSN Co-Op Program. Assistant Clinical Professor.

Joanne Schwartz, PhD, CRNP, CNE (Villanova University) Chair of the Accelerated BSN Department. Assistant Clinical Professor.

Joanne Serembus, EdD, RN, CCRN (Alum), CNE (Widener University). Associate Clinical Professor. Critical care nursing, adult health nursing, nursing education, curriculum development and patient safety.

Susan Solecki, MSN (Hahnemann University). Assistant Clinical Professor. Nursing women’s health, adult health, and occupational health.

Ann Thiel-Barrett, DNP, RN, FNP-BC, CNE (Chatham University). Assistant Clinical Professor. Family health nursing.

Elizabeth Tomaszewski, DNP, CCRN, CRNP, ACNP-BC, ACNPC (Chatham University). Assistant Clinical Professor. Critical care; end of life care; advance practice nursing.

Donna Trinkaus, MSN, RN (DeSales University). Assistant Clinical Professor. Critical care nursing, adult health nursing, infection control and nursing education

AtNena Tucker, DNP, FNP-BC (University of South Alabama). Assistant Clinical Professor. Research in emergency medicine, critical care, health care administration.

Jeannine Uribe, PhD, RN (University of Pennsylvania) Community Clinical Coordinator. Assistant Clinical Professor. Public health nursing; international, professional collaboration, philanthropic health care projects, urban public health issues and caring for immigrant populations.

Roberta Waite, EdD, MSN (Widener University; University of Pennsylvania) Assistant Dean of Academic Integration and Evaluation of Community Programs. Associate Professor. Psychiatric nursing; depression and ADHD in minority adults, and the effects of adverse childhood experiences on adult health in minority adults.

Louise Ward, PhD, CRNP, CNE (Binghamton University). Associate Clinical Professor. Public health nursing.

Lori Wheeler, MSN, RN (West Chester University). Assistant Clinical Professor. Adult health nursing, community health nursing, and nursing education.

Regina Wright, MSN, CEN (University of Pennsylvania). Assistant Clinical Professor. Care of the adult patient with complex health problems (medical/surgical concentration); professional role development; approaches to adult learning behaviors.

Mary Ann Zimmer, MSN, CPN (Villanova University). Assistant Clinical Professor. Pediatrics, adult medical-surgical nursing, nursing education.

Janet Zimmerman, MSN, BSN (University of Colorado). Assistant Clinical Professor. Clinical trials, nursing care of veterans.

Patti Rager Zuzelo, EdD, RN, ACNS-BC, ANP-BC, FAAN (Widener University). Clinical Professor. Advanced practice nursing, leadership and management, nursing education, clinical nurse specialist (adult health) and adult nurse practitioner.

### Nutrition Sciences

**Major:** Nutrition Sciences  
**Degree Awarded:** Doctor of Philosophy (PhD)  
**Calendar Type:** Quarter  
**Total Credit Hours:** 90.0  
**Classification of Instructional Programs (CIP) code:** 30.1901  
**Standard Occupational Classification (SOC) code:** 11-9121; 29-1031

### About the Program

The program mission is to develop scientists who are able to contribute to the scholarly generation of nutrition science knowledge, spanning the overlapping disciplines of human nutrition, nutritional biochemistry, food safety, human physiology, exercise physiology and community nutrition; and the translation of this knowledge with respect to health, disease prevention and treatment.

Nutrition scientists who have a PhD can be involved in research, education, industry, community health, and/or clinical practice. With the current epidemic of obesity and type 2 diabetes mellitus, the need for PhD-educated nutritionists who can discover and design new treatment interventions is of major public health interest.

### Admission Requirements

Applicants must possess a minimum of a Bachelor’s of Science degree in biology, chemistry, nutrition, exercise physiology, food science or a similar area with a strong science base, and have taken an advanced undergraduate course in biochemistry, as well as a course in human nutrition and a course in basic statistics.

- College/University transcripts with a minimal overall grade point average (GPA) of 3.0 (on a 4.0 scale)
- Graduate Record Exam (GRE): minimum combined score of 308 on the Verbal and Math sections
- Two letters of recommendation from advisors, supervisors, professors, and/or mentors
- Curriculum vitae
- Personal statement outlining career plan, topic of research interest and preferred Nutrition Sciences faculty mentor which whom he/she would like to work

### Degree Requirements

The PhD program consists of 90.0 quarter credits. The 90 credits include 45.0 credits of course work, 45.0 credits of research, as well as a research dissertation. Additionally, all PhD students will be required to
obtain a minimum of 10 contact hours of classroom teaching experience in nutrition science courses.

**Required Nutrition Courses (18 credits):**

- NFS 525 Nutritional Assessment Through the Life Cycle 3.0  
- NFS 601 Research Methods 3.0  
- NFS 801 Techniques in Nutrition Sciences Research 3.0  
- NFS 810 Integrative Nutrition I 3.0  
- NFS 811 Integrative Nutrition II 3.0  
- NFS 812 Integrative Nutrition Practicum 3.0

**Required Statistics Courses (6 credits):**

- RSCH 811 Intermediate Biostatistics 3.0  
- RSCH 812 Interpretation of Data 3.0

**Required Professional Skills Courses (9 credits):**

- RSCH 813 Measurement Theory in Healthcare 3.0  
- RSCH 770 Foundations in Research Methods 3.0  
- RHAB 815 Scientific Inquiry and Writing 3.0

**Electives:**

12 credits chosen from graduate nutrition, basic science or other courses, as determined by the faculty mentor and/or dissertation committee 12.0

**Independent Research (33 credits):**

- NFS 997 Research 33.0

**Dissertation Research (12 credits):**

- NFS 999 Dissertation Research 12.0

**Total Credits** 90.0

**Nutrition Sciences Faculty**


Angelo Del Parigi, MD (University of Bari, Italy) Courtesy Appointment. Visiting Research Professor.

Beth L. Leonberg, MS, MA, RD (Colorado State University, Rowan University) Director, Didactic Program in Dietetics. Instructor. Pediatric nutrition.

Brandy-Joe Milliron, PhD (Arizona State University). Assistant Professor. The development and evaluation of modifications in the natural environment to promote healthier living; farm to table school initiatives; Bacillus and Clostridium spores in food processing.

Donna H. Mueller, PhD (Temple University) Registered Dietitian. Nutrition and Foods. Associate Professor. Clinical nutrition; pediatric nutrition; nutrition in pulmonary diseases, especially cystic fibrosis; nutrition in developmental delay; dental nutrition; dietetic education and professional development.

Juan Muniz, PhD (Oregon State University) Laboratory Manager. Assistant Research Professor. Food microbiology; community-based research to assess pesticide levels in homes; prevention of health effects of pesticides for indigenous farmworkers.

Jennifer Nasser, PhD (Rutgers University). Associate Professor. Dopamine-mediated mechanisms of food intake regulation in humans and its impact on metabolic homeostasis, especially as it applies to obesity, eating disorders and aging.

Jennifer Quinlan, PhD (North Carolina State University). Associate Professor. Food microbiology; microbiological quality and safety of produce, dairy and meat products in markets in high vs. low socioeconomics areas, Bacillus and Clostridium spores in food processing.

Barry Ritz, PhD (Drexel University) Courtesy Appointment. Visiting Research Professor.

Vicki Schwartz, MS (Drexel University) Nutrition and Foods. Assistant Clinical Professor. Advanced nutrition, clinical nutrition, nutrition support.

Alison Ventura, PhD (Pennsylvania State University). Assistant Professor. Factors that contribute to the development of eating behaviors and dietary preferences during infancy and early childhood.

Stella Lucia Volpe, PhD, RD, LDN, FACSM (Virginia Polytechnic Institute and State University) Chair, Nutrition Sciences. Professor. Prevention of obesity and diabetes across the lifespan; mineral metabolism and exercise; energy balance; sports nutrition.

**Interdepartmental Faculty**

Rose Ann DiMaria-Ghalili, PhD, MSN, BSN, CNSC (New York University, School of Education, Division of Nursing). Associate Professor. Nutrition and surgical recovery to improve the care of older adults undergoing surgery; nutrition assessment, inflammation, and health outcomes.

Michael Lowe, PhD (Boston College). Professor. Prevention and treatment of eating disorders and obesity; effects of appetitive responsiveness and dietary restraint on eating regulation; psychobiology of obesity-proneness; empirical foundations of unconscious processes.

Margaret O'Neil, PT, PhD, MPH (MCP Hahnemann University; Duke University; University of North Carolina at Chapel Hill). Associate Professor. Measurement of and interventions to improve physical activity and fitness levels and promote participation in children and youth with who are overweight/obese and those with physical disabilities (especially cerebral palsy).

Patricia A. Shewokis, PhD (University of Georgia). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy(NIR) and electroencephalography (EEG) and methodology and research design.

**Physician Assistant Post-Professional Master’s Program**

Major: Physician Assistant, Post-Professional

Degree Awarded: Master of Health Sciences (MHS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Classification of Instructional Programs (CIP) code: 51.0912

Standard Occupational Classification (SOC) code: 29-1071

**About the Program**

The Master of Health Science (MHS) degree is awarded by the University through the College of Nursing and Health Professions’ Physician Assistant Post-Professional Master’s program. This program builds upon
knowledge and skills learned in the PA professional training programs in areas of health policy, evidence-based practice, and leadership. The program is available totally online, and it may be completed on a part-time basis.

The Physician Assistant Post-Professional Master's program provides graduate education courses as a basis for personalized, professional development within the student’s selected area of study. The goal of the program is to enhance basic physician assistant skills and to mentor students in areas of study beyond what is offered by entry-level physician assistant programs. The individually selected study concentration is augmented by the expertise of seasoned faculty and the vast resources of the University.

Specifically, the Physician Assistant Post-Professional Master's program seeks to:

• Broaden the base and depth of analytical thinking by providing a foundation for scholarly inquiry
• Mentor physician assistants in personalized, professional development to enhance the PA profession, its members, and the communities they serve

Additional Information
For more information about this program, contact the Business Manager:

Denise Mielechowski
PA Post-Professional Master's Program
College of Nursing and Health Professions
dmm58@drexel.edu

For more details, visit Drexel's College of Nursing and Health Professions Physician Assistant Post-Professional Master's (https://www.drexel.edu/cnhp/academics/graduate/MHS-Physician-Assistant-Post-Professional-Masters-Program) web page.

Degree Requirements
All students in this program complete a total of 45.0 quarter credits for graduation. The program requires completion of 5 core courses (25.0 quarter credits). The cognate courses, 15.0 quarter credits, are courses in a student's area of interest, and 5.0 quarter credits for the capstone experience that deepens a student's understanding of chosen areas.

For the exceptional graduate student with significant professional credentials achieved as a physician assistant, preparation and presentation of the professional portfolio to a university-based multidisciplinary committee may substitute for all or portions of the credits required for the two graduate project courses.

Required Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PA 581</td>
<td>Research Methods and Designs</td>
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</tr>
<tr>
<td>PA 582</td>
<td>Principles of Evidence-Based Practice</td>
<td>5.0</td>
</tr>
<tr>
<td>PA 583</td>
<td>Clinical Application of Epidemiology</td>
<td>5.0</td>
</tr>
<tr>
<td>PA 584</td>
<td>Health Policy</td>
<td>5.0</td>
</tr>
<tr>
<td>PA 585</td>
<td>Leadership and Stewardship</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Study Concentration Courses

| Cognate 1 * | 5.0 |
| Cognate 2 * | 5.0 |
| Cognate 3 * | 5.0 |

PA 698 Capstone Project 5.0

Total Credits 45.0

* Students may select Cognate courses related to their areas of interest from one of the Study Tracks (http://www.drexel.edu/catalog/masters/adv-pa.htm#Studytracks) listed below.

Study Tracks

Clinical Practice

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PA 641</td>
<td>Clinical Update</td>
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</tr>
<tr>
<td>PA 642</td>
<td>Clinical Colloquium</td>
<td>5.0</td>
</tr>
<tr>
<td>or PA 640</td>
<td>Clinical Practicum</td>
<td>5.0</td>
</tr>
<tr>
<td>PA 643</td>
<td>Clinical Practice Project Research</td>
<td>5.0</td>
</tr>
<tr>
<td>PA 698</td>
<td>Capstone Project</td>
<td>5.0</td>
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</tbody>
</table>

Health Promotion

<table>
<thead>
<tr>
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<th>Course Title</th>
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<tbody>
<tr>
<td>PA 661</td>
<td>Tenets of Health Promotion</td>
<td>5.0</td>
</tr>
<tr>
<td>PA 662</td>
<td>Health Promotion Materials</td>
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</tr>
<tr>
<td>PA 663</td>
<td>Health Promotion Project Research</td>
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</tr>
<tr>
<td>PA 698</td>
<td>Capstone Project</td>
<td>5.0</td>
</tr>
</tbody>
</table>

Drexel e-Learning Certificate Options

Complementary and Integrative Therapies Certificate 12.0
PA 697 Independent Study 3.0
PA 698 Capstone Project 5.0

Leadership in Health Systems Management Certificate 12.0
PA 697 Independent Study 3.0
PA 698 Capstone Project 5.0

Healthcare Informatics Certificate 9.0
PA 697 Independent Study 6.0
PA 698 Capstone Project 5.0

Epidemiology and Biostatistics Certificate 12.0
PA 697 Independent Study 3.0
PA 698 Capstone Project 5.0

Toxicology and Industrial Hygiene Certificate 12.0
PA 697 Independent Study 3.0
PA 698 Capstone Project 5.0

Certificate of Study in Clinical Research 15.0

* PA 698 Capstone Project will be fulfilled with the completion of either CR 600S Designing the Clinical Trial or CR 609S Innovative Product Development.

Alternate Pathway

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Cognate 1</td>
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<td></td>
</tr>
<tr>
<td>Cognate 2</td>
<td>5.0</td>
<td></td>
</tr>
<tr>
<td>PA 695</td>
<td>Portfolio Preparation</td>
<td>1.0</td>
</tr>
<tr>
<td>PA 696</td>
<td>Portfolio Review</td>
<td>5.0-10.0</td>
</tr>
</tbody>
</table>

Total Credits 16.0-21.0
Physician Assistant Faculty

Patrick C. Auth, PhD, PA-C (Drexel University) Department Chair, Physician Assistant Department. Clinical Professor. Clinical reasoning of physician assistant students.

Adrian Banning, MMS, PA-C (Arcadia University). Assistant Clinical Professor. Dermatology, family practice, and evidence based medicine.

Geraldine A. Buck, DrPH, MHS, PA-C (Drexel University) Director, Physician Assistant Post-Professional Master's Program. Associate Teaching Professor. Public health.

M. Rebecca Buckley, MHS, PA-C (Drexel University) Associate Director of Clinical Education. Assistant Clinical Professor. Psychiatry.

Rosalie Coppola, MHS, PA-C (Drexel University). Associate Clinical Professor. Standardized patients, simulation, clinical assessment and pharmacology.

G. John DiGregorio, MD, PhD (Hahnemann University) Medical Director of the Hahnemann Physician Assistant Program. Professor. Pharmacology.

Ellen D. Feld, MD, FACP (University of Cincinnati, College of Medicine). Associate Clinical Professor. Clinical medicine and ethical issues.

Gretchen L. Fox, MMSc, PA-C (St. Francis College) Associate Program Director. Associate Clinical Professor. Internal medicine/family practice.


Julie Kinzel, MEd, PA-C (Temple University). Assistant Clinical Professor. Long term care experiences, geriatrics, gastroenterology and liver disease.

Daniela C. Livingston, PA-C, MD (Medical School, Bucharest, Romania; University of Washington, Seattle). Assistant Clinical Professor. Pediatrics, primary care and working with underserved populations, with a special emphasis on preventative pediatrics.


Nina Multak, MPAS, PA-C (University of Nebraska). Associate Clinical Professor. Human patient simulators, standardized patients and healthcare informatics.

Diana D. Smith, MHS, PA-C (Drexel University). Clinical Instructor. Primary care and international health care; distance education.


Post-Baccalaureate Certificate in Integrated Nursing Care of Autism Spectrum Disorder (ASD)

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post Baccalaureate
Number of Credits to Completion: 9.0 - 12.0
Instructional Delivery: Online

Goals and Objectives

- To provide nurses with information on the nursing care of people with autism spectrum disorders, across the lifespan.
- To examine the prevalence, etiology, and clinical characteristics of autism spectrum disorder in the context of the family and team approach to care.
- To integrate scientific and evidence based knowledge of autism spectrum disorder with the clinical skills of the registered nurse working with this population.
- To integrate scientific and evidence based knowledge of autism spectrum disorder with the clinical skills of the registered nurse who specialized in the adult population.
- To formulate a practice philosophy and long term professional agenda in ASD care to include practice, education, and research.

Curriculum

Required course work for the Certificate in Integrated Nursing Care of Autism Spectrum Disorder is dependent upon the desired focus of study. A focus on:

- Pediatric Healthcare requires three courses: ASD I, ASD II and ASD IV: NURS 540, NURS 541 and NURS 543;
- Adult Healthcare requires three courses: ASD I, ASD III and ASD IV: NURS 540, NURS 542 and NURS 543;
- Healthcare Across the Lifespan requires all four courses: NURS 540, NURS 541, NURS 542, and NURS 543.

Requirements

Students select either 3 or 4 of the following, depending on area of focus:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 540</td>
<td>ASD I: Introduction to Autism Spectrum Disorder</td>
</tr>
<tr>
<td>NURS 541</td>
<td>ASD II: Health and Behavioral Care Planning and Intervention for Children and Adolescents</td>
</tr>
<tr>
<td>NURS 542</td>
<td>ASD III: Health and Behavioral Care Planning and Intervention for Adults with ASD</td>
</tr>
</tbody>
</table>
Additional Information

For more information about this program, contact:

Mr. Redian Furxhiu
Student Services Manager
rf53@drexel.edu
267.359.5691


Post-Master’s Certificate in Art Therapy

Certificate Level: Graduate
Admission Requirements: Master’s degree
Certificate Type: Post-Master’s Certificate
Number of Credits to Completion: 57.0
Instructional Delivery: Campus
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.2301
Standard Occupational Classification (SOC) Code: 29-1129

About the Program

The post-master’s degree in art therapy is for those individuals who hold a master’s degree in a related mental health field such as counseling, social work, psychology, dance/movement therapy, music therapy, psychiatric nursing, or couples and family therapy. It consists of 57.0 quarter credits of art therapy course work and 1200 hours of supervised clinical art therapy practice and internship. Completion of the post-master’s degree program in art therapy and fulfillment of post-graduation supervised clinical hours will allow the individual to be eligible for registration and certification as an art therapist by the Art Therapy Credentials Board.

Admission Requirements

Candidates for the post-professional master’s degree program in art therapy must meet the following admission requirements:

- Documentation of a 48.0 semester credit or 72.0 quarter credit master’s degree completed from an accredited institution in the United States (or equivalent degree from an international institution) in a related field such as counseling, psychology, social work, dance/movement therapy, music therapy, psychiatric nursing and couples and family therapy.
- A 3.0 or above GPA in their graduate school studies as reflected in the submission of official transcript(s).
- An autobiography/personal statement, as described in the application materials.
- Documentation on the transcript of completion of coursework in the following content areas during their related master’s degree education: (a) psychopathology; (b) human growth and development; (c) counseling and psychological theories; (d) cultural and social diversity; (e) assessment; and (f) research.
  - Documentation of the completion of 18.0 semester or 27.0 quarter credits in studio art. The studio art courses should reflect experience and facility with multiple art media such as drawing, painting, clay, sculpture, photography, etc. The credits must be completed either prior to admission, which is preferable, or within 12 months of enrollment.
  - Applicant interview with the faculty of the graduate art therapy program.
  - Review of applicant’s art portfolio prior to the interview. The portfolio should include art work reflecting proficiency with a range of two- and three-dimensional art media.
  - Candidates with a graduate degree from a non-U.S. institution must submit their graduate academic records for evaluation by an agency such as World Education Service (WES). The Test of English as a Foreign Language (TOEFL) is required if English is a second language (minimum expected score: 600 paper/250 computer).

International candidates should request instructions about all of these requirements with their admission materials and are advised to begin the admission process early.

Curriculum and Sample Plan of Study

First Year Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ARTS 501</td>
<td>Introduction to Creative Arts Therapy I</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 502</td>
<td>Introduction to Creative Arts Therapy II</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 503</td>
<td>Introduction to Creative Arts Therapy III</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 506</td>
<td>Professional Orientation and Ethics I</td>
<td>1.0</td>
</tr>
<tr>
<td>ARTS 511</td>
<td>Clinical Practicum II</td>
<td>1.0</td>
</tr>
<tr>
<td>ARTS 511</td>
<td>Clinical Practicum II</td>
<td>1.0</td>
</tr>
<tr>
<td>ARTS 512</td>
<td>Clinical Practicum III</td>
<td>1.0</td>
</tr>
<tr>
<td>ARTS 531</td>
<td>Art Therapy Assessment and Treatment for Adults I</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 532</td>
<td>Art Therapy Assessment and Treatment for Adults II</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 533</td>
<td>Art Therapy Assessment and Treatment for Children I</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 534</td>
<td>Art Therapy Assessment and Treatment for Children II</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 535</td>
<td>Art Therapy Theory and Symbolism I</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 536</td>
<td>Art Therapy Theory and Symbolism II</td>
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</tr>
<tr>
<td>ARTS 537</td>
<td>Art Therapy Group Supervision I</td>
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<tr>
<td>ARTS 538</td>
<td>Art Therapy Group Supervision II</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 539</td>
<td>Art Therapy Group Supervision III</td>
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</tr>
<tr>
<td>ARTS 540</td>
<td>Art Therapy Literature and Research</td>
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</tr>
<tr>
<td>ARTS 541</td>
<td>Jungian Psychology for Art Therapists</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 542</td>
<td>Group Dynamics: Art Therapy</td>
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Second Year Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>ARTS 610</td>
<td>Clinical Internship I</td>
<td>3.0</td>
</tr>
<tr>
<td>ARTS 611</td>
<td>Clinical Internship II</td>
<td>3.0</td>
</tr>
<tr>
<td>ARTS 612</td>
<td>Clinical Internship III</td>
<td>3.0</td>
</tr>
<tr>
<td>ARTS 631</td>
<td>Processes and Materials in Art Therapy &amp; Counseling</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 632</td>
<td>Advanced Art Therapy Process and Practice I</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 633</td>
<td>Advanced Art Therapy Process and Practice II</td>
<td>2.0</td>
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</tbody>
</table>
## Post-Master's Certificate in Dance Movement Therapy

### First Year

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Fall</strong></td>
<td></td>
</tr>
<tr>
<td>ARTS 501</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 506</td>
<td>1.0</td>
</tr>
<tr>
<td>ARTS 510</td>
<td>1.0</td>
</tr>
<tr>
<td>ARTS 531</td>
<td>2.0</td>
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<tr>
<td>ARTS 533</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 535</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 537</td>
<td>2.0</td>
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<tr>
<td><strong>Term Credits</strong></td>
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<tr>
<td><strong>Winter</strong></td>
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<tr>
<td>ARTS 502</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 511</td>
<td>1.0</td>
</tr>
<tr>
<td>ARTS 532</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 534</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 536</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 538</td>
<td>2.0</td>
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<tr>
<td><strong>Term Credits</strong></td>
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<tr>
<td><strong>Spring</strong></td>
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<tr>
<td>ARTS 503</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 512</td>
<td>1.0</td>
</tr>
<tr>
<td>ARTS 539</td>
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<td>ARTS 540</td>
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<tr>
<td>ARTS 541</td>
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<tr>
<td><strong>Term Credits</strong></td>
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### Second Year

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<tr>
<td><strong>Term Credits</strong></td>
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</tr>
</tbody>
</table>

### Elective Course

**Term Credits**: 1.0

- Students must take one 1-credit elective course in their second year. ARTS 640, ARTS 642, and ARTS 643 are offered in Fall term, and ARTS 641 is offered in Spring term.

### Additional Information

For additional information about the program, visit the College of Nursing and Health Professions Creative Arts Therapies (https://www.drexel.edu/cnhp/academics/departments/Creative-Arts-Therapies) web site.

### About the Program

Dance/movement therapy is a body/mind-integrated approach to psychotherapy that uses expressive dance and movement processes to encourage the integration of emotional, cognitive, social, and physical functioning. Dance/movement therapy emphasizes the non-verbal realm of movement, touch, rhythm, and spatial interactions, as well as the congruence and connections between verbal and nonverbal modes of expression.

In this program, students build a strong foundation of theoretical knowledge and clinical application in dance/movement therapy (DMT). The program teaches and balances the art of DMT with the science that supports it. Using diagnostic knowledge, developmental and systems theories, and observational skills based in Laban Movement Analysis, our students learn to assess client functioning and formulate treatment goals. Using their expertise in the dance/movement modality and interactive, improvisational processes, students learn to address the patient’s...
needs in both group and individual therapy formats. They may design creative group tasks for fostering interaction and cohesion, or to guide an individual through a personal conflict or challenge.

Admissions

Admission requirements for the certificate program are similar to those for the MA program in Dance/Movement Therapy.

Curriculum

The Post-Master’s Certificate in Dance/Movement Therapy consists of specialized coursework and supervised clinical experience. For those already holding a master’s degree in a clinical mental health field, this certificate program will help prepare the learner for the Dance Therapist Registered credential (R-DMT) from the Dance/Movement Therapy Certification Board (http://www.adta.org) through the “Alternate Route”.

Courses in the certificate program address categories delineated by the ADTA for Alternate Route Training in DMT:

• theory and practice in the field of dance/movement therapy
• movement observation and analysis

For the categories delineated by the Dance/Movement Therapy Certification Board in general mental health topics, the Department of Creative Arts Therapies offers courses for additional fees. Because the certificate courses are offered in the context of a master’s DMT program that is approved by the American Dance Therapy Association, the courses qualify as approved for Alternate Route training in DMT.

Certificate courses can be taken on a part time basis over two or more years. The certificate program offers the requisite fieldwork and internship components on an optional basis for additional fees.

For additional information about admission to the program, visit the College of Nursing and Health Professions Creative Arts in Therapy (http://www.drexel.edu/artsTherapies) web site.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ARTS 501</td>
<td>Introduction to Creative Arts Therapy I</td>
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</tr>
<tr>
<td>ARTS 502</td>
<td>Introduction to Creative Arts Therapy II</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 519</td>
<td>Neuroscience: Concepts and Applications for Creative Arts Therapy</td>
<td>3.0</td>
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<td>ARTS 552</td>
<td>Therapy Relationship Skills I</td>
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</tr>
<tr>
<td>ARTS 553</td>
<td>Therapy Relationship Skills II</td>
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<tr>
<td>ARTS 554</td>
<td>Movement Observation I</td>
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</tr>
<tr>
<td>ARTS 555</td>
<td>Laban Movement Analysis Lab</td>
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</tr>
<tr>
<td>ARTS 556</td>
<td>Movement Observation II</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 557</td>
<td>Dance/Movement Therapy Theory and Practice - Children I</td>
<td>2.0</td>
</tr>
<tr>
<td>ARTS 558</td>
<td>Dance/Movement Therapy Theory and Practice - Children II</td>
<td>2.0</td>
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<tr>
<td>ARTS 559</td>
<td>Introduction to Dance/Movement Therapy History and Literature</td>
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<tr>
<td>ARTS 563</td>
<td>Movement Perspectives in Human Development</td>
<td>2.0</td>
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<tr>
<td>ARTS 564</td>
<td>Group Dynamics and Therapy II: Dance/Movement Therapy</td>
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<tr>
<td>ARTS 651</td>
<td>Medical Dance/Movement Therapy</td>
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</tr>
<tr>
<td>ARTS 654</td>
<td>Dance/Movement Therapy Theory and Practice III: Adults</td>
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Recommended Electives

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<td>Clinical Internship I</td>
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<td>ARTS 611</td>
<td>Clinical Internship II</td>
<td></td>
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<tr>
<td>ARTS 612</td>
<td>Clinical Internship III</td>
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<tr>
<td>ARTS 652</td>
<td>The Kestenberg Movement Profile</td>
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<tr>
<td>ARTS 658</td>
<td>Dance/Movement Therapy Advanced Group Supervision I</td>
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<td>ARTS 659</td>
<td>Dance/Movement Therapy Advanced Group Supervision II</td>
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<tr>
<td>ARTS 660</td>
<td>Dance/Movement Therapy Advanced Group Supervision III</td>
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</table>

Total Credits 41.5

Post-Master's Certificate in Music Therapy

Certificate Level: Graduate
Admissions Requirements: Master's degree
Certificate Type: Post-Master's Certificate
Number of Credits to Completion: 52.0
Instructional Delivery: Campus
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 51.2305
Standard Occupational Classification (SOC) Code: 29-1129

About the Program

The Post-Master’s Certificate in Music Therapy program is designed to help students develop advanced music therapy clinical skills in an academic health center setting. The program is the only music therapy training model housed in an academic health center. It is unique in that faculty members include mental health and medical professionals who assist students in integrating music therapy with current developmental, neuroscience, mental health, and medical foundations.

Didactic and clinical aspects are balanced to provide a foundation of theoretical knowledge and practical application. The evidence-informed curriculum integrates knowledge of music therapy with current theoretical approaches to assessment and treatment. Experiential core and music therapy modality courses are designed to help students develop the use of the self within the music therapy relationship.

About the Certificate

The certificate program is a 52.0 quarter credit course of study designed to meet the needs of qualified individuals who seek to become eligible to sit for the Board Certification Exam from the Certification Board for Music
Therapists (http://www.cbmt.org) (CBMT). The certificate program is designed for those with a master’s degree in another clinical mental health specialty who wish to add a specialization in music therapy with eligibility to sit for the Board Certification exam, administered by the Certification board for Music Therapists. Each of the following courses addresses one or more competency areas delineated by the American Music Therapy Association. All are taught at the graduate level.

Admissions

Admission requirements for the certificate program are similar to those for the MA program in Music Therapy (p. ). For additional information about admission to the program, visit the College of Nursing and Health Professions’ Creative Arts Therapies (https://www.drexel.edu/cnhp/academics/departments/Creative-Arts-Therapies) web site.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ARTS 501</td>
<td>Introduction to Creative Arts Therapy I</td>
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<tr>
<td>ARTS 502</td>
<td>Introduction to Creative Arts Therapy II</td>
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<td>ARTS 503</td>
<td>Introduction to Creative Arts Therapy III</td>
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<tr>
<td>ARTS 510</td>
<td>Clinical Practicum I: Observation</td>
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<td>ARTS 511</td>
<td>Clinical Practicum II</td>
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<td>ARTS 573</td>
<td>Clinical Musical Improvisation I</td>
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<td>ARTS 575</td>
<td>Theories in Music Therapy I</td>
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<tr>
<td>ARTS 577</td>
<td>Music Therapy Skills I</td>
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<td>ARTS 578</td>
<td>Music Therapy Skills II: Child Skills</td>
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<td>ARTS 579</td>
<td>Music Therapy Skills III: Technological Applications</td>
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<td>ARTS 580</td>
<td>Psychology of Music</td>
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<td>ARTS 581</td>
<td>Music Therapy Group Supervision I</td>
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<td>ARTS 582</td>
<td>Music Therapy Group Supervision II</td>
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<td>ARTS 670</td>
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<td>ARTS 671</td>
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<td>ARTS 672</td>
<td>Multicultural Perspectives in Music Therapy</td>
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<td>ARTS 677</td>
<td>Advanced Music Therapy Skills III - Group</td>
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<td>Clinical Internship Laboratory: Musical Analysis</td>
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<td>NEUR 534</td>
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Total Credits: 52.0

Post-Master's Certificate in Nurse Anesthesia

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Post-Master's Certificate
Number of Credits to Completion: 72.0
Instructional Delivery: Campus

Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 51.3804
Standard Occupational Classification (SOC) Code: 29-1151

The Post Master's Certificate (PMC) in Nurse Anesthesia program is a 72.0 quarter credit full-time program. The program offers 7.0 theoretical nursing and research credits, 9.0 quarter credit basic science component, 31.0 quarter credits of a didactic anesthesia component and a 25.0 credits in a clinical component. Upon successful completion program outcomes student is awarded a post master's certificate in nurse anesthesia and is eligible to take the national certification examination offered by the NBCRNA - Council on Certification of Nurse Anesthetists.

The nurse anesthesia program is accredited by the:

Council on Accreditation of Nurse Anesthesia Educational Programs
222 S. Prospect Ave, Suite 304
Park Ridge, IL 60068
847-692-7050

Admission Requirements

This certificate program is offered to those individuals who have earned a master's degree in nursing and seek further preparation in nurse anesthesia. Transcripts are reviewed and course work is determined on an individual basis. Contact the College of Nursing for more specific admission requirements (https://www.drexel.edu/cnhp/academics/post-masters/Certificate-PM-Nurse-Anesthesia).

Curriculum/Requirements

<table>
<thead>
<tr>
<th>Term</th>
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<td>NURS 503</td>
<td>Basic Principles of Nurse Anesthesia</td>
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<tr>
<td>NURS 504</td>
<td>Overview of Nurse Anesthesia</td>
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<tr>
<td>NURS 550*</td>
<td>Advanced Clinical Assessment Diagnostic Reasoning Across the Lifespan</td>
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<td>NURS 508</td>
<td>Nurse Anesthesia Clinical Practicum I</td>
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<tr>
<td>NURS 505</td>
<td>Chemistry and Physics</td>
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<td>NURS 507</td>
<td>Nurse Anesthesia Pharmacology I</td>
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<td>NURS 510</td>
<td>Advanced Principles of Nurse Anesthesia I</td>
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<td>NURS 511</td>
<td>Nurse Anesthesia Pharmacology II</td>
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<td>NURS 512</td>
<td>Nurse Anesthesia Clinical Practicum II</td>
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<td>NURS 521</td>
<td>Advanced Pathophysiology I</td>
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<tr>
<td>Term 4</td>
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<td>Fall</td>
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<tr>
<td>NURS 515</td>
<td>Advanced Principles of Nurse Anesthesia II</td>
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<tr>
<td>NURS 516</td>
<td>Nurse Anesthesia Clinical Practicum III</td>
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NURS 522 Advanced Pathophysiology II 3.0

Term Credits 8.0

Second Year

Term 5
Winter
NURS 517 Nurse Anesthesia Clinical Practicum IV 3.0
NURS 518 Advanced Principles of Nurse Anesthesia III 3.0
NURS 523 Advanced Pathophysiology III 3.0
NURS 530 Anesthesia Seminar 1.0

Term Credits 10.0

Term 6
Spring
NURS 659 Advanced Principles of Nurse Anesthesia IV 3.0
NURS 683 Nurse Anesthesia Clinical Practicum V 3.0

Term Credits 6.0

Term 7
Summer
NURS 684 Nurse Anesthesia Clinical Practicum VI 3.0

Term Credits 3.0

Term 8
Fall
NURS 527 Evidence Based Approaches to Practice 3.0
NURS 687 Clinical Residency I 6.0

Term Credits 9.0

Third Year

Term 9
Winter
NURS 688 Clinical Correlative Seminars 3.0
NURS 689 Clinical Residency II 6.0

Term Credits 9.0

Total Credit: 72.0

* 1.0 credit Independent Study course may be substituted based upon review of MSN transcript.

Rehabilitation Sciences

Major: Rehabilitation Sciences
Degree Awarded: Master of Science (MS); Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 48.0 (MS); 93.0 (PhD)
Classification of Instructional Programs (CIP) code: 51.2308
Standard Occupational Classification (SOC) code: 29-1123

About the Program
The Doctor of Philosophy (PhD) in Rehabilitation Sciences program is designed to prepare physical therapists and other professionals to take leadership roles as researchers and educators in rehabilitation sciences, and to conduct research that will ultimately impact the quality of life for individuals with limitations in motor function. Concentrations are offered in three areas:

Program Objectives
The PhD program prepares individuals for leadership, teaching and research roles in the profession. On completing the Doctor of Philosophy degree, graduates will be prepared to:

- Analyze the impact of movement dysfunction from multiple perspectives, including body function, activity, and participation.
- Analyze theory, research, and health care policy relevant to health promotion and rehabilitation to translate knowledge into clinical practice.
- Develop and evaluate innovative mechanisms, methods, interventions, and models of service delivery for health promotion and rehabilitation.
- Effectively communicate information orally through professional presentations and in writing through grant proposals and publications in peer-reviewed journals.
- Develop an ongoing area of research that is competitive for grant funding.
- Apply innovative teaching methods to a wide variety of situations, including the education of physical therapists and physical therapy students.

Concentrations
Student and faculty advisor collaboratively design an individualized plan of study based on common research interests. Prospective students are encouraged to explore our faculty research areas (https://www.drexel.edu/cnhp/academics/departments/Physical-Therapy/Research) and information on our PhD faculty mentors on our program website (https://www.drexel.edu/cnhp/academics/doctoral/DHSC-Rehabilitation-Sciences).

Degree Requirements
The core curriculum includes coursework in research and teaching. Concentration courses in clinical and basic science are selected based on the student’s area of interest, objective for doctoral study, and dissertation research. Students work individually with a faculty mentor to complete the required research and teaching practica.

Requirements vary according to the student’s previous degree. Students with master’s degrees must successfully complete 48.0 credits; students with baccalaureate degrees must complete 93.0 credits. A comprehensive examination and a dissertation research project are required. The PhD degree can be completed in 3.5 to 4 years of full-time study for students who enter with a master’s or DPT degree.

Additional Information
For more information, visit the Department of Physical Therapy and Rehabilitation Sciences web page.

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>NHP 762</td>
<td>Health Professional Education</td>
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</tr>
<tr>
<td>RHAB 760</td>
<td>Academia for Rehabilitation Scientists</td>
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</tr>
<tr>
<td>RHAB 761</td>
<td>Foundations of Rehabilitation Research</td>
<td>3.0</td>
</tr>
<tr>
<td>RHAB 815</td>
<td>Scientific Inquiry and Writing</td>
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</tr>
</tbody>
</table>
Upon completion of the MHS program, graduates will be prepared to:

1. Study or a clinical project.
2. Include successful completion of 45.0 credit hours concluding with a case study or a clinical project.

Requirements for the degree completion:

- Individuals cannot enroll directly in the Master of Health Sciences in Rehabilitation Sciences program. Requirements for the degree completion and concentrations are as follows:

  **Master of Health Sciences (MHS): 45.0 quarter credits**

  **Core Requirements**
  - RSCH 519 Introduction to Biostatistics 3.0
  - RSCH 523 Methods for Health Research 3.0
  - PTRS 721 Teaching Concepts in Rehabilitation 3.0
  - PTRS 651 Applied Tissue Biomechanics 3.0
  - PTRS 758 Evidence-Based Rehabilitation 4.0
  - PTRS 650 Motor Control and Learning Rehabilitation 3.0

  **Concentration**
  - Students select a minimum of 16-18 credits in one of the following concentrations:
    - Hand and Upper Quarter Rehabilitation Concentration Options
      - PTRS 767 Foundations in Hand Therapy
      - PTRS 768 Upper Quarter Joint Pathology
      - PTRS 769 Nerve Injuries of the Upper Quarter
      - PTRS 770 Diseases That Affect the Hand
      - PTRS 771 Work Injury Management
    - Pediatrics Concentration Options
      - PTRS 740 Issues in Pediatric Health & Rehabilitation
      - PTRS 760 Pediatric Decision Making
      - PTRS 761 Pediatric Clinical Application
      - PTRS 772 Selected Topics in Pediatrics
    - Orthopedics Concentration Options
      - PTRS 765 Spinal Rehabilitation
      - PTRS 766 Extremity Rehabilitation
      - RHAB 763 Biomechanics in Rehabilitation
      - RHAB 764 Biomechanics in Human Movement
      - RHAB 765 Introduction to Movement Science
      - RHAB 817 Sensors & Transducers in Rehabilitation

  **Practica and Independent Study**
  - RHAB 820 Independent Study 1.0-4.0
  - RHAB 823 Research Practicum 1.0-6.0
  - RHAB 824 Teaching Practicum I 1.0
  - RHAB 825 Teaching Practicum II 2.0
  - RHAB 826 Teaching Practicum III 3.0

  **Additional Information**
  For more information, visit the Department of Physical Therapy and Rehabilitation Sciences (https://www.drexel.edu/cnhp/academics/departments/Physical-Therapy) web page.

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      - PTRS 768 Upper Quarter Joint Pathology
      - PTRS 769 Nerve Injuries of the Upper Quarter
      - PTRS 770 Diseases That Affect the Hand
      - PTRS 771 Work Injury Management
    - Pediatrics Concentration Options
      - PTRS 740 Issues in Pediatric Health & Rehabilitation
      - PTRS 760 Pediatric Decision Making
      - PTRS 761 Pediatric Clinical Application
      - PTRS 772 Selected Topics in Pediatrics
    - Orthopedics Concentration Options
      - PTRS 765 Spinal Rehabilitation
      - PTRS 766 Extremity Rehabilitation
      - RHAB 763 Biomechanics in Rehabilitation
      - RHAB 764 Biomechanics in Human Movement
      - RHAB 765 Introduction to Movement Science
      - RHAB 769 Nerve Injuries of the Upper Quarter
      - PTRS 770 Diseases That Affect the Hand
      - PTRS 771 Work Injury Management
Electives
Select at least two of the following:

PTRS 612 Pharmacotherapeutics
RHAB 824 Teaching Practicum I
RHAB 825 Teaching Practicum II
RHAB 826 Teaching Practicum III
RHAB 816 Special Topics
RHAB 820 Independent Study

Final Project

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<tr>
<td>PTRS 787</td>
<td>MHS Final Project II</td>
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Total Credits 45.0

* Additional courses (as approved). Contact the Rehabilitation Sciences Master of Health Science Program (https://www.drexel.edu/cnhp/academics/departments/Physical-Therapy) for more details.

Facilities

Teaching Facilities and Resources

Most classes are held in lecture halls, classrooms, or laboratories on the Center City (Health Sciences) Campus of Drexel University. The entire campus has wireless capability for easy internet access. The Department of Physical Therapy and Rehabilitation Sciences has two state-of-the-art dedicated laboratories. Our teaching resources also include supported distance learning technology. Instructional materials are provided through text, graphics, audio and video formats and are available online through a course management system 24 hours a day. Our online courses are highly interactive through the use of web discussion boards, audio chat tools, and video conferencing.

Research Facilities

The department's research facilities include over 9,000 square feet of well-equipped research laboratory space (Biomechanics, Gait, Pediatrics, and Neuromuscular Performance Labs), with equipment including force plates, EMG, motion analysis and human performance measurement equipment. This space includes conference rooms, PhD and post doc offices and is located next door to the Colleges 14,000 square feet, multi-disciplinary clinical practice.

The Department of Physical Therapy and Rehabilitation also values community partners as a central part of the research resources. Many faculty and students are involved in community-based research through collaborations with CanChild Centre, 11th Street Family Health Center, and numerous pediatric hospitals, out-patient facilities, and early intervention providers. Faculty are collaborating on research projects with nationally and internationally known researchers on several multi-site funded projects.

Physical Therapy and Rehabilitation Sciences Faculty

Maria Benedetto, DPT (University of Puerto Rico; Columbia University). Associate Clinical Professor. Motor learning and motor control in pediatrics; timed ambulation; obstacle course for children with and without motor disabilities.

Lisa Ann Chiarello, PT, PhD, PCS (Hahnemann University; Ithaca College) Director, PhD Program. Professor. Models of service delivery in early intervention; parent-child relationship and the use of play; family-centered care.

David Ebaugh, PT, PhD (Drexel University). Assistant Professor. Quantitative analysis of movement in patients with shoulder pathology; differential diagnosis of shoulder problems; orthopedic examinations and interventions.

Jane Fedorczyk, PT, PhD, CHT, ATC (Beaver College) Director, Post-Professional Clinical Programs. Associate Clinical Professor. Hand and upper extremity injuries related to repetitive movement including tendinopathies and nerve compression syndromes.

Kevin E. Gard, DPT, OCS (Temple University) Vice-Chair, Department of Physical Therapy and Rehabilitation Sciences and Director, Professional Doctor of Physical Therapy Program. Associate Clinical Professor. Orthopedics; sports medicine.

Noel Goodstadt, DPT, OCS, CSCS (Pennsylvania State University; Hahnemann University; Temple University). Assistant Clinical Professor. Orthopedics, musculoskeletal disorders.

Jan Meiers, PT, DPT, GCS (Temple University) Assistant Director of Clinical Education. Assistant Clinical Professor. Wellness in the geriatric population.

Kathryn D. Mitchell, PT, DPT, NCS (Temple University) Assistant Director of Clinical Education. Assistant Clinical Professor. Adult neuromuscular rehabilitation, vestibular rehabilitation, and balance and falls; clinical health informatics.

Margaret O'Neil, PT, PhD, MPH (MCP Hahnemann University; Duke University; University of North Carolina at Chapel Hill). Associate Professor. Measurement of and interventions to improve physical activity and fitness levels and promote participation in children and youth with who are overweight/obese and those with physical disabilities (especially cerebral palsy).

Margo Orlin, PT, PhD (Drexel University) Interim Chair, Department of Physical Therapy and Rehabilitation Sciences. Associate Professor. Gait and function in children with developmental disabilities, evaluation of musculoskeletal interventions for children with cerebral palsy; enhancing participation for children and adolescents with cerebral palsy.


Deborah Rose, PT, DPT, PCS (Drexel University). Adjunct Instructor. Pediatric clinical specialist.

Patricia Rubertone, MSW, MPT (Temple University; Hahnemann University) Director of Clinical Education. Assistant Clinical Professor. Student learning; course design.

Patricia A. Shewokis, PhD (University of Georgia). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy (fNIR) and electroencephalography (EEG) and methodology and research design.

Sheri Sillies, PT, PhD (MCP Hahnemann University) Research Lab Coordinator. Associate Professor. Identification and treatment of impairments in neuromuscular control of trunk mobility and postural
stability in patients with low back pain; focusing on mechanism of recurrent low back pain.

Susan Smith, PT, PhD (University of Connecticut, Texas Woman's University) Associate Dean for Research and Health Professions, Graduate Education, CNHP. Associate Professor. Health promotion and interventions for manifestations of low bone mass in women; quantitative evaluation and interventions in orthopedic physical therapy with an emphasis on spinal pain and dysfunction.

Sarah Wenger, PT, DPT, OCS (Arcadia University; Temple University) Coordinator of Experiential Learning, Assistant Clinical Professor. Health, wellness and fitness, models for preventative physical therapy.

Interdepartmental Faculty
Joseph A. Rubertone, MPT, PhD (West Virginia University). Associate Clinical Professor. Connectivity of vestibular nuclear complex, brain tumor imaging, and clinical studies pertaining to the effectiveness of stroke rehabilitation.

Women's Health/Gender-Related Nurse Practitioner Post-Master's Certificate

Certificate Level: Graduate
Admission Requirements: Master's degree
Certificate Type: Post-Master's Certificate
Number of Credits to Completion: 37.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.3822
Standard Occupational Classification (SOC) Code: 29-1171

The online Women's Health/Gender Related Nurse Practitioner program supplies nurses with the skills necessary to provide advanced care to women and their partners throughout the lifespan with a specialized emphasis on reproductive and gynecologic health needs. Graduates are also qualified to provide a myriad of gender related services focusing on health promotion and disease prevention that range from well-woman care, prenatal and postpartum care, and common and complex women's health issues in both primary settings and women's health specialty practices. Additionally, this track offers the opportunity for students to work in transdisciplinary simulated scenarios to promote a better understanding and respect of discipline-specific roles, improve existing communication and collaboration within disciplines, and initiate teamwork development in order to promote patient safety and high-quality patient care.

This certificate is offered to those individuals who have earned a master's degree in nursing and seek further preparation to become a Women's Health/Gender Related Nurse Practitioner (WH/GRNP). Transcripts will be reviewed and course work will be determined on an individual basis. Students meet on campus for a mandatory On-Campus Intensive (OCI) learning experiences, simulation, and evaluation. Graduates are eligible to sit for the NCC's Women's Health/Gender Related Nurse Practitioner Certification Examination.

Admission Requirements
- A Master's degree with a major in nursing (MSN) from a regionally accredited program with a cumulative grade point average of at least 3.0 on a scale of 4.0.
- A copy of your current, unrestricted United States RN license or eligibility for licensure as a registered nurse. License verification from your nursing license registry website are acceptable. Once accepted, applicants must have a current RN license in the state of Pennsylvania. In addition, students are required to have a RN Nursing License for the state in which the clinical practicum rotations are being completed.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online through a password secured link or website (use our email address, customerservice@drexel.com). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts. Click here to use our Transcript Look-up Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions. If you attended a Diploma School of Nursing and the school was affiliated with a college/university, the official transcript must be submitted from the college for any non-nursing courses for which you received credit.
  - Current Curriculum vitae and/or resume detailing work experience, including specific job responsibilities and departments.
  - Two professional letters of recommendation (from either a previous or immediate supervisor and/or a former nursing faculty member who can attest to the applicant's clinical knowledge, skill and potential aptitude for graduate study). References will not be accepted from colleagues or family members. Drexel University Online now accepts electronic letters of recommendation. Click here (http://www.drexel.edu/apply/recommend) for instructions regarding their submission. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
  - Personal statement (800-1,600 words) that will give the Admissions Committee a better understanding of why you are choosing this particular program of study, your plans upon completion of this program, and how your current work experience will enhance your experience in this program.
  - International applicants: Please click here (http://www.drexel.com/online-degrees/nursing-degrees/cert-pm-apmhnpiinternational.aspx) for instructions regarding the additional requirements.
  - Once the student is accepted into the program, a GAP analysis may be conducted to determine credit eligibility for previously faculty supervised clinical hours. Note: The Gap Analysis is not mandatory for acceptance into the program. If the prospective student chooses to have a Gap Analysis completed, it is performed after confirmed admissions.
  - A personal interview may be required (online or telephone options will be available).

Program of Study
All incoming post-master’s students have the opportunity for previous coursework to be evaluated on an individual basis for transfer of credit.
Students should check with the program Transfer Credit Evaluator for the exact schedule. The mandatory on campus visits are as follows:

- **2nd Year, Summer Term** – students come to campus during the first clinical course for the On-Campus Intensives (OCI).
- **3rd Year, Fall Term** – students come to campus during the second clinical course for 2-3 days for a standardized patient lab experience (SPL) and/or human patient simulation (HPS) experience.
- **3rd Year, Winter Term** – students come to campus during the third clinical course for 2-3 days for a second standardized patient lab experience (SPL) and/or human patient simulation experience (HPS).
- **3rd Year, Spring Term** – students come to campus during the fourth clinical course for the On-Campus Intensives (OCI).

### Required Courses

<table>
<thead>
<tr>
<th>Support Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 548 Advanced Pathophysiology</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 549 Advanced Pharmacology</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 550 Advanced Clinical Assessment &amp; Diagnostic Reasoning Across the Lifespan</td>
<td>4.0</td>
</tr>
<tr>
<td>NURS 664 Professional Issues for Nurse Practitioners</td>
<td>1.0</td>
</tr>
<tr>
<td>NURS 680 Primary Care for Women’s Health</td>
<td>3.0</td>
</tr>
<tr>
<td>NURS 682 Pharmacology for the Women’s Health Nurse Practitioner</td>
<td>3.0</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Concentration Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>NURS 690 WHNP I: Mngmnt &amp; Care of the Common Gyn and Gender Related Issues throughout the Lifespan</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 691 WHNP II: Mngmnt &amp; Care of the Complex Gyn and Gender Related Issues of Women throughout the Lifespan</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 692 WHNP III: Management &amp; Care of the Low Risk Obstetrical and Post Partum Needs of Women and Families</td>
<td>5.0</td>
</tr>
<tr>
<td>NURS 693 WHNP IV: Mngmnt &amp; Care of the High Risk Obstetrical and Post Partum Needs of Women and Families</td>
<td>5.0</td>
</tr>
</tbody>
</table>

**Total Credits**: 37.0
LeBow College of Business

About the College

LeBow College of Business (http://www.lebow.drexel.edu) is among just 25 percent of business schools nationwide accredited by AACSB--Association to Advance Collegiate Schools of Business. Drexel LeBow offers one MBA degree delivered in different formats – face-to-face or online, part-time or full-time, and at a satellite campuses in Malvern, PA. Additionally, the Drexel LeBow MBA offers several fields of concentration within the MBA: finance, marketing, entrepreneurship/innovation, business analytics and healthcare management. Options include:

- **Full-Time**: one-year MBA and traditional two-year MBA
- **Part-Time**: LEAD (an accelerated MBA), the flexible professional MBA, and executive MBA.
- **Online**: MBA Anywhere and MBA in healthcare management

Prospective students to the Drexel LeBow MBA programs are not required to have undergraduate degrees in business. In addition to MBA programs, Drexel LeBow offers MS degrees in accounting, business analytics, economics, finance, leadership, and marketing.

Majors

- Accounting (MS) (p. 213)
- Business Administration (PhD) (p. 223)
- Business Administration (MBA) (p. 206)
  - Executive Program (p. 204)
  - Concentrations (p. 208)
- Business Analytics (MS) (p. 215)
- Finance (MS) (p. 216)
- Leadership (MS) (p. 218)
- Marketing (MS) (p. 220)
- Supply Chain Management and Logistics (MS) (p. 221)

Certificates

- Advanced Business (p. 203)
- Leadership (p. 204)

About the Curriculum

Graduate business programs at Drexel University’s LeBow College of Business provide a high-quality education that blends theory and practice. Students receive individualized attention to help them achieve short-term and long-term career goals. The Drexel LeBow MBA enrolls approximately 800 students representing diverse backgrounds, 20 percent of whom are enrolled full-time. Approximately 50 percent of the full-time students are international. Drexel LeBow MBA students have come from more than 40 countries in Asia, Europe, South America and Canada.

The part-time MBA programs account for 60 percent of the enrolled students with another 20 percent enrolled in online MBA programs.

Following in the mission of the University’s founder, A.J. Drexel, to provide practical applications of learning, the Drexel LeBow faculty have backgrounds in corporate management and scholarly research. Drexel LeBow faculty combine strengths in teaching and research. They also enjoy strong ties with the corporate community. Corporate and entrepreneurial leaders add to the full-time faculty by coming to campus as guest lecturers or as adjunct professors.

Centers and Facilities

This marriage of academic rigor and practical applications can also be seen in the development of the school’s Centers of Excellence. Centers of Excellence are catalysts for research and innovation, think tanks for nationally significant trends and issues, and incubators for opportunities in business and integration among disciplines. LeBow’s Centers of Excellence provide students with meaningful experiential learning and impact the performance of business in our region and around the world. As part of the curriculum Drexel LeBow MBA students will take courses which reside in the centers and will see firsthand how practical learning is applied.

The Centers are:

- Center for Corporate Reputation Management (https://www.lebow.drexel.edu/academics/centers/corporate-reputation-management)
- Sovereign Institute for Strategic Leadership (https://www.lebow.drexel.edu/academics/centers)
- Center for Corporate Governance (https://www.lebow.drexel.edu/academics/centers/corporate-governance)
- Dana and David Dornsife Center for Experiential Learning (https://www.lebow.drexel.edu/academics/centers/experiential-learning)

Facilities

In fall 2013, LeBow College opened its 12-story, Gerri C. LeBow Hall, with a finance trading lab, behavioral studies lab and integrated teaching technology in all classrooms. The new building features two lecture halls, 15 classrooms of varying sizes and seating configurations, including case study rooms and cluster classrooms designed to facilitate group work. Other amenities consist of extensive areas of student spaces, including 12 collaboration rooms, two quiet study areas, and 3,500 square feet of student lounges. Gerri C. LeBow Hall brings together faculty, students and staff, in a state of the art building on the University City campus.

Certificate in Advanced Business

Certificate Level: Post-graduate
Admission Requirements: Master's degree or higher
Certificate Type: Post-Master's Certificate
Number of Credits to Completion: 12.0
Instructional Delivery: Campus, Online, Hybrid
Calendar Type: Quarter
Expected Time To Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 52.0201
Standard Occupational Classification (SOC) Codes: 11-1021, 13-0000

The Drexel LeBow Advanced Business Certificate (ABC) program is available to applicants possessing an earned master’s degree or doctoral degree from a fully accredited university or college. The program is designed to permit qualified candidates the opportunity to update their skills in a professional field of specialization in which they have had

Certificate in Advanced Business

Certificate Level: Post-graduate
Admission Requirements: Master's degree or higher
Certificate Type: Post-Master's Certificate
Number of Credits to Completion: 12.0
Instructional Delivery: Campus, Online, Hybrid
Calendar Type: Quarter
Expected Time To Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 52.0201
Standard Occupational Classification (SOC) Codes: 11-1021, 13-0000

The Drexel LeBow Advanced Business Certificate (ABC) program is available to applicants possessing an earned master’s degree or doctoral degree from a fully accredited university or college. The program is designed to permit qualified candidates the opportunity to update their skills in a professional field of specialization in which they have had
previous academic experience, or to acquire competence in a new business discipline.

The post-master's ABC program requires completion of a four-course sequence and may include the following specialization areas:

- business analytics
- entrepreneurship
- finance
- leadership
- marketing
- or a customized certificate option

The ABC program is administered by the Krall Center Corporate and Executive Education (http://www.lebow.drexel.edu/corporate-services/corporate-and-executive-education) in Drexel LeBow College of Business. Participants in this part-time certificate program have a three-year maximum timeframe within which to complete the certificate requirements. ABC students are enrolled in courses in Drexel LeBow MBA sections pending availability.

Upon acceptance to the ABC program, students will meet with an advisor to review program/course prerequisites (if applicable), and create a plan of study within one of the programs specializations. Sample course sequences in the specialization areas are listed below.

Certificate Requirements

After completing the four-course series, and receiving at least a 3.0 GPA for the certificate courses, students will receive a Post-Master's Certificate. The credits earned in the certificate are not applicable to any current or future degree program offered by Drexel University unless all applicable entrance criteria for the anticipated program are met.

Certificate in Leadership

Certificate Level: Graduate/Post-graduate
Admissions Requirements: Bachelor's degree or higher
Certificate Type: Graduate
Number of Credits to Completion: 12.0
Instructional Delivery: Campus, Online, Hybrid
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 52.0213
Standard Occupational Classification (SOC) Code: 13-1111

The coursework in this certificate offers students multiple perspectives of leadership, which include leadership of self, groups and of organizations. Through the coursework, opportunities are also provided to enhance persuasion and negotiations skills, as well as to develop and implement technological change.

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<tbody>
<tr>
<td>MGMT 602</td>
<td>Managing Technology Innovation</td>
<td>3.0</td>
</tr>
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<td>MGMT 780</td>
<td>Strategic Management</td>
<td>3.0</td>
</tr>
<tr>
<td>ORGB 625</td>
<td>Leadership and Professional Development</td>
<td>3.0</td>
</tr>
<tr>
<td>ORGB 631</td>
<td>Leading Effective Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 601</td>
<td>Marketing Strategy &amp; Planning</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 622</td>
<td>Buyer Behavior Theory</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 634</td>
<td>Integrated Marketing Communications Management</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 638</td>
<td>New Product Planning, Strategy, and Development</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Certificate in Leadership

Certificate Level: Graduate/Post-graduate
Admissions Requirements: Bachelor's degree or higher
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<tr>
<td>ORGB 631</td>
<td>Leading Effective Organizations</td>
<td>3.0</td>
</tr>
<tr>
<td>ORGB 640</td>
<td>Negotiations for Leaders</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Executive MBA Program

Major: Business Administration
Degree Awarded: Master of Business Administration (MBA)
Calendar Type: Quarter
Total Credit Hours: 51.0
Classification of Instructional Programs (CIP) code: 52.0101
Standard Occupational Classification (SOC) code: 11-1021

About the Program

The Executive MBA program is designed for experienced professionals with a minimum of 7 years of experience including two years in management functions. Executive MBA students have an average of
15 years of professional experience. The program stresses leadership, strategic thinking, and working effectively in a team environment.

The Executive MBA of LeBow College is an accelerated program designed to help experienced professionals leverage valuable work experience to maximize leadership potential. The Executive MBA Program is closely aligned with the needs of students and the business community. The program aims to produce business leaders who:

- communicate effectively as leaders;
- are skilled at innovative thinking;
- can convert ideas into actions;
- understand global business and management;
- can make informed and ethical decisions.

The program is designed for students to learn within a small group (typically 20-30 students) who begin and complete the program together. Students learn from faculty as well as fellow classmates in a dynamic, interactive environment. Networking is a crucial part of the Executive MBA experience. Executive MBA alumni form a close-knit and engaged community.

The curriculum is distinct from that of a traditional MBA, which emphasizes knowledge a practitioner needs; the Executive MBA Program focuses on what decision makers need to know. Leadership workshops and executive coaching are interwoven throughout the 20-month program.

Program Delivery

The Executive MBA Program begins each September with a three-day immersion phase in which students spend a concentrated period working with fellow students and laying the foundations for subsequent coursework and collaboration. The program meets one Friday and two Saturdays to minimize time away from the office and home while keeping students on a steady path to completion in 20 months. One week per month is an on-line or project week. To close the program, students participate in a capstone 10-day international residency.

Additional Information

For additional information about the program, visit the Executive MBA (http://www.lebow.drexel.edu/Prospects/MBA/Executive) web page.

Admission Requirements

The EMBA program has separate admission procedures. A personal interview is required. Students admitted to the program have an average of 15 years work experience and significant potential for advancement in their organizations. A minimum of 7 years of professional experience (including 2 years of management) is required. Students must be admitted to the Executive MBA program to register for EMBA cohorted classes.

For further information, please contact:

Mark Dierkes
Director of Recruitment
Executive MBA Program
484.595.0415
med24@drexel.edu (elie.farhat@drexel.edu)

About the Curriculum

A major strength of the LeBow Executive MBA program is the focus on leadership development. At the core of this instruction is a team-based learning approach. Designed to help enhance the transfer of experiences, each student will progress through the program in diverse teams. During orientation, students participate in team building exercises in which students work together to achieve common goals. Throughout the program, students earn credits towards a Leadership Certificate sponsored by the LeBow Institute for Strategic Leadership.

The Executive MBA is closely aligned with the needs of students and the business community and centers around four relevant and comprehensive modules. Starting with Enterprise Management, the program follows a sequential plan of study, building upon material learned from each of the previous modules. Students explore and apply the core business disciplines of finance, economics, and accounting. In the second year, students take strategy-based classes that require the application and synthesis of knowledge gained earlier in the program. At the end of the program the learning focuses on global business management, including a 10-day international residency.

Foundation Courses

This module is designed to orient students to business concepts, applications and decision making in accounting, finance and economics. Specific courses include:

- Managing the Total Enterprise (business simulation)
- Measuring and Maximizing Financial Performance
- Principles of Macro and Micro Economics

Functional Core

This module is designed to build a solid core of advanced business learning, and will expose students to the latest academic trends from our internationally recognized research faculty. Specific courses include:

- Managerial Accounting
- Corporate Finance
- Business Statistics
- Marketing Strategy and Planning
- Operations Management
- Managerial Economics

Technology Management & Business Analytics

This module is designed to develop planning skills and an understanding of constantly emerging technological trends. Specific courses include:

- Managing Technological Innovation
- MIS: Strategic Alignment
- Fundamentals of Business Analytics

Strategic Leadership

This module is designed to help professionals increase their leadership ability by exposing them to the latest self-assessment tools, industry best practices and strategies. Specific courses include:

- Mergers & Acquisitions and Corporate Governance
- Strategic Management
- International Business Management
- International Residency Seminar
Professional Leadership

- Leadership & Professional Development
- Students complete a Leadership Specialization program on topics as team dynamics, building and leveraging networks, ethics, and leading in dynamic environments. These "short courses" are integrated throughout the EMBA program.

Executive Coaching

Students work individually with an executive coach during and beyond the 20-month program to design and implement a personal career development plan and reinforce leadership skills.

MBA Programs

Major: Business Administration
Degree Awarded: Master of Business Administration (MBA)
Calendar Type: Quarter
Total Credit Hours: 51.0
Classification of Instructional Programs (CIP) code: 52.0101
Standard Occupational Classification (SOC) code: 11-1021; 11-2022; 11-9199

About the MBA

Drexel University’s innovative, high-quality MBA program is recognized for its excellence and for its preparation of students for successful professional careers. We seek to attract and retain students with excellent undergraduate academic records and a commitment to graduate education. From its inception, Drexel has been a technology-oriented university, and we are committed to focusing our graduate curricula to reflect the importance and use of technology in both business and not-for-profit organizations.

Goals and Objectives

The MBA program is designed to:

- Integrate the foundations of business, problem-solving, and decision-making skills; organization theory; and practical aspects of institutional management
- Prepare students for managerial positions in business and other institutions
- Offer concentrations in various areas of management
- Capitalize on communication skills, people skills, global perspectives, technological competence, pragmatic emphasis, and ethical perspectives

Students selecting a concentration can choose from the following options:

- Business Analytics
- Finance
- Healthcare Management (not available in full-time MBA program)
- Entrepreneurship/Innovation Management
- Marketing

Full-time, Part-Time, Online and Accelerated Options

The College offers one MBA degree delivered in different formats: – face-to-face or online, part-time or full-time, and at a satellite campus in Malvern, PA. Additionally, the Drexel LeBow MBA offers several fields of concentration within the MBA. Visit LeBow College’s web site for information about additional MBA options (http://www.lebow.drexel.edu/Prospects/MBA).

Degree Requirements

The Master of Business Administration (MBA) curriculum remains firmly grounded on the best features of the "traditional" MBA as it has evolved over half a century. Among these features is a broad overview of business, complemented by at least one area of specialization.

Students selecting a concentration can choose from the following options:

- Business Analytics
- Finance
- Healthcare Management (not available in full-time MBA program)
- Entrepreneurship/Innovation Management
- Marketing

Foundation Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>BUSN 501</td>
<td>Measuring and Maximizing Financial Performance</td>
<td>3.0</td>
</tr>
<tr>
<td>BUSN 502</td>
<td>Essentials of Economics</td>
<td>3.0</td>
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Core Curriculum

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>ACCT 601</td>
<td>Managerial Accounting</td>
<td>3.0</td>
</tr>
<tr>
<td>ECON 601</td>
<td>Managerial Economics</td>
<td>3.0</td>
</tr>
<tr>
<td>FIN 601</td>
<td>Corporate Financial Management</td>
<td>3.0</td>
</tr>
<tr>
<td>MGMT 601</td>
<td>Managing the Total Enterprise</td>
<td>3.0</td>
</tr>
<tr>
<td>MGMT 602</td>
<td>Managing Technology Innovation</td>
<td>3.0</td>
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<td>ORGB 625</td>
<td>Leadership and Professional Development</td>
<td>3.0</td>
</tr>
<tr>
<td>POM 601</td>
<td>Operations Management</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 601</td>
<td>Business Statistics</td>
<td>3.0</td>
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Flexible Core Sequence

Students select two courses from the following list of flexible core courses:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>MGMT 650</td>
<td>Corporate Venturing</td>
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<tr>
<td>MGMT 652</td>
<td>New Venture Planning</td>
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Center for Corporate Governance

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLAW 605</td>
<td>Legal Options in Decision Making</td>
</tr>
<tr>
<td>FIN 610</td>
<td>Corporate Governance</td>
</tr>
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</table>

Center for Corporate Reputation Management

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 654</td>
<td>Corporate Brand &amp; Reputation Management</td>
</tr>
<tr>
<td>MKTG 790</td>
<td>Seminar In Marketing Management</td>
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International Business/Studies

<table>
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<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>INTB 620</td>
<td>International Business Management</td>
</tr>
<tr>
<td>MIS 651</td>
<td>Information Systems Outsourcing Management</td>
</tr>
</tbody>
</table>

Sovereign Institute for Strategic Leadership

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>ORGB 631</td>
<td>Leading Effective Organizations</td>
</tr>
<tr>
<td>ORGB 640</td>
<td>Negotiations for Leaders</td>
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Capstone Course

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>MGMT 780</td>
<td>Strategic Management</td>
</tr>
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</table>

Concentration Courses

Students selecting a concentration can choose from the following options:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 780</td>
<td>Strategic Management</td>
</tr>
</tbody>
</table>

The College offers one MBA degree delivered in different formats: – face-to-face or online, part-time or full-time, and at a satellite campus in Malvern, PA. Additionally, the Drexel LeBow MBA offers several fields of concentration within the MBA. Visit LeBow College’s web site for information about additional MBA options (http://www.lebow.drexel.edu/Prospects/MBA).
Healthcare Management
Marketing
Entrepreneurship/Innovation Management

Total Credits 51.0

Business Analytics Concentration
The Business Analytics concentration prepares students to make good business decisions with fact-based analysis and an understanding of business performance from a systems view, using statistical and quantitative analysis of data as well as explanatory and predictive modeling.

Requirements

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>STAT 632</td>
<td>Datamining for Managers</td>
<td>3.0</td>
</tr>
<tr>
<td>Select two of the following:</td>
<td></td>
<td>6.0</td>
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<tr>
<td>ECON 650</td>
<td>Business &amp; Economic Strategy: Game Theory &amp; Applications</td>
<td></td>
</tr>
<tr>
<td>FIN 642</td>
<td>Business Conditions and Forecasting</td>
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<td>MKTG 606</td>
<td>Customer Analytics</td>
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<tr>
<td>MIS 630</td>
<td>Inter-Active Decision Support Systems</td>
<td></td>
</tr>
<tr>
<td>MIS 633</td>
<td>Predictive Business Analytics with Relational Database Data</td>
<td></td>
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<tr>
<td>OPR 601</td>
<td>Managerial Decision Models and Simulation</td>
<td></td>
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<td>OPR 626</td>
<td>System Simulation</td>
<td></td>
</tr>
<tr>
<td>POM 625</td>
<td>Supply Chain Management</td>
<td></td>
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<tr>
<td>STAT 634</td>
<td>Quality &amp; Six-Sigma</td>
<td></td>
</tr>
<tr>
<td>STAT 636</td>
<td>Experimental Design</td>
<td></td>
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</tbody>
</table>

Total Credits 9.0

Finance Concentration

Required Courses
Select two of the following: 6.0

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>FIN 602</td>
<td>Advanced Financial Management</td>
</tr>
<tr>
<td>FIN 622</td>
<td>Financial Institutions &amp; Markets</td>
</tr>
<tr>
<td>FIN 624</td>
<td>Risk Management</td>
</tr>
<tr>
<td>FIN 626</td>
<td>Investment Management</td>
</tr>
<tr>
<td>FIN 635</td>
<td>Entrepreneurial Finance</td>
</tr>
<tr>
<td>FIN 640</td>
<td>Mergers and Acquisitions</td>
</tr>
<tr>
<td>FIN 642</td>
<td>Business Conditions and Forecasting</td>
</tr>
<tr>
<td>FIN 648</td>
<td>International Financial Management</td>
</tr>
<tr>
<td>FIN 790</td>
<td>Seminar in Finance</td>
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</table>

Electives
Select one of the following: 3.0

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>BLAW 620</td>
<td>Legal Aspects of Employment</td>
</tr>
<tr>
<td>ECON 614</td>
<td>Macroeconomics</td>
</tr>
<tr>
<td>BLAW T680</td>
<td>Special Topics in BLAW</td>
</tr>
<tr>
<td>ECON 630</td>
<td>International Economics</td>
</tr>
<tr>
<td>ECON 650</td>
<td>Business &amp; Economic Strategy: Game Theory &amp; Applications</td>
</tr>
<tr>
<td>INTB 632</td>
<td>Economic Analysis of Multinational Corporations</td>
</tr>
<tr>
<td>MGMT 655</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>MIS 624</td>
<td>E-Commerce Systems I</td>
</tr>
<tr>
<td>MIS 630</td>
<td>Inter-Active Decision Support Systems</td>
</tr>
<tr>
<td>MKTG 630</td>
<td>Global Marketing</td>
</tr>
</tbody>
</table>

Total Credits 9.0

Healthcare Management Concentration
This specialized, cohort-based, online program was developed together with industry representatives. The custom program is designed for professionals in the pharmaceutical and healthcare industries to help achieve new understanding and advance students’ careers by integrating business strategy with science and technology and the unique perspective of the industry.

Four of the 17 courses offered are in-person residencies over three- to six-day on-site sessions at the beginning, middle, and end of the program. The remainder of the courses are delivered in an online format for ultimate flexibility.

This program begins in the spring and takes approximately 24 months to completion.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 651</td>
<td>Healthcare Business Practice I: Foundations</td>
</tr>
<tr>
<td>BUSN 652</td>
<td>Healthcare Business Practice II</td>
</tr>
<tr>
<td>BUSN 653</td>
<td>Healthcare Business Practice III: Capstone</td>
</tr>
</tbody>
</table>

Total Credits 9.0

Marketing Concentration

Required Courses
Select two of the following: 6.0

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 606</td>
<td>Customer Analytics</td>
</tr>
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<td>MKTG 607</td>
<td>Marketing Experiments</td>
</tr>
<tr>
<td>MKTG 622</td>
<td>Buyer Behavior Theory</td>
</tr>
<tr>
<td>MKTG 624</td>
<td>Channels of Distribution Management</td>
</tr>
<tr>
<td>MKTG 630</td>
<td>Global Marketing</td>
</tr>
<tr>
<td>MKTG 634</td>
<td>Integrated Marketing Communications Management</td>
</tr>
<tr>
<td>MKTG 636</td>
<td>Business to Business Marketing</td>
</tr>
<tr>
<td>MKTG 638</td>
<td>New Product Planning, Strategy, and Development</td>
</tr>
<tr>
<td>MKTG 646</td>
<td>Services Marketing</td>
</tr>
<tr>
<td>MKTG 650</td>
<td>Marketing Management Cases and Problems</td>
</tr>
<tr>
<td>MKTG 652</td>
<td>Marketing Information Management and Research</td>
</tr>
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Electives
Select one of the following: 3.0

<table>
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<tr>
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<th>Title</th>
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<tbody>
<tr>
<td>BLAW T680</td>
<td>Special Topics in BLAW</td>
</tr>
<tr>
<td>ECON 614</td>
<td>Macroeconomics</td>
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<tr>
<td>ECON 630</td>
<td>International Economics</td>
</tr>
<tr>
<td>FIN 642</td>
<td>Business Conditions and Forecasting</td>
</tr>
<tr>
<td>FIN 648</td>
<td>International Financial Management</td>
</tr>
<tr>
<td>INTB 632</td>
<td>Economic Analysis of Multinational Corporations</td>
</tr>
<tr>
<td>INTB 790</td>
<td>Seminar in International Business</td>
</tr>
<tr>
<td>MGMT 655</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>MIS 624</td>
<td>E-Commerce Systems I</td>
</tr>
<tr>
<td>MIS 630</td>
<td>Inter-Active Decision Support Systems</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
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<td>--------------------------------------------------</td>
</tr>
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<td>MIS 632</td>
<td>Database Analysis and Design for Business</td>
</tr>
<tr>
<td>OPR 601</td>
<td>Managerial Decision Models and Simulation</td>
</tr>
<tr>
<td>POM 624</td>
<td>Management of Service Firms</td>
</tr>
<tr>
<td>POM 625</td>
<td>Supply Chain Management</td>
</tr>
<tr>
<td>STAT 634</td>
<td>Quality &amp; Six-Sigma</td>
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</table>

**Total Credits**: 9.0

### Entrepreneurship/Innovation Management Concentration

**Required Courses**

Select two of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BLAW 620</td>
<td>Legal Aspects of Employment</td>
</tr>
<tr>
<td>BLAW 646</td>
<td>Legal Issues in New Ventures</td>
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<tr>
<td>FIN 635</td>
<td>Entrepreneurial Finance</td>
</tr>
<tr>
<td>MGMT 640</td>
<td>Strategic Human Resource Management</td>
</tr>
<tr>
<td>MGMT 655</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>MIS 624</td>
<td>E-Commerce Systems I</td>
</tr>
<tr>
<td>MIS 630</td>
<td>Inter-Active Decision Support Systems</td>
</tr>
<tr>
<td>MIS 632</td>
<td>Database Analysis and Design for Business</td>
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<tr>
<td>MKTG 638</td>
<td>New Product Planning, Strategy, and Development</td>
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**Total Credits**: 6.0

**Electives**

Select one of the following:

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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
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<td>International Economics</td>
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<td>Business &amp; Economic Strategy: Game Theory &amp; Applications</td>
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<td>FIN 602</td>
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<td>FIN 624</td>
<td>Risk Management</td>
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<td>FIN 640</td>
<td>Mergers and Acquisitions</td>
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<td>Business Conditions and Forecasting</td>
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<td>International Financial Management</td>
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<td>FIN 649</td>
<td>Comparative Financial Analysis</td>
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<td>Economic Analysis of Multinational Corporations</td>
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<td>INTB 790</td>
<td>Seminar in International Business</td>
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<td>MGMT 655</td>
<td>Knowledge Management</td>
</tr>
<tr>
<td>MKTG 622</td>
<td>Buyer Behavior Theory</td>
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<tr>
<td>MKTG 624</td>
<td>Channels of Distribution Management</td>
</tr>
<tr>
<td>MKTG 630</td>
<td>Global Marketing</td>
</tr>
<tr>
<td>MKTG 634</td>
<td>Integrated Marketing Communications Management</td>
</tr>
<tr>
<td>MKTG 646</td>
<td>Services Marketing</td>
</tr>
<tr>
<td>MKTG 650</td>
<td>Marketing Management Cases and Problems</td>
</tr>
<tr>
<td>ORGB 640</td>
<td>Negotiations for Leaders</td>
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<td>OPR 601</td>
<td>Managerial Decision Models and Simulation</td>
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<td>POM 620</td>
<td>Management of Manufacturing Firms</td>
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<td>POM 624</td>
<td>Management of Service Firms</td>
</tr>
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<td>POM 625</td>
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</tr>
<tr>
<td>STAT 634</td>
<td>Quality &amp; Six-Sigma</td>
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</table>

**Total Credits**: 3.0

**MBA Concentrations**

### Business Analytics Concentration

The Business Analytics concentration prepares students to make good business decisions with fact-based analysis and an under stranding of business performance from a systems view, using statistical and quantitative analysis of data as well as explanatory and predictive modeling.

**Requirements**

<table>
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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>STAT T680</td>
<td>Special Topics in STAT</td>
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Select two of the following:

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<th>Course Title</th>
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<tr>
<td>ECON 650</td>
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<td>FIN 642</td>
<td>Business Conditions and Forecasting</td>
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<tr>
<td>MIS 630</td>
<td>Inter-Active Decision Support Systems</td>
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<tr>
<td>OPR 601</td>
<td>Managerial Decision Models and Simulation</td>
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<td>OPR 626</td>
<td>System Simulation</td>
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<td>STAT 628</td>
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<td>STAT 634</td>
<td>Quality &amp; Six-Sigma</td>
</tr>
<tr>
<td>STAT 636</td>
<td>Experimental Design</td>
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**Total Credits**: 6.5-15.0

### Healthcare Management Concentration

The concentration in Health Care management is a specialized, cohorted online program designed to address both the political and technological forces shaping the pharmaceutical and healthcare industry in competitive global markets. The program is designed for professionals in the pharmaceutical and healthcare industries to help achieve new understanding and potential for career advancement by integrating business strategy with science and technology and the unique perspective of the industry.

**Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
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<tr>
<td>BUSN 651</td>
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</tr>
<tr>
<td>BUSN 652</td>
<td>Healthcare Business Practice II</td>
</tr>
<tr>
<td>BUSN 653</td>
<td>Healthcare Business Practice III: Capstone</td>
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**Total Credits**: 9.0

### Finance Concentration

**Required Courses**

Select two of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>FIN 602</td>
<td>Advanced Financial Management</td>
</tr>
<tr>
<td>FIN 622</td>
<td>Financial Institutions &amp; Markets</td>
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<tr>
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<td>Mergers and Acquisitions</td>
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<td>Business Conditions and Forecasting</td>
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<td>FIN 648</td>
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</table>

**Finance Electives**

Select one of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>BLAW 620</td>
<td>Legal Aspects of Employment</td>
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<tr>
<td>BLAW T680</td>
<td>Special Topics in BLAW</td>
</tr>
<tr>
<td>ECON 614</td>
<td>Macroeconomics</td>
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</tbody>
</table>
ECON 630 International Economics
ECON 650 Business & Economic Strategy: Game Theory & Applications
INTB 632 Economic Analysis of Multinational Corporations
MGMT 655 Knowledge Management
MIS 624 E-Commerce Systems I
MIS 630 Inter-Active Decision Support Systems
MKTG 630 Global Marketing
MKTG 650 Marketing Management Cases and Problems
OPR 601 Managerial Decision Models and Simulation
POM 620 Management of Manufacturing Firms
POM 624 Management of Service Firms
STAT 634 Quality & Six-Sigma

Total Credits 9.0

Marketing Concentration
Required Courses 6.0
Select two of the following:
MKTG 622 Buyer Behavior Theory
MKTG 624 Channels of Distribution Management
MKTG 630 Global Marketing
MKTG 634 Integrated Marketing Communications Management
MKTG 636 Business to Business Marketing
MKTG 638 New Product Planning, Strategy, and Development
MKTG 646 Services Marketing
MKTG 650 Marketing Management Cases and Problems
MKTG 652 Marketing Information Management and Research

Electives 3.0
Select one of the following:
BLAW T680 Special Topics in BLAW
ECON 614 Macroeconomics
ECON 630 International Economics
FIN 642 Business Conditions and Forecasting
FIN 648 International Financial Management
FIN 649 Comparative Financial Analysis
INTB 632 Economic Analysis of Multinational Corporations
INTB 790 Seminar in International Business
MGMT 655 Knowledge Management
MKTG 622 Buyer Behavior Theory
MKTG 624 Channels of Distribution Management
MKTG 630 Global Marketing
MKTG 634 Integrated Marketing Communications Management
MKTG 646 Services Marketing
MKTG 650 Marketing Management Cases and Problems
ORGB 640 Negotiations for Leaders
OPR 601 Managerial Decision Models and Simulation
POM 620 Management of Manufacturing Firms
POM 624 Management of Service Firms
POM 625 Supply Chain Management
STAT 634 Quality & Six-Sigma

Total Credits 9.0

Entrepreneurship/Innovation Management Concentration
Required Courses 6.0
Select two of the following:
BLAW 620 Legal Aspects of Employment
BLAW 646 Legal Issues in New Ventures
FIN 635 Entrepreneurial Finance

BS/MBA students may be waived from two MBA Enterprise Management courses, assuming a grade of B or better is earned in specified undergraduate courses. Students can review the Waiver Policies for the Statement of Curriculum Standing (http://www.lebow.drexel.edu/PDF/Docs/Grad/CurriculumStanding.pdf) on the LeBow College’s website for additional information.

Interdepartmental Faculty
Marco Airaudo, PhD (University of Pennsylvania Philadelphia). Assistant Professor. Computational economics, international economics, macroeconomics and monetary economics.

Murugan Anandarajan, PhD (Drexel University) Head of Department, Management. Professor. Individual Internet usage behavior (specifically abuse and addiction); Application of artificial intelligence techniques in forensic accounting and ophthalmology.

Rolph E. Anderson, PhD (University of Florida) Sr. Professor of Marketing. Professor. Personal selling and sales
management; multivariate data analysis; customer relationship management (CRM); customer satisfaction and customer loyalty.

Trina Larsen Andras, PhD (University of Texas at Austin) Head of the Department of Marketing; Academic Director, Center for Corporate Research Management. Professor. International marketing, marketing channels management, cross-cultural communication.

Orakwue B. Arinze, PhD (London School of Economics). Professor. Client/Server computing; Enterprise Application Software (EAS)/Enterprise Resource Planning Software (ERP); knowledge-based and decision support applications in operations management.

Edward Armheiter, PhD (University of Massachusetts, Amherst) Department of Decision Sciences. Clinical Professor. Quality implementation and management, supply chain, statistical quality control, six sigma.

Avijit Banerjee, PhD (The Ohio State University) Department of Decision Sciences. Professor. Supply chain management; operations planning and scheduling; inventory control.

David A. Becher, PhD (Pennsylvania State University) Department of Finance. Associate Professor. Mergers and acquisitions, corporate governance, financial institutions.

Hande Yurttan Benson, PhD (Princeton University) Department of Decision Sciences. Associate Professor. Nonlinear optimization, interior-point methods.

Jie Cai, PhD (University of Iowa) Department of Finance. Assistant Professor. Investment banking, mergers and acquisitions, corporate finance and corporate governance.

Oben Ceryan, PhD (University of Michigan Ann Arbor) Department of Decision Sciences. Assistant Professor. Pricing revenue management; inventory control; production planning and control supply chain management.

Hsihui Chang, PhD (University of Minnesota) Department of Accounting and Tax, KPMG Endowed Chair and Department Head. Professor.

Hiu Lam Choy, PhD (University of Rochester). Associate Professor. Financial accounting.

Roger D. Collins, JD, PhD (George Washington University; Georgia State University) Department of Legal Studies. Professor. Patent law, preservation of wealth.

Anthony P. Curatola, PhD (Texas A&M University) Joseph F. Ford Professor of Accounting. Professor. Federal and state income tax policy, retirement income taxation, fringe benefits taxation, educational savings and tax incentives, federal and state income tax research.

Mian Dai, PhD (Northwestern University). Assistant Professor. Managerial economics and strategy.

Qizhi Dai, PhD (University of Minnesota). Associate Professor. Business to Business E-Commerce; information technology adoption; economic analysis of information systems.

Naveen Daniel, PhD (Arizona State University). Assistant Professor. Corporate governance, mutual funds, hedge funds.

Patricia L. Daniel Derrick, PhD (The George Washington University). Assistant Clinical Professor.

Donna Marie De Carolis, PhD (Temple University) Dean, Close School of Entrepreneurship. Professor. Pharmaceutical/biotechnology industries; entrepreneurship; technology & strategy; technology commercialization, strategic alliances; social capital.

Neil Desnoyers, MS (Drexel University) Department of Decision Sciences. Assistant Clinical Professor. Decision sciences.

Daniel Dorn, PhD (Columbia University) Department of Finance. Associate Professor. Capital markets and investments; behavioral finance.

Casey Dougal, PhD (University of North Carolina, Chapel Hill). Assistant Professor. Empirical asset pricing, financial media, behavioral finance, and urban economics.

Michaela Draganska, PhD (Kellogg School of Management, Northwestern University). Associate Professor. Advertising strategy, product assortment decisions, new product positioning, distribution channels.

Anne Duchene, PhD (Ecole Nationale des Ponts et Chaussees, France) Department of Economics and International Business. Assistant Professor. Microeconomics, industrial organization, law and economics.

Larry Duke, MBA (Harvard Business School). Associate Clinical Professor. International marketing and strategy, new product development, business-to-business marketing, marketing of financial services.


Richard P. Freedman, JD, LLM (Temple University) Head of the Department of Legal Studies. Associate Professor. Taxation, corporate and business matters, real estate, estate planning, estate administration and elder law.

David Gefen, PhD (Georgia State University). Professor. Strategic IT management; IT development and implementation management; research methodology; managing the adoption of large IT systems, such as MRP II, ERP, and expert systems; research methodology.

Azi Gera, PhD (University of Maryland). Assistant Professor. Business planning, new venture performance and survival, social networking, cognition and strategy, determinants of firm performance, attention based view, business angles and VC firms, interfirm signaling, private equity investments.

Hubert Glover, PhD (Texas A&M University) Department of Accounting and Tax. Associate Clinical Professor. International financial reporting.

Michael Joseph Gombola, PhD (University of South Carolina) Head of the Department of Finance. Professor. Stock offerings and repurchases, mergers, acquisitions, and restructuring; working capital management, time series analysis; options and derivatives, financial statement analysis.

Cuneyt Gozu, PhD (University of Albany). Associate Clinical Professor.

Jeffrey H. Greenhaus, PhD (New York University) William A. Mackie Professor of Management. Professor. Career management, career decision making, work-family linkages, managing diversity, career and adult life development, organizational behavior/human resources, job
design, models of work motivation and job attitudes, human resource staffing.

Barbara Murray Grein, PhD (Kenan-Flagler Business School, University of North Carolina) Department of Accounting and Tax. Associate Professor. Auditing, auditor selection, audit adjustments, audit fees, corporate governance, financial reporting.

Curtis M. Hall, MBA (University of Arizona). Assistant Professor. Strategic cost management; corporate governance; capital markets research in accounting; human capital investment.

Shawkat M. Hammoudeh, PhD (University of Kansas) Department of Economics and International Business. Professor. Applied econometrics, financial economics, international economics, natural resource economics.

Teresa D. Harrison, PhD (University of Texas at Austin) Department of Economics and International Business. Associate Professor. Econometrics, public finance, industrial organization, empirical microeconomics including health and nonprofit organizations.

Yanliu Huang, PhD (The Wharton School, University of Pennsylvania). Assistant Professor. Consumer n-store decision making, consumer planning, health marketing, memory and learning.

Mazhar Islam, PhD (University of Minnesota). Assistant Professor. New markets in emerging countries, alliances, corporate entrepreneurship, emerging countries, pharmaceutical and biotechnology industry, technological innovation, transaction cost economics.

Paul E. Jensen, PhD (Penn State University) Associate Dean, College of Business. Associate Professor. International trade. Primary research interest is international trade, particularly in empirical studies of international trade patterns.

Bang Nam Jeon, PhD (Indiana University) Department of Economics and International Business. Professor. Financial economics, world financial market linkages, foreign direct investment flows in the Asia-Pacific economies, the Korean economy: currency crisis, FDI, and macroeconomic issues, regional economic integration and newly industrializing economies: the

Kevin K. Jones, EDB (Georgia State University). Assistant Clinical Professor.


Robert W. Keidel, PhD (Wharton School, University of Pennsylvania). Clinical Professor. Organization design and change, management of technology, strategic cognition.

Natalya V. Khimich, PhD (University of California at Berkeley). Assistant Professor. Equity valuation, earnings quality, and accounting for innovation and intangible assets.

Seung-Lae Kim, PhD (Penn State University) Department of Decision Sciences. Professor. Production planning and control; inventory control; Just-In-Time (JIT) and Supply Chain Management (SCM).

Stacy Kline, MBA (Temple University) Department of Accounting and Tax. Clinical Professor. Individual, corporation; S corporation and partnership taxation.

Daniel Korshun, PhD (Boston University). Assistant Professor. Brand and corporate reputation management, corporate social responsibility, internal marketing, marketing strategy, relationship marketing.


Amy Laura Kratchman, MBA (Drexel University) Department of Finance. Clinical Associate Professor. Portfolio management, specifically related to fixed income securities; investment management for pension and mutual fund companies, and fixed income securities.

Rosalie S. Kreider, JD (Villanova University) Department of Legal Studies. Clinical Professor. Business law, international business law.

Hyojin Kwak, PhD (University of Georgia) Department of Marketing. Associate Professor. Advertising effects, consumer behaviors and e-commerce.


Christopher A. Laincz, PhD (Duke University) Department of Economics and International Business. Associate Professor. Economic development, technological change, and growth, industrial organization, macroeconomics and monetary economics.

Bijou Yang Lester, PhD (University of Pennsylvania) Department of Economics and International Business. Professor. Behavioral characteristics of shopping on-line, economic issues of electronic commerce, contingent employment and part-time work, the economy and suicide.

Benjamin Lev, PhD (Case Western Reserve University) Department Head, Department of Decision Sciences. Professor. Operations research/management science, statistics, applications, engineering management.

Merrill W. Liechty, PhD (Duke University) Department of Decision Sciences. Associate Clinical Professor. Bayesian statistics, portfolio selection, higher moment estimation.

Keisha Liggett-Nichols, EDB (Georgia State University). Associate Clinical Professor. Corporate entrepreneurship, determinants of firm performance, evidence-based management.

Frank Linnehan, PhD (Temple University) Interim Dean, LeBow College of Business. Professor. Affirmative action; workforce diversity; equal employment; school-to-work transitions for younger workers. Research focuses on issues of race and diversity in the workplace.

Yu-Chieh Lo, PhD (University of Southern California). Assistant Professor. Organization theory, technology entrepreneurship.

Mark Loschiavo, MS (University of Kentucky). Clinical Professor. Business planning; new venture performance and survival; strategic management; strategic thinking; technology entrepreneurship.

Dali Ma, PhD (University of Chicago). Assistant Professor. Status dynamics, social networks, founding team formation; venture capital syndication; family business; Chinese private entrepreneurship.

Arunkumar Madapusi, PhD (University of North Texas Denton) Department of Decision Sciences. Assistant Clinical Professor. Manufacturing technology development; quality management; supply chain management; interface with information systems.

Hazem Diab Maragah, PhD (Louisiana University) Department of Decision Sciences. Associate Professor. Statistical quality control, total equity management, applied statistics.

Michele K. Masterfano, DBA (Argosy University of Sarasota). Associate Clinical Professor. Entrepreneurship/small business administration, business planning, social capital, social networking.

Mary Mawritz, PhD (University of Central Florida). Assistant Professor. Abusive supervision; deviant behavior; leadership.

Roger A. McCain, PhD (Louisiana State University) Department of Economics and International Business. Professor. Computational economics, game theory.

Bruce D. McCullough, PhD (University of Texas) Department of Decision Sciences. Professor. Applied econometrics; reliability of statistical and econometric software; business data mining.

Thomas P. McWilliams, PhD (Stanford University) Department of Decision Sciences. Professor. Statistical quality control; sequential analysis.

Irina Murtazashvili, PhD (Michigan state University). Assistant Professor. Applied econometrics.

Suchet Nadkarni, PhD (University of Kansas). Associate Professor. Strategic management, cognition and strategy.

V. K. Narayanan, PhD (University of Pittsburgh) Deloitte Touche Jones Stubbs Professor; Associate Dean of Research, Department of Management. Corporate and business strategy; management of technology and innovation; strategy implementation; macro environmental analysis; knowledge management; competitor analysis and intelligence.


Edward Nelling, PhD, CFA (University of Pennsylvania-Wharton) Department of Finance. Associate Professor. Investments; corporate finance; real estate finance.

Gregory Nini, PhD (The Wharton School, University of Pennsylvania). Assistant Professor. Creditor control rights, corporate governance, and firm value; insurance economics.

Maria Olivero, PhD (Duke University) Department of Economics and International Business. Associate Professor. Macroeconomics, international finance.


Neal Orkin, JD (Temple University) Department of Legal Studies. Associate Professor. Intellectual property rights of employed inventors and authors; labor relations.

Duri Park, MS (PhD expected in 2013) (Ohio State University). Assistant Professor. Financial accounting, insider trading, investments, and cash holdings.

Haemin Park, PhD (University of Washington). Assistant Professor. Corporate entrepreneurship; IPO; knowledge-based view of the firm; new venture performance and survival; technology entrepreneurship; venture capital.


Pedersen Pedersen, JD (Harvard University) Department of Legal Studies. Assistant Professor. American law, contract law, labor and employment law.

Bernhard Reichert, PhD, CPA (University of Texas at Austin) Department of Accounting and Tax. Assistant Professor. Behavioral research in accounting and experimental economics.

Christian Resick, PhD (Wayne State University). Associate Professor. Linkages between CEO personality with organizational culture, climate, and effectiveness; cross-cultural studies of ethical leadership beliefs and behaviors; roles of team leadership and member personality in building shared cognition and effective teamw.

Stanley Ridgley, PhD (Duke University). Assistant Clinical Professor. Business communication; cognition and strategy; competitive intelligence; determinants of firm performance; new markets in emerging countries; Russian business culture.

Patricia Robak, PhD (Lehigh University) Department of Finance. Clinical Associate Professor. Investments, money and banking, international finance.

Bert Rosenbloom, PhD (Temple University) Rauth Chair of Electronic Commerce. Professor. Marketing channels and distribution systems, electronic commerce, interorganizational marketing management, wholesale and retail distribution, marketing strategy and planning.

Raja Roy, PhD (University of Pittsburgh). Assistant Professor. Technology entrepreneurship, determinants of firm performance, technological change, technological innovation.

Diana Sandberg, MS (Drexel University) Department of Finance. Clinical Associate Professor. Portfolio management, derivatives, investment management.

Konstantinos Serfes, PhD (University of Illinois at Champaign-Urbana) Department of Economics and International Business. Associate Professor. Industrial organization; microeconomics.

Samir Shah, DPS (Pace University). Associate Clinical Professor.

Wenjing Shen, PhD (University of Michigan) Department of Decision Sciences. Assistant Professor. The interface of operations management and marketing; inventory management; supply chain management.

Steven R. Sher, JD (Georgetown University Law Center) Department of Legal Studies. Associate Professor. Business law, product liability, negligence, medical malpractice.

Milton Silver, PhD (Columbia University). Professor Emeritus. Strategic planning and control systems, analysis and design of information systems, and executive and management development and training.

Prashant Srivastava, PhD (Oklahoma State University). Associate Clinical Professor. New product development, supply chain management, B2B
marketing, sales, strategic alliances, organizational learning, market orientation, healthcare marketing, and database marketing.

Mark Stehr, PhD (University of California at Berkeley) Department of Economics and International Business. Associate Professor. Health Economics, public finance, public policy.

Rajneesh Suri, PhD (University of Illinois at Urbana-Champaign). Professor. Pricing, promotions and branding.

Srinivasan Swaminathan, PhD (University of Texas-Austin), Professor. Marketing research and strategy, pricing and promotions, loyalty and satisfaction.

Constantinos Syropoulos, PhD (Yale University) Trustee Professor of International Economics, Department of Economics and International Business. Professor. International trade, political economy, applied microeconomics.

Samuel H. Szewczyk, PhD (Pennsylvania State University) Department of Finance. Associate Professor. Corporate governance, mergers and acquisitions, financial engineering, investment banking, financial institutions.

An Tran, PhD (University of Colorado–Boulder). Assistant Clinical Professor. Intertemporal choice, the psychology of time and money, consumer planning, financial decision making.

George Tsetsekos, PhD (The University of Tennessee) Dean, LeBow College of Business. Professor. Valuation and corporate restructuring, treasury and risk/hedging operations, investment banking, securitization, emerging capital markets, multinational finance, bank asset-liability management.

Daniel Tzabbar, PhD (University of Toronto). Assistant Professor. Business planning, social capital, technology entrepreneurship, alliances, human capital, innovation management, strategic management.

Mark Vargus, PhD (Wharton School, University of Pennsylvania) Department of Accounting and Tax. Assistant Professor. Capital market research and executive compensation.

Andrew G. Verzilli, PhD (Boston College). Professor Emeritus. Teaching effectiveness in economics; economics and financial history.

Ralph Walkling, PhD (University of Maryland) Stratakis Professor of Corporate Governance, Department of Finance. Professor. Corporate governance, mergers and acquisitions.

Min Wang, PhD (Columbia University) Department of Decision Sciences. Assistant Professor.

Matthew Weinberg, PhD (Princeton University). Assistant Professor. Antitrust and regulation, applied econometrics, industrial organization.

Joan Weiner, PhD (The Wharton School, University of Pennsylvania). Professor. Business ethics, leadership, communication and decision making; educational innovation; health system management design.

Jennifer Wright, MTA Master of Tax Accounting (Villanova University) Department of Accounting and Tax. Associate Clinical Professor.

Chiou-shuang Yan, PhD (Purdue University). Professor Emeritus. International economics, input-output analysis.

Yoto Yotov, PhD (Boston College). Associate Professor. International trade, applied microeconomics, political economy.

Jonathan C. Ziegert, PhD (University of Maryland). Associate Professor. Leadership; team dynamics; group performance; attraction and recruitment; discrimination.

Accounting

Major: Accounting
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0 quarter credits (for students entering with an undergraduate degree in accounting); 63.0 quarter credits (for students entering without an undergraduate degree in accounting)
Classification of Instructional Programs (CIP) code: 52.0301
Standard Occupational Classification (SOC) code: 13-2011

About the Program

The MS in Accounting program, which can be completed in a one-year or two-year format, is designed to meet the needs of those who plan careers in public accounting, corporate accounting, not-for-profit accounting, or government accounting.

The one-year (45.0 quarter credit) option is for students already awarded an undergraduate degree in accounting. Students who do not have an undergraduate degree in accounting can be considered for admission to the two-year (63.0 quarter credit) program, where prerequisite courses are completed in the first year of study.

The program offers students the opportunity to obtain the technical knowledge, analytical skills and communication proficiency required to serve as ethical and effective accounting professionals. Upon completion of the program, students will be qualified to sit for the Certified Public Accountant (CPA) examination.

The one-year program builds on knowledge equivalent to the requirements for a Drexel University baccalaureate degree in business with a major in accounting. Applicants must have earned a minimum grade of C in each of the following prerequisite courses:

<table>
<thead>
<tr>
<th>Prerequisite Requirements</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCT 115</td>
</tr>
<tr>
<td>ACCT 116</td>
</tr>
<tr>
<td>ACCT 321</td>
</tr>
<tr>
<td>ACCT 322</td>
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<tr>
<td>ACCT 323</td>
</tr>
<tr>
<td>ACCT 331</td>
</tr>
<tr>
<td>ACCT 341</td>
</tr>
<tr>
<td>TAX 341</td>
</tr>
</tbody>
</table>

The one-year program is restricted to students who have completed an undergraduate accounting degree at Drexel University or those who have had the requisite accounting courses completed at any AACSB accredited business school. Appropriate syllabi to support transcripts must be submitted for admission consideration.

For Drexel University students planning on entering the one-year program, they are expected to be at Drexel for five years (4 undergraduate years + 1 year for the MS degree) with one co-op residency as part of their combined BS/MS program. Further, while
students with undergraduate degrees in accounting from non-US schools may be eligible for admission to the program, completion of the program will not necessarily make them eligible to sit for the CPA examination. These students will be responsible for assessing whether their academic backgrounds make them eligible to sit for the CPA examination.

Students with undergraduate degrees in areas outside of accounting can be considered for admission to the two-year program or to the one-year program only after they acquire the necessary prerequisite undergraduate accounting and/or business courses. These students should contact the LeBow Advising Office (http://www.lebow.drexel.edu/Faculty/Departments/Accounting) for additional information.

State CPA Requirements

Under the accountancy law that became effective in Pennsylvania in 2012, an individual interested in practicing as a CPA is required to have the equivalent of 150.0 semester (225.0 quarter) credit hours of university education and 36.0 semester-credits (54.0 quarter-credits) in accounting subjects. The combined BS/MS in Accounting program satisfies this Pennsylvania state certification requirement. If students are interested in taking the CPA examination in another state (e.g., Delaware, New Jersey, Maryland), they will need to work in conjunction with the relevant State Board of Accountancy, the Accounting Department, and the LeBow Advising Office to ensure their eligibility to sit for the CPA examination in their desired state.

Students should contact the Accounting Department (http://www.lebow.drexel.edu/Faculty/Departments/Accounting) for additional information.

One-Year Program: Degree Requirements

Required Core Courses

- ACCT 600 Accounting Analysis & Theory 3.0
- ACCT 603 Strategic Cost Management 3.0
- ACCT 604 International Financial Reporting 3.0
- ACCT 605 Assurance Services 3.0
- ACCT 606 Current Issues in the Accounting Profession 3.0
- ACCT 622 Advanced Financial Accounting 3.0
- BLAW 626 Law for the CPA Exam 3.0
- TAX 630 Corporate Taxation 3.0

Select two of the following: 6.0

- ACCT 607 Forensic Investigation
- ACCT 608 Government and Not-for-Profit Accounting
- ACCT 628 Accounting Valuation Issues
- ACCT 644 Internal Auditing
- ACCT 650 Accounting Information Systems
- FIN 602 Advanced Financial Management
- FIN 610 Corporate Governance
- FIN 624 Risk Management
- MIS 612 Aligning Information Systems and Business Strategies
- MIS 630 Inter-Active Decision Support Systems
- MIS 662 Managing with Enterprise Application Software using SAP-Accounting & Analytics
- ORGB 631 Leading Effective Organizations
- ORGB 640 Negotiations for Leaders

Electives

Students select an additional three elective courses. At least two courses must be ACCT or TAX. The following is a list of suggested electives. Students should consult with their program manager for the full list of approved electives available each term.

- ACCT 607 Forensic Investigation
- ACCT 608 Government and Not-for-Profit Accounting
- ACCT 628 Accounting Valuation Issues
- ACCT 644 Internal Auditing
- ACCT 650 Accounting Information Systems
- FIN 602 Advanced Financial Management
- FIN 610 Corporate Governance
- FIN 624 Risk Management
- MIS 612 Aligning Information Systems and Business Strategies
- MIS 630 Inter-Active Decision Support Systems
- MIS 662 Managing with Enterprise Application Software using SAP-Accounting & Analytics
- ORGB 631 Leading Effective Organizations
- ORGB 640 Negotiations for Leaders
- TAX 611 Tax Research

Business Elective Courses

Students take any five (5) business courses from within the LeBow College of Business. Students should consult with their program manager for the full list of approved electives available each term.

Total Credits 45.0

Students should contact the Accounting Department (http://www.lebow.drexel.edu/Faculty/Departments/Accounting) for additional information.

Two-Year Program: Degree Requirements

Required Courses

- ACCT 600 Accounting Analysis & Theory 3.0
- ACCT 601 Managerial Accounting 3.0
- ACCT 603 Strategic Cost Management 3.0
- ACCT 604 International Financial Reporting 3.0
- ACCT 605 Assurance Services 3.0
- ACCT 606 Current Issues in the Accounting Profession 3.0
- ACCT 622 Advanced Financial Accounting 3.0
- ACCT 625 Financial Accounting Theory I 3.0
- ACCT 626 Financial Accounting Theory II 3.0
- ACCT 627 Financial Accounting Theory III 3.0
- ACCT 631 Cost Accounting 3.0
- ACCT 640 Auditing Theory and Philosophy 3.0
- BLAW 626 Law for the CPA Exam 3.0
- ECON 601 Managerial Economics 3.0
- FIN 601 Corporate Financial Management 3.0
- STAT 601 Business Statistics 3.0
- TAX 620 Individual Taxation 3.0
- TAX 630 Corporate Taxation 3.0

Electives

Students take any five (5) business courses from within the LeBow College of Business.

- ACCT 607 Forensic Investigation
- ACCT 608 Government and Not-for-Profit Accounting
- ACCT 628 Accounting Valuation Issues
- ACCT 644 Internal Auditing
- ACCT 650 Accounting Information Systems
- FIN 602 Advanced Financial Management
- FIN 610 Corporate Governance
- FIN 624 Risk Management
- MIS 612 Aligning Information Systems and Business Strategies
- MIS 630 Inter-Active Decision Support Systems
- MIS 662 Managing with Enterprise Application Software using SAP-Accounting & Analytics
- ORGB 631 Leading Effective Organizations
- ORGB 640 Negotiations for Leaders
- TAX 611 Tax Research

- ACCT 607 Forensic Investigation
- ACCT 608 Government and Not-for-Profit Accounting
- ACCT 628 Accounting Valuation Issues
- ACCT 644 Internal Auditing
- ACCT 650 Accounting Information Systems
- FIN 602 Advanced Financial Management
- FIN 610 Corporate Governance
- FIN 624 Risk Management
- MIS 612 Aligning Information Systems and Business Strategies
- MIS 630 Inter-Active Decision Support Systems
- MIS 662 Managing with Enterprise Application Software using SAP-Accounting & Analytics
- ORGB 631 Leading Effective Organizations
- ORGB 640 Negotiations for Leaders
- TAX 611 Tax Research
Accounting and Tax Faculty

Hsihui Chang, PhD (University of Minnesota) Department of Accounting and Tax, KPMG Endowed Chair and Department Head. Professor. Financial accounting.

Hsiu Lam Choy, PhD (University of Rochester). Associate Professor. Financial accounting.

Anthony P. Curatola, PhD (Texas A&M University) Joseph F. Ford Professor of Accounting. Professor. Federal and state income tax policy, retirement income taxation, fringe benefits taxation, educational savings and tax incentives, federal and state income tax research.

Patricia L. Daniel Derrick, PhD (The George Washington University). Assistant Clinical Professor.

Hubert Glover, PhD (Texas A&M University) Department of Accounting and Tax. Associate Clinical Professor. International financial reporting.

Barbara Murray Grein, PhD (Kenan-Flagler Business School, University of North Carolina) Department of Accounting and Tax. Associate Professor. Auditing, auditor selection, audit adjustments, audit fees, corporate governance, financial reporting.

Curtis M. Hall, MBA (University of Arizona). Assistant Professor. Strategic cost management; corporate governance; capital markets research in accounting; human capital investment.

Kevin K. Jones, EDB (Georgia State University). Assistant Clinical Professor.

Natalya V. Khimich, PhD (University of California at Berkeley). Assistant Professor. Equity valuation, earnings quality, and accounting for innovation and intangible assets.

Stacy Kline, MBA (Temple University) Department of Accounting and Tax. Clinical Professor. Individual, corporation; S corporation and partnership taxation.


Duri Park, MS (PhD expected in 2013) (Ohio State University). Assistant Professor. Financial accounting, insider trading, investments, and cash holdings.

Bernhard Reichert, PhD, CPA (University of Texas at Austin) Department of Accounting and Tax. Assistant Professor. Behavioral research in accounting and experimental economics.

Mark Vargus, PhD (Wharton School, University of Pennsylvania) Department of Accounting and Tax. Assistant Professor. Capital market research and executive compensation.

Jennifer Wright, MTA Master of Tax Accounting (Villanova University) Department of Accounting and Tax. Associate Clinical Professor.

About the Program

The MS in Business Analytics program is designed for students who have an interest in quantitative methods, data analysis, and using computer programs to solve business problems.

Students learn how to access and analyze data for the purpose of improved business decision-making. This program prepares students to make good business decisions with fact-based insights and an understanding of business performance from a systems view, using statistical and quantitative analysis of data as well as explanatory and predictive modeling.

The program draws upon three traditional areas of business intelligence:

- statistics, to explore and uncover relationships in data;
- operations research, to develop mathematical models for data-supported decision making; and
- management information systems, to access and create databases that support the other two areas.

Additional Information

For additional information about the program, students should contact the Department of Decision Sciences and MIS (http://www.lebow.drexel.edu/Faculty/Departments/Decision).

Degree Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>OPR 601</td>
<td>Managerial Decision Models and Simulation</td>
<td>3.0</td>
</tr>
<tr>
<td>OPR 620</td>
<td>Operations Research I</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 610</td>
<td>Statistics for Business Analytics</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 630</td>
<td>Multivariate Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 642</td>
<td>Data Mining for Business Analytics</td>
<td>3.0</td>
</tr>
<tr>
<td>MIS 612</td>
<td>Aligning Information Systems and Business Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>MIS 633</td>
<td>Predictive Business Analytics with Relational Database Data</td>
<td>3.0</td>
</tr>
<tr>
<td>MIS 634</td>
<td>Advanced Business Analytics with Relational Database Data</td>
<td>3.0</td>
</tr>
<tr>
<td>BUSN 710</td>
<td>Business Analytics Capstone Project</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Students Select One Concentration**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>MIS 624</td>
<td>E-Commerce Systems I</td>
</tr>
<tr>
<td>MIS 630</td>
<td>Inter-Active Decision Support Systems</td>
</tr>
<tr>
<td>MIS 631</td>
<td>VB.NET Programming</td>
</tr>
<tr>
<td>MIS 632</td>
<td>Database Analysis and Design for Business</td>
</tr>
<tr>
<td>MIS 641</td>
<td>MIS Policy and Strategy</td>
</tr>
<tr>
<td>MIS 650</td>
<td>Management of Health Care Info Systems</td>
</tr>
</tbody>
</table>

*Classification of Instructional Programs (CIP) code: 52.1301
Standard Occupational Classification (SOC) code: 11-1021*
Statistics Concentration

Select Three of the Following

- STAT 626 Statistical Sampling
- STAT 628 Applied Regression Analysis
- STAT 634 Quality & Six-Sigma
- STAT 636 Experimental Design
- STAT 638 Advanced Statistical Quality Control
- ECON 550 Econometrics
- ECON 560 Time Series Econometrics
- ECON 639 Applied Industrial Analysis
- FIN 642 Business Conditions and Forecasting
- MKTG 606 Customer Analytics

Functional Area of Business Concentration

To complete a concentration in one of these fields, the student will develop a plan of study that is mutually approved by the student and the Department Head.

Select three 600-level courses from either: ACCT, FIN, MKTG, POM or ECON

Free Electives** 9.0

Select three 600-level courses within LeBow.

Total Credits 45.0

- Students will need to have the prerequisite for this course waived with permission of the instructor.
- **Courses outside LeBow can be substituted with permission from Department Head and/or Associate Dean.

Decision Sciences Faculty

Edward Amherster, PhD (University of Massachusetts, Amherst) Department of Decision Sciences. Clinical Professor. Quality implementation and management, supply chain, statistical quality control, six sigma.

Avijit Banerjee, PhD (The Ohio State University) Department of Decision Sciences. Professor. Supply chain management; operations planning and scheduling; inventory control.

Hande Yurttan Benson, PhD (Princeton University) Department of Decision Sciences. Associate Professor. Nonlinear optimization, interior-point methods.

Oben Ceryan, PhD (University of Michigan Ann Arbor) Department of Decision Sciences. Assistant Professor. Pricing revenue management; inventory control; production planning and control supply chain management.

Neil Desnoyers, MS (Drexel University) Department of Decision Sciences. Assistant Clinical Professor. Decision sciences.

Seung-Lae Kim, PhD (Penn State University) Department of Decision Sciences. Professor. Production planning and control; inventory control; Just-In-Time (JIT) and Supply Chain Management (SCM).

Benjamin Lev, PhD (Case Western Reserve University) Department Head, Department of Decision Sciences. Professor. Operations research/management science, statistics, applications, engineering management.

Merrill W. Liechten, PhD (Duke University) Department of Decision Sciences. Associate Clinical Professor. Bayesian statistics, portfolio selection, higher moment estimation.

Arunkumar Madapusi, PhD (University of North Texas Denton) Department of Decision Sciences. Assistant Clinical Professor. Manufacturing technology development; quality management; supply chain management; interface with information systems.

Hazem Diab Maragah, PhD (Louisiana University) Department of Decision Sciences. Associate Professor. Statistical quality control, total equity management, applied statistics.

Bruce D. McCullough, PhD (University of Texas) Department of Decision Sciences. Professor. Applied econometrics; reliability of statistical and econometric software; business data mining.

Thomas P. McWilliams, PhD (Stanford University) Department of Decision Sciences. Professor. Statistical quality control; sequential analysis.


Wenjing Shen, PhD (University of Michigan) Department of Decision Sciences. Assistant Professor. The interface of operations management and marketing; inventory management; supply chain management.

Min Wang, PhD (Columbia University) Department of Decision Sciences. Assistant Professor.

Emeritus Faculty


Finance

Major: Finance

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 54.0

Classification of Instructional Programs (CIP) code: 52.0801

Standard Occupational Classification (SOC) code: 11-3031; 13-2031; 13-2041; 13-2051
About the Program
The MS in Finance program is designed to meet the needs of individuals who plan specialized careers in finance or financial consulting in business or industrial firms, investment management and advisory firms, consulting firms, public accounting firms, or banking and financial institutions.

The program has a more focused curriculum than the MBA, allowing students to expand their understanding of finance for advancement in the field. The program is for those interested in establishing a career in finance or financial services, seeking career advancement or making a career change to the field. Many students ultimately seek to achieve the Chartered Financial Analyst (CFA) designation.

• Like the MBA program, the MS in Finance program can include an internship or consulting experience with an employer in the finance field.
• Due to course sequencing, students enrolling in the MS in Finance program begin in the fall quarter.

Admission Requirements
The following items are required for admissions consideration:

• GMAT score
• Official transcripts from all colleges/universities attended
• Two letters of recommendation
• Personal statement
• Resume
• TOEFL score (for international students)

The admission committee will evaluate your candidacy based on test scores and undergraduate GPA, with some consideration given for work experience. Work experience is preferred and will enhance the composite admission score, but is not mandatory. There is no specific minimum score requirement for GMAT and/or TOEFL as admission is based on a composite score. However, the average GMAT for current graduate students is approximately 600 and TOEFL scores usually exceeds 90.

Please contact Drexel LeBow’s Graduate Admissions Office directly with any questions concerning required entrance exams (such as the GMAT), evaluation of undergraduate or graduate records (grades, scores, total years and subjects studied, etc.), and any other issues regarding application to the College’s MS in Finance program (http://www.lebow.drexel.edu/resources/admissions/mbams/admissions-standards).

Degree Requirements
Foundation Courses
BUSN 501 Measuring and Maximizing Financial Performance 3.0
BUSN 502 Essentials of Economics 3.0

Required Core Courses
STAT 610 Statistics for Business Analytics 3.0
ECON 601 Managerial Economics 3.0
ACCT 601 Managerial Accounting 3.0
OPR 601 Managerial Decision Models and Simulation 3.0

Required Finance Courses
FIN 601 Corporate Financial Management 3.0
FIN 602 Advanced Financial Management 3.0
FIN 622 Financial Institutions & Markets 3.0
FIN 626 Investment Management 3.0
FIN 642 Business Conditions and Forecasting 3.0
FIN 790 Seminar in Finance 3.0
or FIN 794 Seminar in Investments

Elective Graduate Courses
Select six of the following: 18.0
ECON 614 Macroeconomics
ECON 630 International Economics
FIN 624 Risk Management
FIN 635 Entrepreneurial Finance
FIN 640 Mergers and Acquisitions
FIN 648 International Financial Management
FIN 649 Comparative Financial Analysis
FIN 650 Derivative Securities
POM 601 Operations Management
STAT 622 Statistical Decision Theory I
STAT 628 Applied Regression Analysis
TAX 620 Individual Taxation
TAX 630 Corporate Taxation
TAX 790 Tax Policy Seminar
BUSN 698 Course BUSN 698 Not Found

Total Credits 54.0

* At least three electives must be finance courses. Courses other than those listed are acceptable with approval of the Finance Department Head or the MS Finance Advisor.
Additional specialization can be achieved by concentrating the six electives in one of the following fields: banking, investments, or systems management.

Finance Faculty
David A. Becher, PhD (Pennsylvania State University) Department of Finance. Associate Professor. Mergers and acquisitions, corporate governance, financial institutions.
Erik Benrud, PhD, FRM, CAIA, CFA (University of Virginia) Department of Finance. Clinical Professor. Economics/managerial economics: game theory; finance: alternative investments, derivatives.
Jie Cai, PhD (University of Iowa) Department of Finance. Assistant Professor. Investment banking, mergers and acquisitions, corporate finance and corporate governance.
Thomas Chi-Nan Chiang, PhD (The Pennsylvania State University) Marshall M. Austin Professor of Finance. Professor. International finance; time series analysis of financial data; econometric modeling & forecasting; financial markets; international risk management; monetary theory; macroeconomics; emerging markets; and global country funds.
Naveen Daniel, PhD (Arizona State University). Assistant Professor. Corporate governance, mutual funds, hedge funds.
Daniel Dorn, PhD (Columbia University) Department of Finance. Associate Professor. Capital markets and investments; behavioral finance.
Casey Dougal, PhD *(University of North Carolina, Chapel Hill)*. Assistant Professor. Empirical asset pricing, financial media, behavioral finance, and urban economics.


Michael Joseph Gombola, PhD *(University of South Carolina)*. Head of the *Department of Finance*. Professor. Stock offerings and repurchases, mergers, acquisitions, and restructuring; working capital management, time series analysis; options and derivatives; financial statement analysis.

Amy Laura Kratchman, MBA *(Drexel University)*. *Department of Finance*. Clinical Associate Professor. Portfolio management, specifically related to fixed income securities; investment management for pension and mutual fund companies, and fixed income securities.

Edward Nelling, PhD, CFA *(University of Pennsylvania-Wharton)*. *Department of Finance*. Associate Professor. Investments; corporate finance; real estate finance.

Gregory Nini, PhD *(The Wharton School, University of Pennsylvania)*. Assistant Professor. Creditor control rights, corporate governance, and firm value; insurance economics.

Patricia Robak, PhD *(Lehigh University)*. *Department of Finance*. Clinical Associate Professor. Investments, money and banking, international finance.

Diana Sandberg, MS *(Drexel University)*. *Department of Finance*. Clinical Associate Professor. Portfolio management, derivatives, investment management.

Samuel H. Szewczyk, PhD *(Pennsylvania State University)*. *Department of Finance*. Associate Professor. Corporate governance, mergers and acquisitions, financial engineering, investment banking, financial institutions.

George Tsetsekos, PhD *(The University of Tennessee)*. Dean, LeBow *College of Business*. Professor. Valuation and corporate restructuring, treasury and risk/hedging operations, investment banking, securitization, emerging capital markets, multinational finance, bank asset-liability management.

Ralph Walking, PhD *(University of Maryland)*. Stratakis Professor of *Corporate Governance, Department of Finance*. Professor. Corporate governance, mergers and acquisitions.

### Leadership

**Major:** Leadership  
**Degree Awarded:** Master of Science (MS)  
**Calendar Type:** Quarter  
**Total Credit Hours:** 45.0  
**Classification of Instructional Programs (CIP) code:** 52.0213  
**Standard Occupational Classification (SOC) code:** 13-1111

### About the Program

The MS in Leadership program will be launching in fall of 2014. The program is designed for individuals interested in examining the roles of the individual and business in society. Using a multi-disciplinary approach, students learn to help shape the strategic direction of an organization within its environment. The program combines foundational and core coursework in general business with economics, legal studies, leadership and management to expand a student’s ability to aid in long-term planning for business and industry.

Students interested in the program are from diverse backgrounds and industries looking for advancement in their specialization, and need a sound business background to take the next step. This program builds a foundation of general business knowledge while providing tools for examining individual and company roles within society and for strategic planning within their organization.

### Program Delivery

- The MS in Leadership is a lockstep program delivered through a blend of face-to-face classes at Drexel University’s Malvern, PA campus and through online courses.
- Many of the courses in the MS in Leadership program will be completed with students enrolled in the College’s MBA programs.
- New cohorts begin each winter quarter

### Curriculum

The curriculum consists of a (1) six-credit foundation in accounting, finance and economics; (2) core coursework in business law, economics, leadership and marketing; (3) a two-course sequence in leadership, legal studies, management and economics. The highlight of the program is a series of capstone courses in sustainability and a project-based course that demonstrates the student’s integrated knowledge obtained through the program.

Areas of learning objectives include:

- ethical management  
- economics  
- integrative thinking  
- human resources

### Additional Information

For additional information about this program, visit the College’s Master of Science in Leadership *(http://www.lebow.drexel.edu/Prospects/Masters/Leadership.php)* website.

### Admission

Designed to optimize leadership potential, the target audience for the MS in Leadership program is a student who: seeks a less quantitative-based and more abstract master’s degree than the MBA; is a working professional with over five years of experience in a management or management-track position; has an undergraduate degree in a non-business area of study; is interested in developing (a) general business knowledge; (b) a foundation in leadership; (c) a better understanding of the laws and policies impacting industry, and (d) an ethical approach to decision-making.

Applications are reviewed on a rolling basis, with decisions provided within two weeks of file completion.

All applicants must have earned a four-year bachelor’s degree from an accredited college or university to be considered for admission to graduate programs at Drexel University. The Committee reviews applications based on undergraduate record, quality and quantity of professional experience, clarity of career goals, professional references, statement of purpose and professional resume. No standardized test is required for this program.
For more details about how to apply to this program, including deadlines, visit the College’s Graduate Admissions (http://www.lebow.drexel.edu/Prospects/Apply/Graduate/HowToApply.php) website.

**Degree Requirements**

**Foundation Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 505</td>
<td>Financial Performance of the Firm - Accounting</td>
<td>1.5</td>
</tr>
<tr>
<td>BUSN 506</td>
<td>Financial Performance of the Firm - Finance</td>
<td>1.5</td>
</tr>
<tr>
<td>BUSN 507</td>
<td>Essentials of Economics I</td>
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</tr>
<tr>
<td>BUSN 508</td>
<td>Essentials of Economics II</td>
<td>1.5</td>
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**Core Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BLAW 605</td>
<td>Legal Options in Decision Making</td>
<td>3.0</td>
</tr>
<tr>
<td>ECON 601</td>
<td>Managerial Economics</td>
<td>3.0</td>
</tr>
<tr>
<td>ORGB 625</td>
<td>Leadership and Professional Development</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 601</td>
<td>Marketing Strategy &amp; Planning</td>
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</table>

**Leadership Courses**

<table>
<thead>
<tr>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ORGB 640</td>
<td>Negotiations for Leaders</td>
<td>3.0</td>
</tr>
<tr>
<td>ORGB 631</td>
<td>Leading Effective Organizations</td>
<td>3.0</td>
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</table>

**Legal Studies**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BLAW 620</td>
<td>Legal Aspects of Employment</td>
<td>3.0</td>
</tr>
<tr>
<td>BLAW 624</td>
<td>Social Forces and the Law</td>
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**Management Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>MGMT 640</td>
<td>Strategic Human Resource Management</td>
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</tr>
<tr>
<td>MGMT 670</td>
<td>Business Ethics</td>
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**Economics**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>ECON 688</td>
<td>Course ECON 698 Not Found (Economics of Social Justice)</td>
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**Capstone Courses**

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<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>MGMT 680</td>
<td>Leading for Innovation</td>
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</tr>
<tr>
<td>MGMT 698</td>
<td>Course MGMT 698 Not Found (Sustainability)</td>
<td>3.0</td>
</tr>
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</table>

**Total Credits** 45.0

**Management Faculty**

Shanti Dewi Anak Agung Istri, PhD (Georgia Institute of Technology). Assistant Professor. Technology commercialization; technology entrepreneurship.

Murugan Anandarajan, PhD (Drexel University) Head of Department, Management. Professor. Individual Internet usage behavior (specifically abuse and addiction); Application of artificial intelligence techniques in forensic accounting and ophthalmology.

Orakwue B. Arinze, PhD (London School of Economics). Professor. Client/Server computing; Enterprise Application Software (EAS)/Enterprise Resource Planning Software (ERP); knowledge-based and decision support applications in operations management.

Suresh Chandran, PhD. Associate Clinical Professor. Corporate entrepreneurship; corporate social responsibility; global management; intellectual property and employee rights.

QiZhi Dai, PhD (University of Minnesota). Associate Professor. Business to Business E-Commerce; information technology adoption; economic analysis of information systems.

Donna Marie De Carolis, PhD (Temple University) Dean, Close School of Entrepreneurship. Professor. Pharmaceutical/biotechnology industries; entrepreneurship; technology & strategy; technology commercialization, strategic alliances; social capital.

David Gefen, PhD (Georgia State University). Professor. Strategic IT management; IT development and implementation management; research methodology; managing the adoption of large IT systems, such as ERP, ERPII, and expert systems; research methodology.

Azi Gera, PhD (University of Maryland). Assistant Professor. Business planning, new venture performance and survival, social networking, cognition and strategy, determinants of firm performance, attention based view, business angles and VC firms, interfirm signaling, private equity investments.

Cuneyt Gozu, PhD (University of Albany). Associate Clinical Professor. Jeffrey H. Greenhaus, PhD (New York University) William A. Mackie Professor of Management. Professor. Career management, career decision making, work-family linkages, managing diversity, career and adult life development, organizational behavior/human resources, job design, models of work motivation and job attitudes, human resource staffing.

Mazhar Islam, PhD (University of Minnesota). Assistant Professor. New markets in emerging countries, alliances, corporate entrepreneurship, emerging countries, pharmaceutical and biotechnology industry, technological innovation, transaction cost economics.

Robert W. Keidel, PhD (Wharton School, University of Pennsylvania). Clinical Professor. Organization design and change, management of technology, strategic cognition.

Keisha Liggett-Nichols, EDB (Georgia State University). Associate Clinical Professor. Corporate entrepreneurship, determinants of firm performance, evidence-based management.

Frank Linnehan, PhD (Temple University) Interim Dean, LeBow College of Business. Professor. Affirmative action; workforce diversity; equal employment; school-to-work transitions for younger workers. Research focuses on issues of race and diversity in the workplace.

Yu-Chieh Lo, PhD (University of Southern California). Assistant Professor. Organization theory, technology entrepreneurship.

Mark Loschiavo, MS (University of Kentucky). Clinical Professor. Business planning; new venture performance and survival; strategic management; strategic thinking; technology entrepreneurship.

Dail Ma, PhD (University of Chicago). Assistant Professor. Status dynamics, social networks, founding team formation; venture capital syndication; family business; Chinese private entrepreneurship.

Michele K. Masterfano, DBA (Argosy University of Sarasota). Associate Clinical Professor. Entrepreneurship/small business administration, business planning, social capital, social networking.

Mary Mawritz, PhD (University of Central Florida). Assistant Professor. Abusive supervision; deviant behavior; leadership.

Suchet Nadkarni, PhD (University of Kansas). Associate Professor. Strategic management, cognition and strategy.

V. K. Narayanan, PhD (University of Pittsburgh) Delloitte Touche Jones Stubs Professor; Associate Dean of Research, Department of Management. Corporate and business strategy; management of...
technology and innovation; strategy implementation; macro environmental analysis; knowledge management; competitor analysis and intelligence.

Haemin Park, PhD (University of Washington). Assistant Professor. Corporate entrepreneurship; IPO; knowledge-based view of the firm; new venture performance and survival; technology entrepreneurship; venture capital.

Christian Resick, PhD (Wayne State University). Associate Professor. Linkages between CEO personality with organizational culture, climate, and effectiveness; cross-cultural studies of ethical leadership beliefs and behaviors; roles of team leadership and member personality in building shared cognition and effective teamwork.

Stefan Riddley, PhD (Duke University). Assistant Clinical Professor. Business communication; cognition and strategy; competitive intelligence; determinants of firm performance; new markets in emerging countries; Russian business culture.

Raja Roy, PhD (University of Pittsburgh). Assistant Professor. Technology entrepreneurship, determinants of firm performance, technological change, technological innovation.

Samir Shah, DPS ( Pace University). Associate Clinical Professor.

Sidney R. Siegel, PhD (Drexel University). Professor. Organizational change, development and behavior.

Daniel Tzabbar, PhD (University of Toronto). Assistant Professor. Business planning, social capital, technology entrepreneurship, alliances, human capital, innovation management, strategic management.

Joan Weiner, PhD (The Wharton School, University of Pennsylvania). Associate Professor. Business ethics, leadership, communication and decision making; educational innovation; health system management design.

Jonathan C. Ziegert, PhD (University of Maryland). Associate Professor. Leadership; team dynamics; group performance; attraction and recruitment; discrimination.

Emeritus Faculty

Milton Silver, PhD (Columbia University). Professor Emeritus. Strategic planning and control systems, analysis and design of information systems, and executive and management development and training.

Marketing

Major: Marketing
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 52.1401
Standard Occupational Classification (SOC) code: 11-2021

About the Program

The MS in Marketing provides students with a more focused training in marketing science and it develops the technical skills necessary for success in today’s business environment. Marketers require a higher level of technical capabilities to respond to today’s dynamic marketing. At the same time, new tools such as neuroscience and analytics empower marketers to better understand customers and respond to their needs and wants. These skills require a higher level of training that this degree provides.

Admission Requirements

The LeBow College of Business seeks applicants with exceptional ability and motivation. Students who hold a bachelor’s degree, either in Marketing or another discipline, may apply to the MS program. Students who lack some part of this preparation may be considered for admission conditional on their completing the appropriate undergraduate courses as non-matriculated students during the summer term before they begin the program in the fall.

In reviewing an applicant's credentials, the following factors will be considered:

- Prior Academic Accomplishments: All course work taken prior to application will be examined, paying particular attention to the specific courses that have been completed. Applicants should have attained a minimum grade point average (GPA) of 3.0 (on a 4.0) scale for all undergraduate course work completed.

- Graduate Record Examination (GRE) or Graduate Management Aptitude Test (GMAT): Applicants are required to submit GRE or GMAT scores. Scores of more than five years old are not accepted.

- Test of English as a Foreign Language (TOEFL): Applicants whose native language is not English and who have not already received a degree from a U.S. university must also submit scores from the Test of English as a Foreign Language (TOEFL).

- Personal Statement/Essay: Each applicant must submit a personal statement. The personal statement should explain the applicant's educational and personal experiences that have influenced the decision to pursue an MS and should discuss the candidate's career plans and goals.

- Letters of Recommendation: Two letters of recommendation must be submitted in support of the application. Applicants are strongly encouraged to seek recommendations from academics or other professionals who can assess the applicant's likelihood of success in the MS program.

Degree Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MKTG 601</td>
<td>Marketing Strategy &amp; Planning</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 622</td>
<td>Buyer Behavior Theory</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 630</td>
<td>Global Marketing</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 652</td>
<td>Marketing Information Management and Research</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 601</td>
<td>Business Statistics</td>
<td>3.0</td>
</tr>
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</table>

Required Electives - Choose 7 of the following (2 must be from MKTG)

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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</thead>
<tbody>
<tr>
<td>BMES 509</td>
<td>Entrepreneurship for Biomedical Engineering and Science</td>
</tr>
<tr>
<td>BMES 510</td>
<td>Biomedical Statistics</td>
</tr>
<tr>
<td>BMES 524</td>
<td>Introduction to Biosensors</td>
</tr>
<tr>
<td>BMES 538</td>
<td>Biomedical Ethics and Law</td>
</tr>
<tr>
<td>BMES 551</td>
<td>Biomedical Signal Processing</td>
</tr>
<tr>
<td>BMES 621</td>
<td>Medical Imaging Systems I</td>
</tr>
<tr>
<td>MKTG 606</td>
<td>Customer Analytics</td>
</tr>
<tr>
<td>MKTG 607</td>
<td>Marketing Experiments</td>
</tr>
</tbody>
</table>
MKTG 634 Integrated Marketing Communications Management
MKTG 638 New Product Planning, Strategy, and Development
MKTG 646 Services Marketing
MKTG 654 Corporate Brand & Reputation Management
PSY 512 Cognitive Psychology
PSY 611 Computer-Based Research Methods for Psychological Research
PSY 615 Judgment & Decision-making
PSY 811 Multilevel Regression
PSY 812 Cognitive Neuroscience

Internship/Practicum 9.0
BUSN 615 Graduate Internship

Total Credits 45.0

Marketing Faculty

Rolph E. Anderson, PhD (University of Florida) Royal H. Gibson Sr. Professor of Marketing. Professor. Personal selling and sales management; multivariate data analysis; customer relationship management (CRM); customer satisfaction and customer loyalty.

Trina Larsen Andras, PhD (University of Texas at Austin) Head of the Department of Marketing; Academic Director, Center for Corporate Research Management. Professor. International marketing, marketing channels management, cross-cultural communication.

Michaela Draganska, PhD (Kellog School of Management, Northwestern University). Associate Professor. Advertising strategy, product assortment decisions, new product positioning, distribution channels.

Larry Duke, MBA (Harvard Business School). Associate Clinical Professor. International marketing and strategy, new product development, business-to-business marketing, marketing of financial services.

Michael Howley, PhD (Arizona State University). Associate Clinical Professor. Investments in dissatisfied customers, service recovery, health care marketing, marketing of service organizations, financial consequences of marketing actions.

Yanliu Huang, PhD (The Wharton School, University of Pennsylvania). Assistant Professor. Consumer n-store decision making, consumer planning, health marketing, memory and learning.

Daniel Korshun, PhD (Boston University). Assistant Professor. Brand and corporate reputation management, corporate social responsibility, internal marketing, marketing strategy, relationship marketing.

Hyokjin Kwak, PhD (University of Georgia) Department of Marketing. Associate Professor. Advertising effects, consumer behaviors and e-commerce.

Bert Rosenbloom, PhD (Temple University) Rauth Chair of Electronic Commerce. Professor. Marketing channels and distribution systems, electronic commerce, interorganizational marketing management, wholesale and retail distribution, marketing strategy and planning.

Prashant Srivastava, PhD (Oklahoma State University). Associate Clinical Professor. New product development, supply chain management, B2B marketing, sales, strategic alliances, organizational learning, market orientation, healthcare marketing, and database marketing.

Rajneesh Suri, PhD (University of Illinois at Urbana-Champaign). Professor. Pricing, promotions and branding.

Srinivasan Swaminathan, PhD (University of Texas-Austin). Professor. Marketing research and strategy, pricing and promotions, loyalty and satisfaction.

An Tran, PhD (University of Colorado–Boulder). Assistant Clinical Professor. Intertemporal choice, the psychology of time and money, consumer planning, financial decision making.

Supply Chain Management and Logistics

Major: Supply Chain Management and Logistics
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 52.0203
Standard Occupational Classification (SOC) code: 11-3071

About the Program

Today, companies worldwide are competing in very different ways and very different environments than they were in the past because of technological advances. Operations, Supply Chain Management, and Logistics are key functions through which companies can gain strategic advantage, and companies are hiring graduates to drive innovations for their new economic surroundings.

The Drexel MS Program in Supply Chain Management and Logistics is delivered in two tracks:

- For students in the Industry Professional Track, we are committed to increasing their supply chain competencies and leadership abilities. We work with organizations and leaders from around the world to help shape strategies that inspire competitive advantage and business success.
- For students in the Research Track, we leverage industry relationships to inform the development of theory and models that advance the field. Research seminars led by our top-notch faculty prepare our MS students to enter PhD programs and become academic leaders.

Additional Information

For additional information about the program or to schedule an appointment, please contact the Department of Decision Sciences and MIS (http://www.lebow.drexel.edu/Faculty/Departments/Decision).

Major: Supply Chain Management and Logistics
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 52.0203
Standard Occupational Classification (SOC) code: 11-3071

Degree Requirements

All students will be required to take a series of foundation courses in the management of operations and the quantitative methods that support analysis and decision making for supply chain management and logistics.
After the common core, the students will choose one of the following tracks:

(1) **Industry Professional Track**: This track covers a range of topics for practical management decisions over multiple horizons for different types of supply chains and prepares the students for effective leadership in an increasingly complex, dynamic, global business environment. For those students with a bachelor’s degree in engineering, we also encourage them to take advantage of the Certificate in Systems Engineering Integrated Logistics (p. 330), offered by the College of Engineering.

(2) **Research Track**: This track goes deeper into the theoretical foundations of decision making in supply chains and prepares students for doctoral studies in the area.

**Foundations:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>POM 601</td>
<td>Operations Management</td>
<td>3.0</td>
</tr>
<tr>
<td>POM 602</td>
<td>Strategic Operations &amp; Quality</td>
<td>3.0</td>
</tr>
<tr>
<td>POM 620</td>
<td>Management of Manufacturing Firms</td>
<td>3.0</td>
</tr>
<tr>
<td>POM 624</td>
<td>Management of Service Firms</td>
<td>3.0</td>
</tr>
<tr>
<td>POM 625</td>
<td>Supply Chain Management</td>
<td>3.0</td>
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</table>

**Quantitative Methods**

<table>
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<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>STAT 601</td>
<td>Business Statistics</td>
<td>3.0</td>
</tr>
<tr>
<td>OPR 601</td>
<td>Managerial Decision Models and Simulation</td>
<td>3.0</td>
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Select one of the following tracks: 24.0

**Industry Professional Track**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>MIS 661</td>
<td>Managing with Enterprise Application Software using SAP - Logistics</td>
</tr>
<tr>
<td>POM 622</td>
<td>Materials Management</td>
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<tr>
<td>STAT 634</td>
<td>Quality &amp; Six-Sigma</td>
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Select four of the following:

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>BUSN 502</td>
<td>Essentials of Economics</td>
</tr>
<tr>
<td>ECON 610</td>
<td>Microeconomics</td>
</tr>
<tr>
<td>ECON 630</td>
<td>International Economics</td>
</tr>
<tr>
<td>ECON 650</td>
<td>Business &amp; Economic Strategy: Game Theory &amp; Applications</td>
</tr>
<tr>
<td>MIS 651</td>
<td>Information Systems Outsourcing Management</td>
</tr>
<tr>
<td>MIS 662</td>
<td>Managing with Enterprise Application Software using SAP - Accounting &amp; Analytics</td>
</tr>
<tr>
<td>OPR 640</td>
<td>Decision Models for the Public Sector</td>
</tr>
<tr>
<td>ORGB 625</td>
<td>Leadership and Professional Development</td>
</tr>
<tr>
<td>ORGB 631</td>
<td>Leading Effective Organizations</td>
</tr>
<tr>
<td>ORGB 640</td>
<td>Negotiations for Leaders</td>
</tr>
<tr>
<td>POM 642</td>
<td>Sustainable Supply Chain Management and Logistics</td>
</tr>
<tr>
<td>POM 643</td>
<td>Managing Queues for Service Operations</td>
</tr>
<tr>
<td>POM 644</td>
<td>Revenue Management</td>
</tr>
<tr>
<td>STAT 638</td>
<td>Advanced Statistical Quality Control</td>
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<tr>
<td>POM 770</td>
<td>Supply Chain Management and Logistics Practicum</td>
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**Research Track**

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<th>Course Title</th>
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<tr>
<td>POM 771</td>
<td>Supply Chain Management and Logistics Master's Thesis</td>
</tr>
<tr>
<td>OPR 922</td>
<td>Operations Research Methods I</td>
</tr>
<tr>
<td>POM 900</td>
<td>Decision Processes in Operations Management</td>
</tr>
<tr>
<td>POM 922</td>
<td>Inventory Models Seminar</td>
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**Sample Plan of Study**

**Plan of Study for the Industry Professional Track:**

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>OPR 601</td>
<td>Managerial Decision Models and Simulation 3.0</td>
</tr>
<tr>
<td>POM 601</td>
<td>Operations Management 3.0</td>
</tr>
<tr>
<td>STAT 601</td>
<td>Business Statistics 3.0</td>
</tr>
<tr>
<td>Term Credits</td>
<td>9.0</td>
</tr>
<tr>
<td>Winter</td>
<td></td>
</tr>
<tr>
<td>POM 620</td>
<td>Management of Manufacturing Firms 3.0</td>
</tr>
<tr>
<td>POM 624</td>
<td>Management of Service Firms 3.0</td>
</tr>
<tr>
<td>Track Elective 1</td>
<td>3.0</td>
</tr>
<tr>
<td>Term Credits</td>
<td>9.0</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
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<tr>
<td>POM 602</td>
<td>Strategic Operations Quality 3.0</td>
</tr>
<tr>
<td>POM 625</td>
<td>Supply Chain Management 3.0</td>
</tr>
<tr>
<td>Track Elective 2</td>
<td>3.0</td>
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<tr>
<td>Term Credits</td>
<td>9.0</td>
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<tr>
<td>Summer</td>
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<tr>
<td>STAT 634</td>
<td>Quality Six-Sigma 3.0</td>
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<tr>
<td>Track Elective 3</td>
<td>3.0</td>
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<tr>
<td>Track Elective 4</td>
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<tr>
<td>Second Year</td>
<td></td>
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<tr>
<td>Fall</td>
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<tr>
<td>MIS 661</td>
<td>Managing with Enterprise Application Software using SAP - Logistics 3.0</td>
</tr>
<tr>
<td>POM 622</td>
<td>Materials Management 3.0</td>
</tr>
<tr>
<td>POM 770</td>
<td>Supply Chain Management and Logistics Practicum 3.0</td>
</tr>
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<td>Term Credits</td>
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</tbody>
</table>

Total Credit: 45.0

**Plan of Study for the Research Track**

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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<tbody>
<tr>
<td>Fall</td>
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<tr>
<td>OPR 601</td>
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<td>Operations Management 3.0</td>
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<td>Winter</td>
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<tr>
<td>OPR 922</td>
<td>Operations Research Methods I 3.0</td>
</tr>
<tr>
<td>POM 620</td>
<td>Management of Manufacturing Firms 3.0</td>
</tr>
<tr>
<td>POM 624</td>
<td>Management of Service Firms 3.0</td>
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<tr>
<td>Term Credits</td>
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</table>
### Decision Processes in Operations Management

<table>
<thead>
<tr>
<th>Term Credits</th>
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<tbody>
<tr>
<td>3.0</td>
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### Supply Chain Management and Logistics Master's Thesis

<table>
<thead>
<tr>
<th>Term Credits</th>
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</table>

### Business Administration

**Major:** Business Administration  
**Degree Awarded:** Doctor of Philosophy (PhD)  
**Calendar Type:** Quarter  
**Total Credit Hours:** 60.0 (Post-Master's) or 90.0 (Post-Bachelor's)  
**Classification of Instructional Programs (CIP) code:** 52.0101  
**Standard Occupational Classification (SOC) code:** 11-1021

#### About the Program

Drexel's PhD in Business Administration program prepares candidates for careers in academic research and teaching. The Drexel program is characterized by a healthy respect for the interrelations among the different branches of knowledge and a close, collaborative relationship between each PhD candidate and the faculty. LeBow's faculty take a hands-on approach to research and mentoring students on a daily basis. The support of LeBow's collaborative, collegial research environment provides our doctoral students with tremendous research opportunities.

The program enables students to complete their doctoral coursework in two years. Students begin specializing in their chosen area during the first year of study. Specializations are available in five areas: accounting, decision sciences, finance, marketing, and management (organization and strategy). For information about doctoral work in economics, please visit the PhD in Economics page.

PhD students complete a minimum of 60.0 quarter credits beyond the master's degree. Students who enter the program without a master's degree must complete 90.0 credits beyond the bachelor's degree. Degree Requirements describe the basic structure of the PhD in Business curriculum.

For additional information about the program visit the PhD Program in Business page.

#### Admission Requirements/Financial Aid

The LeBow College of Business seeks applicants with exceptional ability and motivation who can succeed in a research-oriented program.

Admission to this full-time program is competitive and highly selective. Applicants are only admitted for full-time status. Applicants must specify their proposed area of specialization, and their credentials are ultimately compared to the credentials of other applicants in the same specialization area. There may be relatively few openings in a given area. A master's degree is not a requirement, although most admitted students have one.

In reviewing an applicant's credentials, the faculty consider the following factors:

- **Prior Academic Accomplishments:** The faculty will examine all course work taken prior to application, paying particular attention to the specific courses that have been completed. Applicants should have attained a minimum grade point average of 3.0 (on a 4.0 scale) for all undergraduate course work completed. They also should have attained a minimum 3.3 average for any graduate-level course work taken. The faculty generally expect applicants to demonstrate a substantially higher level of accomplishment than these minimum requirements.
- **Graduate Management Admissions Test (GMAT) or Graduate Records Examination (GRE):** Applicants to all specializations within the PhD program are required to submit scores from either the GMAT or GRE. While all specializations will accept either one, applicants applying to the Accounting, Management (Organization or Strategy), Finance, or Marketing specializations should submit GMAT scores. Applicants to the specializations in Decision Sciences or Economics should submit the GREs. GMAT and GRE scores are not accepted if they are more than five years old.
- **Test of English as a Foreign Language (TOEFL):** Applicants whose native language is not English and who have not already received a degree from a U.S. university, must also submit scores from the Test of English as a Foreign Language (TOEFL).
- **Personal Statement/Essay:** Each applicant must submit a personal statement. The personal statement should explain the applicant's educational and personal experiences that have influenced the decision to pursue a PhD and should discuss the candidate's career plans and goals. The faculty are especially interested in learning about an applicant's prior research experience and the commitment to future research in the applicant's area of specialization.
- **Letters of Recommendation:** Two letters of recommendation must be submitted in support of the application. Applicants are strongly encouraged to seek recommendations from academics or other professionals who can assess the applicant's likelihood of success in a research-oriented PhD program.

#### Admission Procedures

The PhD Program in Business admits students each fall. To be considered for admission, the completed application must be received by the LeBow College of Business Office of Graduate Admissions no later than January 15th. It is the applicant's responsibility to ensure that all transcripts, test scores and letters of recommendation, as well as the application form and the personal statement, are received by Drexel University no later than January 15th.

#### Assistantships and Financial Aid

The LeBow College of Business strives to provide a graduate assistantship to each entering PhD student. Therefore, each applicant to the PhD program is automatically considered for a graduate assistantship as well as for admissions into the program. First-year graduate assistants are assigned to work with a faculty member on research activities. During the second and subsequent years, graduate assistants are generally
assigned a combination of teaching and research responsibilities. Assistants receive a stipend and 27 credits of tuition remission per academic year. Doctoral students who are making satisfactory progress toward the degree can expect to be provided with an assistantship for at least four years.

For questions about applying, please contact:

The LeBow Ph.D. Program Office
Bennett S. LeBow College of Business
Drexel University
3141 Chestnut Street
Philadelphia, PA 19104-2875
lebowphd@drexel.edu

Degree Requirements

60 credits (Post-Master's degree)
90 credits (Post-Bachelor's degree)

• 15.0 credits of core courses
• 30.0 credits of specialization requirements
• 15.0 credits of dissertation research
• 30.0 credits for students without Master's degree

Core Program

PhD students in business select one of two broad streams of research:

• behavioral based research; or
• economics based research.

Within each stream all students pursue a common set of core courses during their first year of study. This core consists of course work in research methodology (three courses) and economics (two courses) or behavioral science (two courses). In addition to these core courses, students also take courses in their specializations during their first year in the program.

Each research stream consists of 5 core courses. All courses are 3.0 credits each.

Economics Stream Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 902</td>
<td>Mathematical Economics</td>
<td>3.0</td>
</tr>
<tr>
<td>ECON 910</td>
<td>Advanced Microeconomics I</td>
<td>3.0</td>
</tr>
<tr>
<td>ECON 940</td>
<td>Econometrics I</td>
<td>3.0</td>
</tr>
<tr>
<td>ECON 941</td>
<td>Econometrics II</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 931</td>
<td>Statistics for Economics</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits: 15.0

* Decision Sciences students may make substitutions for the econometrics series. Their research methodology sequences is comprised of Statistics, STAT 924 Multivariate Analysis I and OPR 922 Operations Research Methods I.

Economics Stream First Year Core Sequence

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>ECON 902</td>
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<td>STAT 931</td>
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Term Credits: 6.0

Winter

<table>
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<tr>
<th>Course</th>
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<td>MGMT 906</td>
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</tr>
<tr>
<td>STAT 932</td>
<td>3.0</td>
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Term Credits: 6.0

Spring

<table>
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<th>Course</th>
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<tbody>
<tr>
<td>MGMT 907</td>
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<tr>
<td>STAT 924</td>
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Term Credits: 3.0

Total Credit: 15.0

Behavioral Stream

Behavioral Stream Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tr>
<td>STAT 924</td>
<td>Multivariate Analysis I</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 932</td>
<td>Statistics for Behavioral Science</td>
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<tr>
<td>MGMT 906</td>
<td>Foundations of Research in Behavioral Science</td>
<td>3.0</td>
</tr>
<tr>
<td>MGMT 907</td>
<td>Research Analysis in Behavioral Sciences</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 940</td>
<td>Multivariate II</td>
<td>3.0</td>
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</table>

Total Credits: 15.0

Behavioral Stream First Year Core Sequence

<table>
<thead>
<tr>
<th>Semester</th>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
<td>MGMT 906</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>STAT 932</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Term Credits: 6.0

Winter

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MGMT 907</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 924</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Term Credits: 6.0

Spring

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MKTG 940</td>
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</table>

Term Credits: 3.0

Total Credit: 15.0

First-Year Examination

After the completion of the core coursework, students are examined on their competence in the core material and their readiness to proceed to their specialization area.

Specialization

The PhD Program in Business offers specializations in six areas:

- Accounting
- Decision Sciences
- Finance
- Marketing
- Organizational Behavior (Management)
- Strategy (Management)

Each specialization area consists of 10 courses (30 credits) in addition to the 5 stream courses. The courses outside of the stream courses are either department requirements or electives selected by the student with the approval of their PhD coordinator. Up to 3 of the electives may be independent studies or dissertation research courses subject to the approval of the student's PhD coordinator and the Director of the LeBow PhD Program. The requirements of each area of specialization are discussed in detail on the Lebow College of Business PhD Program Areas.
Candidacy Examination
At the completion of their coursework, students take written and oral candidacy examinations. These examinations test each student’s preparation for dissertation research. Once the candidacy examinations are passed, the student is recognized as a PhD candidate.

Doctoral Dissertation
The doctoral dissertation is a piece of original research designed to make a contribution to the student’s chosen discipline. Each candidate selects a dissertation adviser and an advisory committee of additional faculty members is formed. The candidate prepares a detailed dissertation proposal that is defended before the University community. After successfully defending the proposal, the candidate conducts the research (15-credit minimum) and prepares a written dissertation. The completed dissertation is then defended in a final oral examination.

Dissertation Format Review
In addition to meeting the Thesis Advisory Committee’s standards of originality and scholarly content, all doctoral dissertations must conform to university format requirements. Students should obtain a copy of the Thesis Manual from the Graduate College of Drexel University (http://www.drexel.edu/graduatecollege) or from the Thesis Reviewer in 5038 MacAlister Hall.

Admission Requirements
The LeBow College of Business: School of Economics seeks applicants with exceptional ability and motivation. Students who hold a bachelor’s degree, either in economics or another discipline, may apply to the MS program. All courses in the program expect a preparation of at least principles of economics and basic statistics. Students who lack some part of this preparation may be considered for admission conditional on their completing the appropriate undergraduate courses as non-matriculated students during the summer term before they begin the program in the fall.

In reviewing an applicant’s credentials, the faculty will consider the following factors:

• Prior Academic Accomplishments: The faculty will examine all course work taken prior to application, paying particular attention to the specific courses that have been completed. Applicants should have attained a minimum grade point average of 3.0 (on a 4.0 scale) for all undergraduate course work completed.
• Graduate Record Examination (GRE) or Graduate Management Aptitude Test (GMAT): Applicants are required to submit GRE or GMAT scores. Scores of more than five years old are not accepted.
• Test of English as a Foreign Language (TOEFL): Applicants whose native language is not English and who have not already received a degree from a U.S. university must also submit scores from the Test of English as a Foreign Language (TOEFL).
• Personal Statement/Essay: Each applicant must submit a personal statement. The personal statement should explain the applicant’s educational and personal experiences that have influenced the decision to pursue an MS and should discuss the candidate’s career plans and goals.
• Letters of Recommendation: Two letters of recommendation must be submitted in support of the application. Applicants are strongly encouraged to seek recommendations from academics or other professionals who can assess the applicant’s likelihood of success in the MS program.

Admission Procedures
The MS in Economics program admits students each fall. To be considered for admission, the completed application must be received by the LeBow College of Business Office of Graduate Admissions. Admissions are considered on a rolling basis and will remain open until all available slots are filled. It is the applicant’s responsibility to ensure that all transcripts, test scores and letters of recommendation, as well as the application form and the personal statement, are received by LeBow College Business, School of Economics.

Graduate Assistantships and Financial Aid
Financial assistance for the MS program may be available on a limited basis to highly qualified candidates. Research Assistantships and Teaching Assistantships may be also be available on a limited basis for highly qualified candidates.

To obtain an application, please contact:
Graduate Admissions Office
Bennett S. LeBow College of Business
Drexel University
3141 Chestnut Street
Philadelphia, PA 19104-2875
215.895.6804
msecon@lebow.drexel.edu

Degree Requirements

Core Requirements
Select one course from each of the following sets:

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<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>ECON 548</td>
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<td>or ECON 902</td>
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<tr>
<td>ECON 550</td>
<td>Econometrics</td>
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<tr>
<td>or ECON 940</td>
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<tr>
<td>ECON 560</td>
<td>Time Series Econometrics</td>
<td>3.0</td>
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<tr>
<td>or ECON 941</td>
<td>Econometrics II</td>
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<tr>
<td>ECON 610</td>
<td>Microeconomics</td>
<td>3.0</td>
</tr>
<tr>
<td>or ECON 910</td>
<td>Advanced Microeconomics I</td>
<td></td>
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</tbody>
</table>
Complete 9 additional credits from the list of Economics electives or Business electives

**Economics electives**

- Complete 18.0 additional credits from the following:
  - ECON 601 Managerial Economics
  - ECON 616 Public Finance and Cost Benefit Analysis
  - ECON 630 International Economics
  - ECON 634 History of Economic Analysis
  - ECON 639 Applied Industrial Analysis
  - ECON 650 Business & Economic Strategy: Game Theory & Applications
  - ECON 661 Health Economics
  - ECON 662 Economic Analysis of Health Systems
  - ECON T680 Special Topics in ECON
  - ECON 700 Economics Seminar
  - ECON 902 Mathematical Economics
  - ECON 910 Advanced Microeconomics I
  - ECON 911 Advanced Microeconomics II
  - ECON 920 Advanced Macroeconomics I
  - ECON 921 Advanced Macroeconomics II
  - ECON 925 Macroeconomic Dynamics
  - ECON 940 Econometrics I
  - ECON 941 Econometrics II
  - ECON 942 Applied Microeconometrics
  - ECON 950 Industrial Organization I
  - ECON 951 Industrial Organization II
  - ECON 959 Industrial Organization Seminar
  - ECON 960 International Trade
  - ECON 961 Empirical International Trade
  - ECON 962 Open Economy Macroeconomics
  - ECON 969 International Trade Seminar
  - ECON 979 Open Economy Macro Seminar
  - ECON 980 Game Theory
  - INTB 632 Economic Analysis of Multinational Corporations
  - STAT 631 Statistics for Economics

**Business electives**

- Complete 9 additional credits from the list of Economics electives or the list below:
  - BLAW 605 Legal Options in Decision Making
  - BLAW 620 Legal Aspects of Employment
  - BLAW 630 Government and Business
  - BUSN 501 Measuring and Maximizing Financial Performance
  - BUSN 615 Graduate Internship
  - FIN 601 Corporate Financial Management
  - FIN 602 Advanced Financial Management
  - FIN 622 Financial Institutions & Markets
  - FIN 635 Entrepreneurial Finance
  - FIN 640 Mergers and Acquisitions
  - FIN 648 International Financial Management
  - MGMT 602 Managing Technology Innovation

**Economics**

- MKTG 630 Global Marketing
- OPR 601 Managerial Decision Models and Simulation
- OPR 620 Operations Research I
- OPR 622 Operations Research II
- OPR 624 Advanced Mathematical Program
- STAT 662 Statistical Decision Theory I
- STAT 664 Statistical Decision Theory II
- STAT 666 Statistical Sampling

**Total Credits**

- 45.0

**Centers and Facilities**

This marriage of academic rigor and practical applications can also be seen in the development of the school’s Centers of Excellence. Centers of Excellence are catalysts for research and innovation, think tanks for nationally significant trends and issues, and incubators for opportunities in business and integration among disciplines. LeBow’s Centers of Excellence provide students with meaningful experiential learning and impact the performance of businesses in our region and around the world. As part of the curriculum, Drexel LeBow MBA students will take courses which reside in the centers and will see firsthand how practical learning is applied.

The Centers are:

- Sovereign Institute for Strategic Leadership (https://www.lebow.drexel.edu/academics/centers)
- Center for Corporate Governance (https://www.lebow.drexel.edu/academics/centers/corporate-governance)
- Dana and David Dornsife Center for Experiential Learning (https://www.lebow.drexel.edu/academics/centers/experiential-learning)

**Facilities**

In fall 2013, LeBow College opened its 12-story, Gerri C. LeBow Hall, with a finance trading lab, behavioral studies lab and integrated teaching technology in all classrooms. The new building features two lecture halls, 15 classrooms of varying sizes and seating configurations, including case study rooms and cluster classrooms designed to facilitate group work. Other amenities consist of extensive areas of student spaces, including 12 collaboration rooms, two quiet study areas, and 3,500 square feet of student lounges. Gerri C. LeBow Hall brings together faculty, students and staff, in a state of the art building on the University City campus.

**Economics and International Business Faculty**

Marco Airaudo, PhD (University of Pennsylvania Philadelphia). Assistant Professor. Computational economics, international economics, macroeconomics and monetary economics.

Richard Barnett, PhD (University of Minnesota). Associate Clinical Professor. Economic theory, macroeconomics.

Sebastien Bradley, PhD (University of Michigan). Assistant Professor. Public finance, international economics.
Mian Dai, PhD (Northwestern University). Assistant Professor. Managerial economics and strategy.

Pia DiGirolamo, PhD (Purdue University). Assistant Clinical Professor. Macroeconomics, international finance.

Anne Duchene, PhD (Ecole Nationale des Ponts et Chaussées, France) Department of Economics and International Business. Assistant Professor. Microeconomics, industrial organization, law and economics.

Ramya Ghosh, PhD (Claremont Graduate University). Assistant Clinical Professor. International economics.

Shawkat M. Hammoudeh, PhD (University of Kansas) Department of Economics and International Business. Professor. Applied econometrics, financial economics, international economics, natural resource economics.

Teresa D. Harrison, PhD (University of Texas at Austin) Department of Economics and International Business. Associate Professor. Econometrics, public finance, industrial organization, empirical microeconomics including health and nonprofit organizations.

Paul E. Jensen, PhD (Penn State University) Associate Dean, College of Business. Associate Professor. International trade. Primary research interest is international trade, particularly in empirical studies of international trade patterns.

Bang Nam Jeon, PhD (Indiana University) Department of Economics and International Business. Professor. Financial economics, world financial market linkages, foreign direct investment flows in the Asia-Pacific economies, the Korean economy: currency crisis, FDI, and macroeconomic issues, regional economic integration and newly industrializing economies: the


Christopher A. Laincz, PhD (Duke University) Department of Economics and International Business. Associate Professor. Economic development, technological change, and growth, industrial organization, macroeconomics and monetary economics.

Bijou Yang Lester, PhD (University of Pennsylvania) Department of Economics and International Business. Professor. Behavioral characteristics of shopping on-line, economic issues of electronic commerce, contingent employment and part-time work, the economy and suicide.


Roger A. McCain, PhD (Louisiana State University) Department of Economics and International Business. Professor. Computational economics, game theory.

Irina Murtazashvili, PhD (Michigan State University). Assistant Professor. Applied econometrics.

Maria Olivero, PhD (Duke University) Department of Economics and International Business. Associate Professor. Macroeconomics, international finance.


Konstantinos Serfes, PhD (University of Illinois at Champaign-Urbana) Department of Economics and International Business. Associate Professor. Industrial organization; microeconomics.

Mark Stehr, PhD (University of California at Berkeley) Department of Economics and International Business. Associate Professor. Health Economics, public finance, public policy.

Constantinos Syropoulos, PhD (Yale University) Trustee Professor of International Economics, Department of Economics and International Business. Professor. International trade, political economy, applied microeconomics.

Matthew Weinberg, PhD (Princeton University). Assistant Professor. Antitrust and regulation, applied econometrics, industrial organization.

Yoto Yotov, PhD (Boston College). Associate Professor. International trade, applied microeconomics, political economy.

Interdepartmental Faculty

Bruce D. McCullough, PhD (University of Texas) Department of Decision Sciences. Professor. Applied econometrics; reliability of statistical and econometric software; business data mining.

Emeritus Faculty


Andrew G. Verzilli, PhD (Boston College). Professor Emeritus. Teaching effectiveness in economics; economics and financial history.

Chiou-shuang Yan, PhD (Purdue University). Professor Emeritus. International economics, input-output analysis.

Economics

Major: Economics

Degree Awarded: Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 60.0 (Post-Master's degree) or 90.0 (Post-Bachelor's degree)

Classification of Instructional Programs (CIP) code: 45-0601

Standard Occupational Classification (SOC) code: 19-3011

About the Program

Drexel's PhD program in Economics prepares economists for academic research as well as careers in government or industry by providing a solid background in economic theory, quantitative analysis, and analytical tools at the advanced level. Each year a relatively small number of PhD students are accepted into the program, which allows for a collegial environment where the PhD students interact with faculty on a daily basis. Requirements for the MS in Economics program are satisfied if the coursework associated with the first and second years of the PhD program are complete.

The PhD program in Economics offers three fields of study:
The PhD program in Economics is also particularly strong in applied microeconometrics.

Students typically complete their coursework in two years and the PhD degree in five. Students work as research and teaching assistants under the supervision of a faculty member. After their second year, students can teach independently.

Additional information can be found online at the PhD Program in Economics (http://www.lebow.drexel.edu/Prospects/Doctorate/Econ) page as well as in the LeBow College of Business PhD Programs Handbook (http://www.lebow.drexel.edu/Current/Doctorate).

To apply and for application information please check online at the LeBow PhD Admissions (http://www.lebow.drexel.edu/resources/admissions/phd) webpage.

Questions should be addressed to lebowphd@drexel.edu.

Admission Requirements

The LeBow College of Business: School of Economics seeks applicants with exceptional ability and motivation. For the PhD, the School places emphasis on applicants who can provide evidence of strong potential in a research-oriented program. In general, prior training at either the undergraduate or graduate level in economics and mathematics is strongly encouraged. All courses in the program expect a preparation of at least principles of economics and basic statistics. Students who lack some part of this preparation may be considered for admission conditional on their completing the appropriate undergraduate courses as non-matriculated students during the summer term before they begin the program in the fall.

Admission is competitive and highly selective.

In reviewing an applicant’s credentials, the faculty will consider the following factors:

- **Prior Academic Accomplishments**: The faculty will examine all course work taken prior to application, paying particular attention to the specific courses that have been completed. Applicants should have attained a minimum grade point average of 3.0 (on a 4.0 scale) for all undergraduate course work completed. They also should have attained a minimum 3.3 average for any graduate-level course work taken. The faculty generally expects applicants to demonstrate a substantially higher level of accomplishment than these minimum requirements. A master's degree is not a requirement.
- **Graduate Record Examination (GRE)**: Applicants are required to submit GRE scores. GRE scores are not accepted if they are more than five years old.
- **Test of English as a Foreign Language (TOEFL)**: Applicants whose native language is not English and who have not already received a degree from a U.S. university must also submit scores from the Test of English as a Foreign Language (TOEFL).
- **Personal Statement/Essay**: Each applicant must submit a personal statement. The personal statement should explain the applicant's educational and personal experiences that have influenced the decision to pursue a PhD and should discuss the candidate's career plans and goals. The faculty are especially interested in learning about an applicant's prior research experience and the commitment to future research in the applicant's area of specialization.
- **Letters of Recommendation**: Two letters of recommendation must be submitted in support of the application. Applicants are strongly encouraged to seek recommendations from academics or other professionals who can assess the applicant's likelihood of success in a research-oriented PhD program.

Admission Procedures

The PhD Programs in Economics admits students each fall. To be considered for admission, the completed application must be received by the LeBow College of Business Office of Graduate Admissions no later than January 15th. It is the applicant's responsibility to ensure that all transcripts, test scores and letters of recommendation, as well as the application form and the personal statement, are received by Drexel University no later than January 15th.

Assistantships and Financial Aid

The LeBow College of Business strives to provide graduate assistantships to all entering PhD students. Each applicant to the PhD program is automatically considered for a graduate assistantship as well as for admission into the program. First-year graduate assistants are assigned to work with a faculty member on research activities. During the second and subsequent years, graduate assistants are generally assigned a combination of teaching and research responsibilities. Assistants receive a stipend and 27.0 credits of tuition remission per academic year. Doctoral students who are making satisfactory progress toward the degree can expect to be provided with an assistantship for at least four years.

Degree Requirements

The PhD in Economics program prepares economists for careers in research, teaching, business, and government. It is designed to provide students with not only a broad understanding of modern economics, but also the opportunity to conduct high quality research in a number of specific fields of study including industrial organization, international economics, and health economics.

In the second year of study, the PhD in Economics offers three fields of specialization: industrial organization, international trade, and open economy macroeconomics. Students complete courses in two of these fields of specialization.

Curriculum

60.0 credits (Post-Master's degree)
90.0 credits (Post-Bachelor's degree)

- 27.0 credits of first-year core courses
- 18.0 credits of economics field requirements
- 15.0 credits (minimum) of dissertation research
- 30.0 additional dissertation research credits for students without a Master's degree

Core Program

All PhD students pursue a common set of core courses. The following courses are all completed during the first year, with the exception of ECON 942 Econometrics III, which is completed in the second year.

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 902</td>
<td>Mathematical Economics</td>
<td>3.0</td>
</tr>
</tbody>
</table>
ECON 910  Advanced Microeconomics I  3.0
ECON 911  Advanced Microeconomics II  3.0
ECON 920  Advanced Macroeconomics I  3.0
ECON 921  Advanced Macroeconomics II  3.0
ECON 940  Econometrics I  3.0
ECON 941  Econometrics II  3.0
ECON 942  Applied Microeconometrics *  3.0
ECON 980  Game Theory  3.0
STAT 931  Statistics for Economics  3.0

Total Credits 30.0

* Taken in the second year.

First-Year Examination
After the completion of the core coursework, students are examined on their competence in the core material and their readiness to proceed.

Fields of Specialization
Students are required to complete the coursework for at least two of the following fields/sequences.

Industrial Organization
  ECON 950  Industrial Organization I
  ECON 951  Industrial Organization II
  ECON 959  Industrial Organization Seminar

International Trade
  ECON 960  International Trade
  ECON 961  Empirical International Trade
  ECON 969  International Trade Seminar

Open Economy Macroeconomics
  ECON 925  Macroeconomic Dynamics
  ECON 962  Open Economy Macroeconomics
  ECON 979  Open Economy Macro Seminar

Electives
In addition, students can take elective courses from the Economics Department, from any other departments in the College of Business, and from departments in other Colleges of Drexel University. The following is a set of sample electives:

  ECON 930  Monetary Economics  3.0
  ECON 952  Health Economics  3.0
  ECON 955  Public Economics  3.0
  ECON 964  Economic Development  3.0
  ECON 990  Course ECON 990 Not Found  0.5-9.0
  ECON 992  Course ECON 992 Not Found  3.0
  Additional courses with the permission of the advisor  3.0

Dissertation Research
  ECON 998  Dissertation Research in Economics  12.0

Economics and International Business Faculty
Marco Airaudo, PhD (University of Pennsylvania, Philadelphia). Assistant Professor. Computational economics, international economics, macroeconomics and monetary economics.

Richard Barnett, PhD (University of Minnesota). Associate Clinical Professor. Economic theory, macroeconomics.

Sebastien Bradley, PhD (University of Michigan). Assistant Professor. Public finance, international economics.

Mian Dai, PhD (Northwestern University). Assistant Professor. Managerial economics and strategy.

Pia DiGirolamo, PhD (Purdue University). Assistant Clinical Professor. Macroeconomics, international finance.

Anne Duchene, PhD (Ecole Nationale des Ponts et Chaussees, France) Department of Economics and International Business. Assistant Professor. Microeconomics, industrial organization, law and economics.

Ramyta Ghosh, PhD (Claremont Graduate University). Assistant Clinical Professor. International economics.

Shawkat M. Hammoudeh, PhD (University of Kansas) Department of Economics and International Business. Professor. Applied econometrics, financial economics, international economics, natural resource economics.

Teresa D. Harrison, PhD (University of Texas at Austin) Department of Economics and International Business. Associate Professor. Econometrics, public finance, industrial organization, empirical microeconomics including health and nonprofit organizations.

Paul E. Jensen, PhD (Penn State University) Associate Dean, College of Business. Associate Professor. International trade. Primary research interest is international trade, particularly in empirical studies of international trade patterns.

Bang Nam Jeon, PhD (Indiana University) Department of Economics and International Business. Professor. Financial economics, world financial market linkages, foreign direct investment flows in the Asia-Pacific economies, the Korean economy; currency crisis, FDI, and macroeconomic issues, regional economic integration and newly industrializing economies: the


Christopher A. Laincz, PhD (Duke University) Department of Economics and International Business. Associate Professor. Economic development, technological change, and growth, industrial organization, macroeconomics and monetary economics.

Bijou Yang Lester, PhD (University of Pennsylvania) Department of Economics and International Business. Professor. Behavioral characteristics of shopping on-line, economic issues of electronic commerce, contingent employment and part-time work, the economy and suicide.

Roger A. McCain, PhD (Louisiana State University) Department of Economics and International Business. Professor. Computational economics, game theory.

Irina Murtagashvili, PhD (Michigan State University). Assistant Professor. Applied econometrics.

Maria Olivero, PhD (Duke University) Department of Economics and International Business. Associate Professor. Macroeconomics, international finance.


Konstantinos Serfes, PhD (University of Illinois at Champaign-Urbana) Department of Economics and International Business. Associate Professor. Industrial organization; microeconomics.

Mark Stehr, PhD (University of California at Berkeley) Department of Economics and International Business. Associate Professor. Health Economics, public finance, public policy.

Constantinos Syropoulos, PhD (Yale University) Trustee Professor of International Economics, Department of Economics and International Business. Professor. International trade, political economy, applied microeconomics.

Matthew Weinberg, PhD (Princeton University). Assistant Professor. Antitrust and regulation, applied econometrics, industrial organization.

Yoto Yotov, PhD (Boston College). Associate Professor. International trade, applied microeconomics, political economy.

Interdepartmental Faculty

Bruce D. McCullough, PhD (University of Texas) Department of Decision Sciences. Professor. Applied econometrics; reliability of statistical and econometric software; business data mining.

Emeritus Faculty


Andrew G. Verzilli, PhD (Boston College). Professor Emeritus. Teaching effectiveness in economics; economics and financial history.

Chiou-shuang Yan, PhD (Purdue University). Professor Emeritus. International economics, input-output analysis.

LeBow College of Business: School of Economics

Economics is one of Drexel LeBow’s strongest disciplines. The LeBow College of Business celebrated its strengths in economics teaching and research by elevating its economics department into a School of Economics in September 2013. The School of Economics will continue Drexel LeBow’s commitment to offering a curriculum that is current and challenging, and to conducting research that aligns with business trends and informs policy makers.

Economics is at the root of business decisions, government policy making and global relations. As a course of study, it can lead to diverse career opportunities. A degree in economics provides students with a robust understanding of the workings of the market system and major economic institutions, and development. The Economics Department boasts an award-winning group of faculty members who are leading researchers and dedicated teachers. The world-renowned faculty members take a hands-on approach to teaching, research and mentoring students.

Majors

- Economics (MS) (p. 225)
- Economics (PhD) (p. 227)
The Antoinette Westphal College of Media Arts and Design

About the College

The Antoinette Westphal College of Media Arts & Design (The Westphal College) offers graduate programs in Arts Administration, Fashion Design, Interior Architecture & Design, Digital Media, Museum Leadership, and Television Management. The programs are distinctive in content and professionally oriented.

The Westphal College is a community of learning within the areas of media, design, the fine arts, the performing arts, and the management of creative enterprise that values experiential and immersive education; it is a place where students are encouraged to give form to ideas by learning to negotiate change in an ever-changing world. Through creative, critical, and collaborative approaches, the Westphal College’s diverse programs seek to foster innovation and leadership in progressively interconnected professional disciplines and areas of study.

The academic programs are rigorous, and provide the appropriate balance of a solid foundation with individual creative direction, cultural awareness, strong technical skills, and an understanding of management and professional practice. The College is committed to a continual review of our curricula, processes and outcomes in order make those improvements and refinements necessary to further enrich our students’ education, and to continue to foster independent thinkers, astute leaders, and creative problem solvers.

Majors

- Arts Administration (MS) (p. 231)
- Digital Media (MS, PhD) (p. 233)
- Fashion Design (MS) (p. 237)
- Interior Architecture & Design (MS) (p. 240)
- Museum Leadership (MS) (p. 243)
- Television Management (MS and MS/MBA) (p. 245)

Full/Part-Time Options

- Graduate study in and digital media, fashion design, interior architecture + design includes two years of full-time graduate study. There are some programs that require pre-requisite coursework before entering into the graduate level studies.
- Students may enroll in the arts administration program on a full-time or part-time basis. Full-time arts administration students may complete the degree in five terms. The arts administration graduate program is also available as a fully-online degree through Drexel University Online.
- Students may enroll in the Paul F. Harron Graduate Program in Television Management program on a full-time or part-time basis. Television management students enrolled full-time in either option should plan to take two full years to complete the program.

Facilities

Designed to be an incubator for tomorrow’s creative leaders, The URBN Center is the award-winning home for many of the programs in the Antoinette Westphal College of Media Arts & Design, providing students with rigorous, studio intensive instruction with the latest technological resources. Majors that share this space include Animation & Visual Effects, Architecture, Design & Merchandising, Entertainment & Arts Management, Fashion Design, Game Design & Production, Graphic Design, Interactive Digital Media, Interior Design, Music Industry and Product Design.

The URBN Center also provides a black box theater for our Theatre program, a 3,500 square foot Leonard Pearstein Gallery, two MIDI labs and MAD Dragon Records Suite, a Motion Capture studio, a Hybrid Making Lab featuring Universal Laser Cutters and 3D printing and prototyping, the Robert and Penny Fox Historic Costume Collection (http://www.drexel.edu/westphal/resources/FHCC), the Charles Evans Fashion Design Library, a multi-use screening & lecture room, and offices for the College’s administrative functions.

The Paul Peck Problem Solving & Research Building is home to our Photography major and Department of Art & Art History. Within this facility, the Westphal College occupies a 10,000- square-foot photography lab, lighting studios, two digital imaging labs, as well as six lecture/ laboratory spaces for our Visual Studies courses.

In University Crossings, a 25,000 square foot space houses offices for Film & Video, Screenwriting & Playwriting and Television faculty. Also in this building are two state-of-the-art digital editing facilities, a shooting studio with special effects capability, two screening rooms, a digital audio post production studio, several multi-media classrooms, and a well-stocked equipment room.

MacAlister Hall serves students in the Westphal College with: digital audio labs and recording studios for Music Industry; The Mandell Theater (http://www.drexel.edu/westphal/resources/MandellTheater), a 420-seat proscenium theater with scene shop and dressing rooms; the Ellen Forman Memorial Dance Studio; and a high-definition studio space for our Theatre program, a 3,500 square foot Leonard Pearstein Gallery, two MIDI labs and MAD Dragon Records Suite, a Motion Capture studio, a Hybrid Making Lab featuring Universal Laser Cutters and 3D printing and prototyping, the Robert and Penny Fox Historic Costume Collection (http://www.drexel.edu/westphal/resources/FHCC), the Charles Evans Fashion Design Library, a multi-use screening & lecture room, and offices for the College’s administrative functions.

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Arts Administration

Major: Arts Administration
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 50.1002
Standard Occupational Classification (SOC) code: 13-1011

About the Program

The MS in Arts Administration program is designed to provide academic preparation for leadership positions with nonprofit organizations, foundations, corporations, and government agencies involved in the arts and culture sector.

Students may enroll in the program on a full- or part-time basis. The program is designed to accommodate working students, so all classes are offered in the evening or online. Students must matriculate in either the campus or online program, but students in either program may take some courses in the other program.
Students should plan to enter the program at the start of the fall term. Full-time arts administration students may complete the degree in five consecutive terms when beginning in the fall term, and part-time students typically take seven to eight terms to complete the degree.

Professional Opportunities

Graduates of the program serve in various administrative capacities with museums, galleries, historical societies, government agencies, performing arts organizations, arts centers, and philanthropic and corporate foundations.

Admission Requirements

Requirements for Admission

In addition to meeting the general requirements for admission to graduate studies, applicants should present a résumé demonstrating a strong affinity for the field through work, volunteer experiences, education, or special training. Undergraduate preparation must include at least one course in financial accounting, two courses in the history or literature of an art form, and/or two courses in the practical or creative aspects of an art. Applicants who lack this preparation (or the equivalent) must complete work in the above areas during the first two terms in the program.

An important part of the admissions process is a personal interview with the Program Director. Potential applicants will be contacted to schedule an interview through the Department of Arts & Entertainment Enterprise 215.895.2453 once the application is processed through Graduate Admissions.

Financial Assistance

A limited number of assistantships are available to students in the campus program. Students should have experience in gallery management, public relations or newsletter writing/editing, and should indicate their interest in these positions in their initial letters of inquiry. Students are also encouraged to explore other assistantships available across the University. In the past, arts administration students have held positions in the honors program, the Greek Life Office, the Leadership Program, and the College of Evening and Professional Studies. Awards are made annually on a competitive basis.

Students in the online program only may qualify for a tuition discount through Drexel's partnership with Americans for the Arts.

Dean’s Fellowship

In addition to teaching and research assistantships, the College of Arts and Sciences also awards 10 Dean’s Fellowships per year to full-time students in the campus program. These highly competitive awards are granted across the College, and come with a $5,000 stipend supplement for each of the first two years of study in addition to any other support a student receives.

For additional information on requirements and how to apply, visit Graduate Admissions (http://www.drexel.edu/grad/programs/westphal/ arts-administration) at Drexel University.

Degree Requirements

Each student is assisted with the planning and completion of a program of study in accordance with the student’s needs and career goals. Each candidate for the MS in arts administration must complete 45 credits, including courses in cultural policy, management skills, and fund development. To enable the student to tailor the program of study to meet his or her career goals, a variety of electives are offered. Students may identify tracks in marketing, fund development, finance, or research through their selection of electives.

Many of our students work in an appropriate related arts job associated with a professional arts organization. After completing all core courses, some students choose to complete an internship within the arts and cultural community. The student’s thesis grows out of the internship experience or can address a research topic that the student chooses to explore further.

Curriculum

Professional Requirements

<table>
<thead>
<tr>
<th>Course Number</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AADM 505</td>
<td>Overview Of Arts Administration</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 510</td>
<td>Writing for the Arts</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 610</td>
<td>Financial Accounting for Non-Profit Arts</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 620</td>
<td>Law and the Arts</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 650</td>
<td>Fund Development for the Arts</td>
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</tr>
<tr>
<td>AADM 670</td>
<td>Audience Development</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 710</td>
<td>Strategic Planning and Evaluation</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 750</td>
<td>Arts Administration Seminar</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 751</td>
<td>Management Techniques In the Arts</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 770</td>
<td>Technology and the Marketing of the Arts</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 798</td>
<td>Thesis Development</td>
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</tr>
<tr>
<td>AADM 799</td>
<td>Thesis Completion</td>
<td>1.5</td>
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</table>

Electives

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<tr>
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</thead>
<tbody>
<tr>
<td>AADM 660</td>
<td>International Cultural Policy</td>
</tr>
<tr>
<td>AADM 680</td>
<td>Trends in Fund Development</td>
</tr>
<tr>
<td>AADM 720</td>
<td>Leadership in the Arts</td>
</tr>
<tr>
<td>AADM 731</td>
<td>Human Resources Management in the Arts</td>
</tr>
<tr>
<td>AADM 740</td>
<td>Production Laboratory in the Arts</td>
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<td>AADM 752</td>
<td>Performing Arts Management</td>
</tr>
<tr>
<td>AADM 753</td>
<td>Visual Arts Organization Management</td>
</tr>
<tr>
<td>AADM 755</td>
<td>Community Cultural Planning</td>
</tr>
<tr>
<td>AADM 757</td>
<td>Political Activism in the Arts</td>
</tr>
<tr>
<td>AADM 760</td>
<td>Special Problems in Arts Management</td>
</tr>
<tr>
<td>AADM 775</td>
<td>Technology Management in the Arts</td>
</tr>
<tr>
<td>HRMT 622</td>
<td>Human Resource Administration</td>
</tr>
<tr>
<td>MGMT 680</td>
<td>Leading for Innovation</td>
</tr>
<tr>
<td>VSST 501</td>
<td>Contemporary Art Issues</td>
</tr>
</tbody>
</table>

Total Credits: 45.0

* All Business electives must be approved by advisor and require registration through the MBA office.

Sample Elective Offerings

<table>
<thead>
<tr>
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<tr>
<td>AADM 660</td>
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</tr>
</tbody>
</table>

Arts & Entertainment Enterprise Faculty

Xela Batchelder, PhD (Ohio State University). Assistant Professor. Entertainment and arts management; theater management, touring, presenting and booking.
Jean Brody, DFA (Yale School of Drama) Program Director, Online MS in Arts Administration. Associate Teaching Professor. Arts administration.

Lawrence Epstein, MBA (Cornell University) Interim Department Head, Arts & Entertainment Enterprise. Associate Teaching Professor.

Julie Goodman Hawkins, MFA (Temple University) Program Director, MS in Arts Administration. Assistant Professor. Cultural policy, political activism in the arts, changes in economic and social policy, arts sector changes.

James L. Klein, BA (Oberlin College). Associate Professor. Music technologist, sound and recording engineer, songwriter for film, TV and radio music.

Michelle Manghise, BS (St. John’s University). Assistant Teaching Professor. 25-year veteran of music industry; music publishing, copyright, artist management, entertainment marketing.

Brian Moore, MS, MFA (Drexel University; Louisiana State University) Program Director, BS in Entertainment and Arts Management. Assistant Teaching Professor. Nonprofit organizations: fund development; strategic planning; communications and marketing; and executive management.

John Seay, BMus (James Madison University). Associate Professor. Sound and recording engineer, music technologist, music producer and studio technician.

Cyrille Taillandier Associate Teaching Professor. Recording engineer, music producer and digital editor.

Neville Vakharia, MS (Drexel University) Research Director. Assistant Professor. Technology in the arts, strategic planning and evaluation, management and leadership, innovation and entrepreneurship.

Darren Walters, BA (University of Delaware). Associate Teaching Professor. General Manager of Mad Dragon Records and co-owner and President of Jade Tree, an independent record label.

Andrew Zitcer, MCP (University of Pennsylvania). Assistant Teaching Professor. Arts and community development, community based organizations, governance modes, organizational planning, narrative and social theory.

### Digital Media

**Major:** Digital Media  
**Degree Awarded:** Master of Science (MS) or Doctor of Philosophy (PhD)  
**Calendar Type:** Quarter  
**Total Credit Hours:** 45.0 (MS); 90.0 (PhD, post-bachelor’s); or 45.0 (PhD, post-master’s)  
**Classification of Instructional Programs (CIP) code:** 11.0801  
**Standard Occupational Classification (SOC) code:** 27-1027

### Admission Requirements

#### Master of Science Program

The MS in Digital Media is an advance course of study. A successful applicant for admission will have a baccalaureate degree, a minimum 3.2 undergraduate GPA and assumed production skills in 3-D modeling, animation and interactivity.

Proof of basic competencies is demonstrated by undergraduate transcript and/or portfolio review. For qualified candidates lacking production skills, we offer a series of pre-graduate classes. Satisfactory completion of the classes qualifies one to apply for graduate admission. Pre-graduate classes may include some or all of the following:

- **CS 171** Computer Programming I 3.0  
- **CS 172** Computer Programming II 3.0  
- **DIGM 100** Digital Design Tools 3.0  
- **DIGM 505** Design and Interactivity 3.0  
- **DIGM 506** Animation and Game Design 3.0

For additional information on requirements and how to apply, visit Graduate Admissions at Drexel University (http://www.drexel.edu/grad/programs/westphal).

### Degree Requirements

Students are required to take a Digital Media History, Theory and Methods course and an advanced seminar for a total of six credits, as well as a minimum of nine courses in advanced modeling animation and interactivity.

During the first year, students also take three New Media Project courses (9.0 credits); these courses provide opportunities to work on funded and unfunded research and industry projects under the guidance of a graduate faculty member. With faculty approval, students may also work on personally designed projects relevant to problem solving in a student’s specific area of interest.

In addition, students are required to take 12.0 credits (a minimum of four courses) of directed studies in support of developing knowledge in an area—outside of media and design—to which digital media skills may be applied. This two-year program offers comprehensive studies in advanced digital design including 3D modeling, animation, interactivity, gaming and digital media history, theory and methods. The curriculum for the MS in Digital Media offers a mix of academic course work and project-related activities. Projects consist of funded grant research opportunities, industry-sponsored projects and independent, student-generated and faculty-approved projects.

#### PhD Program

The Digital Media PhD program focuses on translational research in digital media within an experiential learning environment. It studies the application of digital media towards solving research problems in various disciplines including but not limited to engineering, education, cultural heritage, health or business. This doctoral program is built on a fundamentally interdisciplinary course structure and emphasizes an iterative and design based research philosophy.

For more information, visit Drexel’s Graduate Studies in Digital Media (http://www.drexel.edu/westphal/graduate/DIGM) web page.

### Program Options

#### MS in Digital Media

**Degree Requirements**

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applied. The set of directed studies will be determined by the students and their graduate advisors. Possible areas for this focus include, but are not limited to, computer science, information science, bio-medical technology, social science, humanities and education.

Thesis Project

During the second year of study, each student develops and produces a master’s thesis project. By the third week of the fall term students submit a proposal to the Digital Media Graduate Committee. Upon approval of the proposal, the student works toward thesis completion, including:

- an oral presentation to the college
- a written statement to the committee
- a copy of the completed media work for the graduate program archive

The thesis project must demonstrate domain knowledge of the agreed upon classes. The media component of the project must demonstrate expertise in 3D modeling/animation and/or interactivity.

Prerequisite Courses

Students without adequate background in digital media are required to take the following prerequisite courses, which are offered during the summer term. These courses do not count towards the MS in Digital Media degree requirements.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<td>DIGM 506</td>
<td>Animation and Game Design</td>
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Total Credits 6.0

Required Courses

Digital Media Core Courses

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<tr>
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Total Credits 18.0

Directed Research Electives

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Total Credits 6.0

Research Core Courses

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Dissertation

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<td>Digital Media Ph.D. Seminar</td>
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Total Credits 18.0

The Program Requirements Overview

Students applying for admission into the Digital Media PhD program are either post-baccalaureate or post-master’s students. Those who are post-master’s are required to take a minimum of 45.0 credits toward their PhD degree (Research Core). Post-baccalaureate PhD students are required to take a minimum of 90.0 credits (45.0 credits Digital Media Core, and 45.0 credits Research Core).

Prerequisite Courses

Post-baccalaureate PhD students without adequate background in digital media are required to take the following prerequisite courses, which are offered during the summer term. These courses do not count towards the Digital Media degree requirements.

Program Requirements Overview

Students applying for admission into the Digital Media PhD program are either post-baccalaureate or post-master’s students. Those who are post-master’s are required to take a minimum of 45.0 credits toward their PhD degree (Research Core). Post-baccalaureate PhD students are required to take a minimum of 90.0 credits (45.0 credits Digital Media Core, and 45.0 credits Research Core).

Prerequisite Courses

Post-baccalaureate PhD students without adequate background in digital media are required to take the following prerequisite courses, which are offered during the summer term. These courses do not count towards the Digital Media degree requirements.
their respective dissertation projects. No more than 12.0 of the elective research credits can be independent study credits.

**Doctoral Candidacy Committee**

The Department of Digital Media has to establish a Doctoral Candidacy Committee conforming to established university and college rules for dissertation/candidacy committee membership. The purpose of this committee is to conduct and evaluate doctoral candidacy examinations.

**Doctoral Candidacy Exam**

The Doctoral Candidacy Exam consists of a preliminary proposal prepared by the student outlining the dissertation research plan with an oral defense before the Doctoral Candidacy Committee. A student may schedule the preliminary proposal portion whenever she/he and her/his advisor decide they are ready but no later than the end of the fall term of second year of study.

To be considered a doctoral candidate by the university, a student must have both passed the Doctoral Candidacy Exam and completed all 45.0 credits of master level coursework post-baccalaureate or 15 credits coursework post-master. Once the student has reached doctoral candidate status, the Department of Digital Media will review her/his progress annually.

**Dissertation Committee**

Within six months of successful completion of the Doctoral Candidacy Examination the Department of Digital Media has to appoint the student’s Dissertation Committee based on a proposal submitted by the student and the dissertation advisor. The committee has to conform to established university and college rules for dissertation/candidacy committee membership. The committee must have at least five members, three of whom must be tenure-track faculty at Drexel. At least one member must be from outside the Antoinette Westphal College of Media Arts and Design. In addition, at least three members must be Digital Media core faculty. The chair of the committee must be a Digital Media core faculty member who is not also the dissertation advisor of the student.

Once the Dissertation Committee is established, it will continue on throughout the student’s progress toward the PhD degree. The committee’s function is to guide the research and to determine the student's general knowledge of the area, as well as the student's breadth and depth of the specific topic. The committee will also consider the scientific feasibility of the proposed research.

**Dissertation Proposal**

The Dissertation Proposal consists of a written proposal of the dissertation research, a public presentation, and oral proposal defense before the Dissertation Committee. To ensure that students are progressing towards completion of the PhD in a timely fashion, the proposal defense must take place no later than the end of the second year of study. A formal request for an extension of this deadline must be approved following a review of the student's progress.

The purpose of the Dissertation Proposal is to determine if the PhD student is able to initiate, organize, write and defend a scientific idea, which will lead to a PhD dissertation. The presentation will be based on the formal written proposal submitted to the Dissertation Committee at least three weeks before the presentation.

Students who elect to complete the MS in Digital Media alongside the Digital Media PhD degree can submit a revised version of the Dissertation Proposal as a Master Thesis for the partial fulfillment of the MS in Digital Media degree.

**Dissertation Defense**

The written dissertation will be submitted with the dissertation advisor's approval to the Dissertation Committee. A title and abstract of the dissertation must also be provided to the Digital Media office at least three weeks prior to the defense to allow the time and place of the defense to be publicized. The PhD candidate’s public defense consists of his or her presentation of dissertation research followed by an examination by the Dissertation Committee.

**Sample Plan of Study**

Students without adequate background in digital media must complete two prerequisite courses in the summer, prior to beginning the graduate program: DIGM 505 Design and Interactivity and DIGM 506 Animation and Game Design.

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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<tr>
<td>Fall</td>
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<tr>
<td>DIGM 501</td>
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**Total Credit: 45.0**
Sample Plan of Study for Post-Baccalaureate PhD Students

Students without adequate background in digital media must complete two prerequisite courses in the summer, prior to beginning the graduate program: DIGM 505 Design and Interactivity and DIGM 506 Animation and Game Design.

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<tbody>
<tr>
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<td>DIGM 501</td>
<td>New Media: History, Theory and Methods</td>
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<td>DIGM 520</td>
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<td>Advanced Animation I</td>
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<td>DIGM 526</td>
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<td>DIGM 530</td>
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| Directed Research Elective | 3.0 |
| **Term Credits**           | 4.0 |

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Sample Plan of Study for Post-Master Ph.D. Students

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Total Credit: 90.0
### Directors Research Elective

Term Credits: 3.0

**Winter**

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Term Credits: 4.0

**Spring**

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Term Credits: 4.0

**Summer**

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Term Credits: 6.0

**Third Year**

**Fall**

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Term Credits: 4.0

**Winter**

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<td>DIGM 998</td>
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Term Credits: 3.0

**Spring**

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<th>Course Code</th>
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**Total Credit: 45.0**

### Facilities

The Digital Media Program operates several labs including a state of the art combined green screen/motion capture studio as well as 2.5 ton 3-degree-of-freedom motion platform. All labs and classrooms are equipped with powerful Dell and Boxx Technologies Workstations running Windows and Unix operating systems and Mac computers running OS X. Software includes a host of Adobe products and Autodesk 3ds Max and Combustion; Alias Maya; Softimage XSI and Behavior, Pixar RenderMan Pro Server along with RenderMan Artist Tools for Maya and RenderMan for Maya; Pixologic Z-Brush; Apple Shake; MotionBuilder; GarageGames; NextLimit RealFlow, and SideEffect's Houdini.

### Digital Media Faculty

Frank J. Lee, PhD (Carnegie Mellon University). Associate Professor. Human-computer interaction; cognitive engineering and science; intelligent software agents for games and education.

### Interdepartmental Faculty

Ted Artz, BFA (Tyler School of Art, Temple University). Associate Professor. Digital media.

Paul Diefenbach, PhD (University of Pennsylvania) Associate Program Director, Game Art & Production. Assistant Professor. Game development, real-time rendering.

Jeremy Fernsler, BA (Pennsylvania State University). Assistant Teaching Professor. Digital effects artist; compositor and animator for the feature film visual effects industry.

Troy Finamore, MS (Drexel University) Associate Program Director, Interactive Digital Media. Assistant Teaching Professor. Advertising, design and interactivity.

Nick Jushchyn, MFA (Academy of Art University) Associate Program Director, Animation and Visual Effects. Visual effects, digital media and animation.

David Mauriello, BA (Lafayette College). Assistant Professor. 3D modeling and animation.

Glen Muschio, PhD (Temple University). Associate Professor. Digital media, society, communication.

Jervis Thompson, BS (Drexel University). Associate Teaching Professor. Digital media, interactive multimedia.

Michael Wagner, PhD (Vienna University of Technology) Program Director, Digital Media. Associate Professor. Educational use of digital media and computer games.

Jichen Zhu, PhD (Georgia Institute of Technology). Assistant Professor. Developing humanistic and interpretive framework of computational technology, particularly artificial intelligence (AI), and constructing AI-based cultural artifacts; interactive storytelling, games and software studies.

### Fashion Design

**Major: Fashion Design**

**Degree Awarded:** Master of Science (MS)

**Calendar Type:** Quarter

**Total Credit Hours:** 63.0

**Classification of Instructional Programs (CIP) code:** 50.0407

**Standard Occupational Classification (SOC) code:** 27-1022

### About the Program

The MS in Fashion Design is a full-time program that stresses the development of the aesthetic and philosophical concepts of fashion design and the technical skills to support research and experimentation in these concepts. A typical graduate sequence may consist of seven terms of graduate courses and five terms of prerequisite coursework, beginning with the summer term accelerated design and drawing courses.

The goal of the MS program in fashion design is to integrate the understanding of design with the construction of clothing so that the final products answer physical, aesthetic, psychological, and social needs within the context of contemporary fashion and industrial limitations. The curriculum is structured so that studio, laboratory, and classroom work give the graduate student a directed experience in the study of aesthetics, criticism, and contemporary art concepts; contemporary and historic art and design; traditional and current fashion technology; the discipline of drawing; and the making of art. A required industry internship affords the graduate student direct experience in a workplace of their choice. This comprehensive approach provides the basis for a broad range of employment in the fashion industry and in education. Other professional opportunities lie in merchandising, costume design, curatorial work, and computer-aided design.
The faculty of the Department of Design includes art historians, CAD specialists, designers, fiber artists, merchandising specialists, new materials and processes researchers, painters, and sculptors. The department also draws on practicing professionals as adjunct professors for specialized coursework and for critique of student work.

A limited number of graduate assistantships are available to students after completing the first year.

The Fashion and Design & Merchandising programs produce a professionally juried annual fashion show which provides competitive fashion industry and department awards and excellent exposure for the graduate students’ design thesis. Drexel’s students participate in the activities of the Fashion Group of Philadelphia, the local chapter of an international fashion industry organization. Students may also join the Fashion and Design Student Organization and attend trips to fashion events in New York City.

The 63.0 graduate quarter credits does not include any of the required prerequisite coursework. See the Admission Requirements for a list of courses students are expected to have completed prior to beginning their graduate study.

**Additional Information**
For more information about this program, please contact the Program Director:
Kathi Martin
martink@drexel.edu

**Admission Requirements**
Students enter the program from diverse backgrounds, including liberal arts, fine arts, and business. A personal interview is required. The admission criteria for the graduate program consist of the requirements of the University for graduate admission plus satisfaction of undergraduate admission criteria for the graduate program consist of the requirements of arts, fine arts, and business. A personal interview is required. The University for graduate admission plus satisfaction of undergraduate admission criteria for the graduate program consist of the requirements of arts, fine arts, and business. A personal interview is required. The admission requirements for this program include:

- **Prerequisite Undergraduate Coursework**
  - ARTH 335 [WI] History of Costume I: Preclassical to Directoire (p. 237) 3.0
  - ARTH 336 [WI] History of Costume II: Directoire to World War I (p. 237) 3.0
  - FASH 201 Survey of the Fashion Industry 3.0
  - FASH 210 Presentation Techniques in Fashion 3.0
  - FASH 211 Fashion Drawing I 3.0
  - FASH 212 Fashion Drawing II 3.0
  - FASH 230 Textiles for Fashion Design 3.0
  - FASH 241 Construction Skills 4.0
  - FASH 251 Fashion Design I 4.0
  - FASH 341 Flat Pattern Design 4.0
  - FASH 342 Draping Design 4.0
  - FASH 343 Tailoring and Design 4.0
  - VSST 104 Accelerated Design I* 2.0
  - VSST 105 Accelerated Design II* 2.0
  - VSST 106 Accelerated Design III* 2.0
  - VSST 110 Introductory Drawing 3.0
  - ARTH 335 [WI] History of Costume I: Preclassical to Directoire 3.0
  - ARTH 336 [WI] 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 3.0
  - FASH 211 Fashion Drawing I 3.0
  - FASH 212 Fashion Drawing II 3.0
  - FASH 230 Textiles for Fashion Design 3.0
  - FASH 241 Construction Skills 4.0
  - FASH 251 Fashion Design I 4.0
  - FASH 341 Flat Pattern Design 4.0
  - FASH 342 Draping Design 4.0
  - FASH 343 Tailoring and Design 4.0
  - VSST 104 Accelerated Design I* 2.0
  - VSST 105 Accelerated Design II* 2.0
  - VSST 106 Accelerated Design III* 2.0
  - VSST 110 Introductory Drawing 3.0
  - ARTH 335 [WI] History of Costume I: Preclassical to Directoire 3.0
  - ARTH 336 [WI] 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 3.0
  - FASH 211 Fashion Drawing I 3.0
  - FASH 212 Fashion Drawing II 3.0
  - FASH 230 Textiles for Fashion Design 3.0
  - FASH 241 Construction Skills 4.0
  - FASH 251 Fashion Design I 4.0
  - FASH 341 Flat Pattern Design 4.0
  - FASH 342 Draping Design 4.0
  - FASH 343 Tailoring and Design 4.0
  - VSST 104 Accelerated Design I* 2.0
  - VSST 105 Accelerated Design II* 2.0
  - VSST 106 Accelerated Design III* 2.0
  - VSST 110 Introductory Drawing 3.0

The 63.0 graduate quarter credits does not include any of the required prerequisite coursework. See the Admission Requirements for a list of courses students are expected to have completed prior to beginning their graduate study.

**Degree Requirements**
The two years of full-time graduate coursework combine four terms of faculty-directed studio work in fashion design and two terms of student-directed independent studio work with required courses in design, aesthetics, and the art process. Elective coursework in fashion or specific topics; advanced studies in art, computer-aided design, art history, and fashion design; and independent studies allow individual flexibility in curriculum design.

Graduate Problems in Fashion Design I and II (FASH 865 and FASH 866) emphasize the development of an original statement of design intent, allowing students to synthesize their academic experiences and prepare for the marketplace. Each graduate student develops his or her personal collection which is then produced and presented in a professional fashion show.

Professional Portfolio (FASH 864) is a capstone course in which students create a professional quality collection of drawings geared to their market preferences.

Students are required to participate in at least three national and international fashion design competitions (FASH 899). These competitions provide awareness of world-wide design sensibilities and the overall level of competition in various facets of the marketplace.

The fashion industry internship (FASH 600) promotes spirit of entrepreneurship and provides perspective on success in the fashion industry. A full-time ten week position in industry is required and provides experience in design and production processes.

**Required Courses**

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<thead>
<tr>
<th>Code</th>
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<tbody>
<tr>
<td>ARTH 530</td>
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<td>FASH 615</td>
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</tr>
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<td>FASH 616</td>
<td>Computer Aided Design for Fashion Design</td>
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<td>FASH 628</td>
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<td>FASH 766</td>
<td>Fashion Business Topics</td>
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<td>FASH 864</td>
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<td>Problems in Fashion Design Phase I</td>
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<td>Problems in Fashion Design Phase II</td>
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<tr>
<td>FASH 899</td>
<td>Comprehensive Examination in Fashion Design</td>
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Select two of the following: 6.0

- FASH 617 Technical Design
- FASH 625 Principles of Flat Pattern and Draping
- FASH 750 Machine Knitting
- FASH 751 Accessory Design
- FASH 752 Millinery Design
- FASH 754 Advanced Fashion Drawing
- FASH 767 Style and the Media
- FASH 799 Special Topics in Fashion Design

**Total Credits: 63.0**

### Sample Plan of Study

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<td>Tailoring 3.0</td>
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<tr>
<td>FASH 765</td>
<td>Fashion Presentation 3.0</td>
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<td>History of Modern Design 3.0</td>
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<td>FASH 616</td>
<td>Computer Aided Design for Fashion Design 3.0</td>
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<td>Fashion Design B 3.0</td>
</tr>
<tr>
<td>Term Credits</td>
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</table>

### Term Credits

- Term 7: 3.0
- Term 8: 3.0
- Term 9: 3.0

**Total Credit: 63.0**

### Facilities

The open design of the URBN Center studio spaces fosters collaboration across our diverse design, media and art disciplines. It provides spaces where students can see what their classmates are creating; where making labs can be shared by students from many majors; and where creative connections can be made.

All majors in the college integrate use of discipline-specific and general use software in the 35 computer labs at Drexel’s Westphal College of Media Arts & Design which house over 550 computers (Apple iMacs, Apple MacPros, BoxxTech, Dell, and HP). Also available within our college are five premier Music Industry recording studios and a motion capture/green screen compositing space. The Hybrid Lab contains traditional metal and woodworking machines as well as a rapid prototyper, a laser cutter, and access to a 3D router for multi-disciplinary design and product making. In The Shima Seiki Haute Technology Laboratory students experiment with production methods that advance the field of wearable technology using sixteen SDS-ONE APEX3 workstations, three state-of-the-art knitting machines.

The Robert and Penny Fox Historic Costume Collection (http://www.drexel.edu/westphal/resources/FHCC) (FHCC), one of the finest teaching collections in the United States, is an educational resource for the students of Drexel University. Our mission as a University-based collection is to educate and inspire, while providing a significant resource for an ever-expanding community of historians, scholars, artists, and designers. Westphal College’s new URBN Center facility has greatly improved the accessibility and visibility of the FHCC and allowed us to honor A. J. Drexel’s original educational intent in taking a leadership role in research and scholarship, while preserving the collection for future generations. The Charles Evans Library contains books, periodicals, DVDs and other sources of inspiration for the fashion student.

The fourth floor of the Academic Building is occupied by a 10,000-square-foot photography lab, lighting studios, and two digital imaging labs. It offers professional-quality equipment in a comfortable working environment.

Film and video facilities include two fully equipped television studios; digital editing facilities; video-editing suites; film editors; and specially outfitted multimedia rooms for all courses. Loan equipment available to students includes digital video cameras; Bolex, Gizmo and Arriflex film...
cameras; and field lighting and audio equipment. Additionally, the college operates a cable television station reaching over 400,000 households.

The music industry major’s digital audio labs and recording studios in MacAlister Hall and University Crossings offer opportunities for the creation, modification, analysis, and recording of sound and music using analog and digital media.

The Mandell Theater (http://www.drexel.edu/westphal/resources/MandellTheater/Facilities) provides a 420-seat proscenium theater with scene shop, dressing rooms, and costume shop. Costume is taught with primary source material from Drexel’s 7,000-piece Historic Costume Collection (http://www.drexel.edu/westphal/resources/FHCC).

The Ellen Forman Memorial Dance Studio, adjacent to the Mandell Theater is the primary studio for the Dance major.

In University Crossings, a 25,000 square foot space houses offices for film, video, screenwriting, and playwriting faculty as well as two state-of-the-art digital editing facilities, a shooting and motion capture studio with special effects capability, two screening rooms, several multimedia classrooms, a laboratory for game development and research, laboratories for other digital media purposes and for music industry, and a well-stocked equipment room.

**Fashion, Product Design & Merchandising Faculty**

Kristen Ainscoe, BS (Drexel University). Assistant Teaching Professor. Visual merchandiser; merchandise management.

Catherine Byers, MA (American University). Assistant Teaching Professor. Journalism; marketing and communications.

Nick Cassway, BFA (Tyler School of Art). Assistant Teaching Professor. Curating; experimental portraiture; computer design.

Anne C. Cecil, MA (University of the Arts) Program Director, Design & Merchandising. Teaching Professor. Web designer, product designer, merchandising and artist.

Renee Weiss Chase, MS (Drexel University). Professor. Fashion designer; computer-aided design systems for the fashion curriculum.

Anita Dennis, AST (Art Institute of Philadelphia) Fashion Laboratory Technician. Assistant Teaching Professor. Fashion designer and technician; construction skills.

Genevieve Dion, MFA (University of the Arts). Assistant Professor. Industrial designer, wearable artist, new materials technology research.

Michael Glaser, MFA (Ohio State University) Program Director for Product Design. Assistant Professor. Quantifying the designer's intuition; the interplay between digital and physical forms; human desire to shape our surroundings.

Cynthia Golembuski, MS (Drexel University) Associate Program Director, Fashion Design. Assistant Teaching Professor. Fashion designer, illustrator, computer aided design.

Roberta Hochberger Gruber, MS (Drexel University) Head of the Fashion and Product Design & Merchandising Department. Associate Professor. Fashion designer and illustrator; wearable artist, merchandiser, special events.

Joseph H. Hancock, II, PhD (Ohio State University). Associate Professor. Apparel merchandising, textiles and clothing, culture and marketing strategies.

Lisa L. Hayes, BFA (Syracuse University) Program Director, Fashion Design. Associate Professor. Fashion designer, product designer, pattern design.

Jan Marshall, BA (Long Island University). Assistant Teaching Professor. Fashion designer, knitter, product development, fashion analysis.

Kathi Martin, MSIS (Drexel University) Associate Director of the Graduate Program in Fashion Design. Associate Professor. Fashion and textile designer; textile artist; computer-aided design, best practices online databases and graphic interfaces for fashion and historic costume, virtual characters for fashion design.

Alphonso McClendon, MS (Drexel University). Assistant Professor. Fashion designer, textile designer, computer aided design.

Beth Phillips, MS (Georgetown University). Associate Teaching Professor. Business and international marketing, linguist, analysis of products.

Juanita Phillips, BS (Drexel University). Assistant Teaching Professor. Fashion designer and educator.

Clare Sauro, MA (Fashion Institute of Technology) Curator of the Drexel Historic Costume Collection. Assistant Teaching Professor. Museum studies: costume and textiles.

**Interior Architecture and Design**

**Major: Interior Architecture and Design**

**Degree Awarded: Master of Science**

**Calendar Type: Quarter**

**Total Credit Hours: 69.0**

**Classification of Instructional Programs (CIP) code: 50.0408**

**Standard Occupational Classification (SOC) code: 17-1011; 27-1025**

**About the Program**

The Master of Science program in Interior Architecture & Design at Drexel is an internationally recognized CIDA accredited First Professional MS degree that prepares students of diverse undergraduate backgrounds to become leaders in the field of interior design. Through an integrated studio approach, coursework teaches application of design concepts, technical information and hands-on skills to create a range of public, commercial, residential and institutional spaces. Students learn to transform space to address aesthetic, social, physical and psychological needs. In conjunction with the integrated studio, the program emphasizes independent research culminating in a master's thesis. The Master of Science program in Interior Architecture & Design was recently ranked 7th in the nation by DesignIntelligence, America’s Best Architecture & Design Programs 2014.

Comprised of 69.0 graduate credits, most students complete the MS Interior Architecture & Design program in two to three years, depending upon individual student backgrounds and the completion of all necessary prerequisites.

**Student Background**

MS Interior Architecture & Design students come to the program with undergraduate degrees in a wide variety of fields. With more than 90% of the applicants having backgrounds in a non-design related field and
on average 10% being international students, the graduate student body brings rich and diverse life and cultural experiences to the Department and the College. Open mindedness and the desire and commitment to acquire knowledge through various avenues ensure that all students enrich the exchange of ideas and professional development.

Professional Opportunities
Alumni are principals of their own interior design firms, project managers in major design and architectural firms, facilities managers, and design coordinators. About one-third of the students obtain entry-level employment before graduation from the program; within five years, many hold managerial positions.

Professional exposure occurs in exchanges with practitioners through professional jurying of all major student projects. Students are also encouraged to become members of local, national, and international interior design professional organizations.

For more information, visit Drexel’s Graduate Studies in Interior Architecture & Design (http://www.drexel.edu/westphal/academics/graduate/interiordesign) web page.

Admission Requirements
Admission criteria for the graduate program consist of the requirements of the University for graduate admission plus satisfaction of basic interior design undergraduate coursework. These prerequisites include courses in design, drawing, and art history.

Prerequisite Undergraduate Coursework

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<tr>
<th>Course</th>
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<tr>
<td>ARTH 103</td>
<td>History of Art: Early to Late Modern</td>
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<td>VSST 104</td>
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<td>VSST 105</td>
<td>Accelerated Design II</td>
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<td>VSST 106</td>
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<td>VSST 110</td>
<td>Introductory Drawing</td>
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<td>INTR 160</td>
<td>Visualization I: Computer Imaging</td>
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<tr>
<td>INTR 200</td>
<td>History of Modern Architecture and Interiors</td>
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<td>INTR 220</td>
<td>Visualization II: Orthographic</td>
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<td>INTR 300 [WI (p. 240)]</td>
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<td>INTR 305 [WI (p. 240)]</td>
<td>Visual Culture: Furniture</td>
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* Or VSST 101, VSST 102, VSST 103 (Design I, II, III; 12.0 credits).

The program begins in the summer term with three terms of prerequisite coursework that prepares candidates for the graduate coursework. A portfolio review or evaluation by the Associate Director of the Interior Architecture & Design program determines what prerequisites have been satisfied. Contact the Graduate Studies in Interior Architecture & Design (http://www.drexel.edu/westphal/academics/graduate/interiordesign) for specific information about prerequisites or to make an appointment for review and evaluation.

For additional information on requirements and how to apply, visit Graduate Admissions (http://www.drexel.edu/grad/programs/westphal/interior-architecture-and-design) at Drexel University.

Degree Requirements
The full-time graduate coursework combines seven terms of faculty-directed coursework in interior design, including a student-initiated thesis.

The 69.0 credits that make up the graduate requirement include a visual studies sequence as well as elective coursework in the following areas: interior design seminars on specific topics; advanced studies in art, art history, and interior design; and independent studies. This allows individual flexibility in curriculum design.

Required Courses

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Visual Studies

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IAD Seminars

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<td>INTR 863</td>
<td>Advanced Digital Methods</td>
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Thesis

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Comprehensive Exam

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>INTR 899</td>
<td>Comp Exam for Interior Design +</td>
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Graduate Review

Total Credits 69.0

* INTR 899 consists of two components: a series of sketch problems and design competitions that must be completed during the two + graduate years and a faculty review of a portfolio presentation of a body of student-selected work.

Facilities

The interior design program is housed in the new URBN Center, a state of the art design and arts facility on Drexel’s campus. The URBN Center officially opened in September 2012. A hub for creative minds to gather, share ideas and work together to bring those ideas from the mind to the
page, and into the world of tomorrow, interior students benefit from a wide-range of resources including interior design studios, the interior design resource library, a hybrid making lab, and state-of-the-art computer laboratories. College lab equipment includes scanners, printers, plotters, laser cutters, 3-d printers, computer/video projection systems and other peripheral devices as appropriate to each major.

The URBN Annex houses a black box theater, screening room and the Leonard Pearlstein Gallery. Additional studio and classroom space in the Peck Problem Solving and Research Center and the Design Arts Annex accommodate photography, basic design, painting, sculpture and a large woodworking shop with industrial-quality equipment. The woodshop is available for use by students for three-dimensional coursework or individual projects.

Philadelphia, one of the nation's major design centers, gives interior design students the vitality of the contemporary arts at local galleries; easy access to many museums, libraries, renowned buildings, and access to the resources of The Marketplace, as well as design centers located in New York City and Washington, D.C.

Architecture + Interiors Faculty

David Ade, AIA, BArch (Drexel University). Adjunct Associate Professor. Principal, SMP Architects.

Dr.-Ing. Ulrike Altenmüller-Lewis, AIA, Dr.-Ing., (Bauhaus Universität Weimar) Program Director. Assistant Professor. Research on educational environments; translations of architectural theory texts. Design studios, lectures and seminar courses.

Stephen Bonitatibus, AIA, MArch (University of Pennsylvania). Adjunct Professor. Principal, Bonitatibus Associates.

Mark Brack, PhD (University of California at Berkeley). Associate Professor. British and American architecture from 1700 to the present; Hispanic colonial architecture in the American Southwest; vernacular architecture; historic preservation.

Michael Burns, RA, BArch (Drexel University). Adjunct Associate Professor. Principal, Michael Burns Architects.

Jon Coddington, AIA, MArch (University of Pennsylvania) Department Head, Department of Architecture + Interiors. Professor. Architecture, urban design and planning.

Rena Cumby, BArch, MS (Drexel University) Associate Department Head of the Department of Architecture + Interiors. Associate Professor. Interior designer; foundation studies and design education.

Eugenia Ellis, PhD (Virginia Polytechnic State University). Associate Professor. Registered architect; interior design, extended-care facilities design, research on spatial visualization, perception and imagination.

Jeff Fama, MArch (State University of New York at Buffalo). Adjunct Associate Professor. Retail, entertainment, and theater design. Graduate interiors thesis advisor.

Gary Garofalo, BS Arch Eng (Pennsylvania State University). Adjunct Assistant Professor. Principal Lighting Design Collaborative. Lighting expert. Lighting design.

Don Jones, AIA, MArch (University of Pennsylvania). Adjunct Professor. Ewing Cole.

Nicole Kollick, MArch (University of California). Assistant Professor. Researching possibilities for architecture and design through the use of unexpected and innovative interdisciplinary models. Foundation design studios, fabrication and technology seminars.

Karin Kuenstler, MS (Bank Street College of Education and Parsons). Associate Professor. Interior designer; interior design for corporate and commercial facilities, history of corporate interiors, fiber art.

Maria Kuttruff, MS (Drexel University), Adjunct Assistant Professor. Residential interior design. Design studios.

Diana S. Nicholas, AIA, MFA (University of the Arts, Philadelphia). Assistant Teaching Professor. Principal of Switched on Design. Design studios, analog and digital visualization.

Karen Pelzer, BS (Drexel University) Associate Director of the MS in Interior Architecture and Design Program. Assistant Teaching Professor. Interior designer, hospitality design. Design studios.

Marilynne L. Rose, MS (Drexel University). Associate Teaching Professor. NCIDQ interior designer; residential and commercial design. Design studios, lecture and seminar courses.

Debra Ruben, MS (Drexel University). Associate Professor. NCIDQ, Interior designer; residential and commercial design. Research on user participation and the design process.

Paul Salvaggio, AIA, BArch (Pennsylvania State University). Adjunct Assistant Professor. Principal, Arcus Design Group. Foundation design studios.

Joseph Scanlon, BArch (Drexel University). Adjunct Professor. Foundation design studios.


Virginia Smith, MS (Drexel University). Adjunct Associate Professor. Exhibit/graphic design, interior design, interior and architectural visualization.

Erik Sundquist, MArch (Florida International University) Director of the Hybrid Making Lab of AW CoMAD. Assistant Teaching Professor. Design studios, analog and digital architectural representation and fabrication.


Simon Tickell, AIA, MArch (University of Pennsylvania) Associate Director of the Architecture Evening Program. Associate Teaching Professor. Design studios and professional practice/electives; educational and museum buildings.


Ada Tremonte, BS (Drexel University) Associate Director of the BS Program in Interior Design. Assistant Teaching Professor. NCIDQ Interior designer, corporate/commercial design. Design studios, lecture and seminar courses.
Frank de Santis, AIA (Yale University). Assistant Teaching Professor. Design studios, analog and digital architectural representation.

Emeritus Faculty

Judith Bing, MArch (Yale University). Professor Emeritus. Design studios, lecture and seminar courses.

Sylvia Clark, MArch (University of Pennsylvania). Professor Emeritus.


Marjorie Kriebel, B.Arch (University of Pennsylvania). Professor Emeritus.

Museum Leadership

Major: Museum Leadership
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 30.1401
Standard Occupational Classification (SOC) code: 25-4011; 25-4012; 25-4013

About the Program

At the beginning of the 20th century museums were primarily keepers of things—their collections—and were thought of primarily as repositories of knowledge. Over the course of the century the American museum has changed. While collections remain at the core of their missions, museums have focused more and more on their educational roles, their communities and their audiences. The internet and digital technology are challenging museums to rethink how they operate, re-evaluate how they use their collections and the nature of their audiences.

Drexel University’s MS in Museum Leadership program prepares students for a range of management and leadership roles that are essential to the integrity and health of today’s museums. Students study the philosophy and history of leadership in cultural institutions, incorporating theory and practice from the museum field as well as business, government, and other non-profit organizations. The program examines the process of creating new museums as well as expanding existing museums. Students learn the variety of roles required to run the contemporary museum, including curators, conservators, registrars, educators, programmers, audience development, fundraising, board members and volunteers.

Taking advantage of various departments and programs across Drexel University, such as The Academy of Natural Sciences of Drexel University (http://www.anfsp.org), as well as other regional museums, the program includes hands-on participation in learning laboratories during practicum experiences and other opportunities. Importantly, the program encompasses the full range of museums—art, history, science, archaeology, zoos, aquariums, arboretums, historic houses, children’s, and folklore— as well as covering both USA and international museum practices.

Goals and Objectives

Drexel’s Museum Leadership program will prepare leaders who enable museums to fulfill their missions of stewardship and education. These leaders will develop a knowledge and skill base to steer tomorrow’s museums.

Graduates of the program will be prepared:

• To lead museums that preserve, present and critically interpret the knowledge and heritage of diverse human societies and identities;
• To lead museums that will achieve financial security and stability;
• To address the changing nature of museums, including expanding new technologies, educational and community outreach goals, changing demographics, and a changing political and funding environment;
• To build museums that address changing public expectations of the museum experience, including responsiveness to their diverse communities as well as a more participatory visitor experience;
• To contribute to a museum workforce that is culturally rich, representing the full diversity of each museum’s surrounding community;
• To engage with the full spectrum of their local communities as well as a national and international community of museums and museum-goers.

Additional Information

For additional information about this program, contact:

Dr. Danielle Rice
Director, Museum Leadership Program
URBN Center, 210G
Danielle.rice@drexel.edu

Degree Requirements

Required Courses

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<tr>
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<td>Financial Accounting for Non-Profit Arts Organizations</td>
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<td>AADM 650</td>
<td>Fund Development for the Arts</td>
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<td>INFO 748</td>
<td>Museum Informatics</td>
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<td>MUSL 500</td>
<td>Museum History and Philosophy</td>
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<td>Museum Leadership</td>
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<td>MUSL 530</td>
<td>Inside the Museum</td>
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<td>MUSL 710</td>
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<td>Museum Leadership Practicum I</td>
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<td>MUSL 500</td>
<td>Foundations of Informal Education in Museum Settings</td>
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<td>AADM 660</td>
<td>International Cultural Policy</td>
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<td>AADM 670</td>
<td>Audience Development</td>
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<td>AADM 680</td>
<td>Trends in Fund Development</td>
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<td>AADM 710</td>
<td>Strategic Planning and Evaluation</td>
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<td>AADM 731</td>
<td>Human Resources Management in the Arts</td>
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<td>AADM 753</td>
<td>Visual Arts Organization Management</td>
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<td>AADM 754</td>
<td>Museum Management</td>
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<td>AADM 759</td>
<td>Cultural Organizations in Transition</td>
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<td>INFO 552</td>
<td>Introduction to Web Design for Information Organizations</td>
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<td>INFO 643</td>
<td>Information Services In Organizations</td>
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<tr>
<td>MUSL 630</td>
<td>Exhibitions and Programming</td>
</tr>
<tr>
<td>MUSL 640</td>
<td>The Museum in the Community</td>
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Admission Requirements

In addition to meeting the general requirements for admission to graduate studies at Westphal College of Media Arts and Design, applicants should present a resume demonstrating a strong affinity for the field through work, volunteer experiences, education or special training.

Preparation must include at least one undergraduate level course in financial accounting, two courses in any field related to museum practice, and/or two years’ professional or board level experience with a museum. Students entering the program without the required undergraduate accounting course must complete the pre-requisite within the first two terms of matriculation.

Applicants must have a minimum 3.0 GPA in their undergraduate work, and for international students whose first language is not English, the minimum TOEFL score is 90/577.

For additional information on requirements and how to apply, visit Graduate Admissions at Drexel University (http://www.drexel.edu/grad/).
Anne-Marie Obajtek-Kirkwood, PhD (University of Pennsylvania). Associate Professor. French and francophone 20th and 21st century literature, culture and film. Representations of the Occupation (WWII); war; minorities in France; autobiography; feminist issues.

Joel E. Oestreich, PhD (Brown University) Director of International Area Studies. Associate Professor. International organizations, international finance, development, and human rights.

Marilyn Gaye Piety, PhD (McGill University). Associate Professor. History of philosophy, philosophy of religion, critical reasoning, Kierkegaard.

Simone Schlichting-Artur, EdD (University of Pennsylvania) Senior Assistant Dean of Global Initiatives. Teaching Professor. International business communication (Germany and the U.S.), public health policy and languages, German post-war history through film and literature, development of writing assessment tools for German minor.

Natsumi Shor, MA. Assistant Teaching Professor. Business and professional Japanese; Japanese film and culture; interrelation between Japanese language to the nation's culture and thought.

Interdepartmental Faculty

Anne C. Cecil, MA (University of the Arts) Program Director, Design & Merchandising. Teaching Professor. Web designer, product designer, merchandising and artist.

George Ciccariello-Maher, PhD (University of California, Berkeley). Assistant Professor. Colonialism, social movements, political theory.

Rose Corrigan, PhD (Rutgers University). Associate Professor. Women, public law, American politics and policy.

Christian Hunold, PhD (University of Pittsburgh). Associate Professor. Environmental policy; comparative politics; political theory.

Gabriella Ibieta, PhD (City University of New York). Associate Professor. Comparative literature; Cuban and Latin American fiction.

Emmanuel F. Koku, PhD (University of Toronto). Associate Professor. Social network analysis; qualitative/quantitative research; medical sociology; social epidemiology; social demography; sociology of development; communication and information technology; community and urban sociology.

Christopher A. Laincz, PhD (Duke University) Department of Economics and International Business. Associate Professor. Economic development, technological change, and growth, industrial organization, macroeconomics and monetary economics.

Usha Menon, PhD (University of Chicago). Associate Professor. Self, identity & personhood, emotional functioning, Hindu morality, gender relations in Hindu society, adult development, popular Hinduism, post-colonial feminism, Hindu religious nationalism and Islamic radicalism.

Julie Mostov, PhD (New York University) Vice Provost for Global Initiatives. Professor. Modern political thought, democratic theory, nationalism, gender studies, South Eastern Europe and the Balkans.

Emilie S. Passow, PhD (Columbia University) Director, Certificate Program in Medical Humanities. Associate Teaching Professor. Judaic studies; medical humanities; nineteenth-century British literature.

Rakhmial Peltz, PhD (Columbia University, Linguistics; University of Pennsylvania, Biological Sciences) Director of Judaic Studies Program. Professor. Sociolinguistics, ethnography of communication, social history of Yiddish language and culture, Yiddish culture of Eastern Europe, language planning, language and ethnic identity, language and group memory, aging and ethnicity, history of urban neighborhoods.

Abioseh Porter, PhD (University of Alberta, Canada) Department Head, English and Philosophy. Professor. Comparative literature; postcolonial literatures; Editor, JALA, Journal of the African Literature Association.

Robert Powell, PhD (Temple University). Assistant Teaching Professor. Early and Middle Bronze Age Crete; archaeoastronomy; early state formation; archaeology and anthropology of frontiers; mass communication.

Rachel R. Reynolds, PhD (University of Illinois at Chicago). Associate Professor. Sociolinguistics, ethnography of communication, intercultural communication, globalization and the rhetoric of community; political economy of immigration, race and ethnicity, new African immigrants in the United States, Igbo studies.

Wesley Shumar, PhD (Temple University) Department Head, Anthropology. Professor. Ethnography of cyberspace, online learning communities, political economy of higher education, globalization, activity theory, semiotics, critical realism, psychoanalysis, identity and the self.

Judith Storniolo, PhD (University of Pennsylvania). Teaching Professor. Historical and comparative linguistics, Mesoamerican languages and culture, applied anthropology, public policy, oral traditions and narratives, ideology and ritual, Mesoamerican ethnohistory; and pre-Columbian literature.

Alden Young, PhD (Princeton University) Director of the Program in Africana Studies. Assistant Professor. African history; economic history and the history of Arab and African interactions.

Jennifer Yusin, PhD (Emory University). Associate Professor. Postcolonial literature; trauma theory; literary theory; psychoanalysis, and memory studies in contemporary literature in English.

Paul F. Harron Television Management Program

Major: Television Management
Degree Awarded: Master of Science (MS); Master of Science/Master of Business Administration (MBA)
Calendar Type: Quarter
Total Credit Hours: 49.0 (MS) or 79.0 (MS/MBA)
Classification of Instructional Programs (CIP) code: 09.0701
Standard Occupational Classification (SOC) code: 27-2012

About the Program

The Paul F. Harron Graduate Program in Television Management will celebrate its tenth anniversary in academic year (AY) 2014-2015. The program draws a global student body, and its graduates hold responsible positions in top media companies around the world.

In September 2015 we will launch the online version (http://www.drexel.com/online-degrees/business-degrees/television-management/) of the graduate on-campus program.
The Paul F. Harron Television Management program offers two approaches to graduate study: the MS in Television Management and the dual MS/MBA degree option.

The stand-alone MS degree prepares students with a solid grounding in business management and specialized courses in the management of television and converged media. The program integrates business course content with current practice in the television industry. Students interact with working professionals on campus and in the field through internships. Course content includes programming analysis and strategy, media analytics and audience measurement, structural analysis of media industries, scope and methods of the field, media finance, social media and television, media sales models and practice, media law and ethics, telecommunications policy and public interest law, field internships, and topical electives.

The dual degree option includes a full MBA. Students in both programs gain hands-on management experience through internships in broadcast television stations and networks, cable companies, independent production companies and evolving media hybrids that operate in the region and beyond. The program combines practical and academic experience, including courses designed to challenge students to discover the critical interplay between creative process and the business skills required to manage successful media companies.

About the Curriculum

The television industry is undergoing a radical transformation, the signs of which are everywhere to be found. You don't have to search the trades, academic, or popular press for very long to discover that the converged world of television has undergone a sea change in the face of new revenue models, rapidly changing telecommunications policy, transformative technology, shifting audience loyalties, dynamic delivery platforms, and a volatile national and global marketplace: Big Data, Netflix, Roku, Apple TV, Amazon Prime, the challenge of Aereo, Blufin Laboratories, traditional media transformations, social media begetting social television, broadcast TV incentive auctions, retransmission consent, net neutrality, backbone networks, edge and broadband providers, end users, neuro-marketing and biometrics, Google Glass, Oculus Rift Virtual Reality goggles, wearable technologies, OLED screens, 4k and 8k video projection, streaming media, WIMAX and Wi-Fi...the list of change agents affecting the legacy television industry is much longer than this. But the impact is clear: television has changed, is changing and will continue to change; and our students will become the next generation of change agents.

Today's television and media industries are some of the most competitive and fastest growing in the world, and this has created new opportunities for those who can manage, market and create for the world of converged media. The Paul F. Harron Graduate Program in Television Management offers two graduate study options to prepare students for the demanding television and media industries: the MS in Television Management and the dual MS/MBA.

The stand-alone MS degree offers a solid grounding in business management and specialized courses in the management of television and evolving media hybrids. The dual MS/MBA option allows students to integrate business course content with the practices of television and new media industries, and provides graduates the advantages of also having the renowned Drexel MBA.

Ultimately, we believe the way people learn is by doing. Students engage in hands-on management experience through internships at broadcast television stations and networks, multi-channel video programming distributors, streaming media and evolving web companies, independent production companies, and emerging media hybrids in the region and beyond. The program combines practical and academic experience in courses such as Audience Measurement, TV Programming, Structure of TV Organizations, Media Law, Media Sales, Media Ethics, Money and the Medias, Social TV, Emerging TV Technologies and TV Production. Students gain hands-on management insights through simulations in retransmission consent negotiation, technology management, contract negotiation, and debate around technology assessment. These courses challenge participants to discover the critical interplay between creative process and the business skills required to manage successful media companies.

Program Features

Features of the program include the availability of Fellowships and Graduate Assistantships, flexible scheduling with part-time and full-time options, evening classes, rolling admissions (allowing students to start in any term, including summer) as well as professional internships. Philadelphia is the fourth largest television market and home to Comcast, Banyan Productions, Center City Video, Shooters, broadcast network affiliates, three public television organizations, Tierney Communications, Harmelin Media, Star Group, Domus, and innovative web-streaming and specialized digital content producers and online agencies such as 03World.

Students find internships and employment with major broadcast, multichannel, and new media companies in Philadelphia, New York, Washington, Los Angeles, London, Beijing, and beyond, including:

- CNN
- NBC/Universal
- Sony
- NBC SportsChannel
- China Central TV
- Time, Inc.
- University of Pennsylvania
- Nielsen
- Harmelin Media
- SMG Shanghai
- Disney
- Katz Media Group
- Discovery Channel
- Raycom Media
- Shanghai Media Group
- Game Show Network
- USA Networks
- Bounce TV
- Reign Deer Entertainment
- PBS/Sprout
- Philly.com
- Comcast SportsNet
- NBC Sports
- MTV Networks
- Sesame Workshop
- Pro Mobile Productions
- Sony
- PHL 17
• NBC10
• CBS3/CW
• WPVI6
• WYBE35
• Center City Video
• CCTV
• CNBC International
• Princeton University
• QVC
• National Geographic Channel
• Univision
• Nancy Glass Productions
• Telemundo
• Dreamworks
• and many others.

Additional Information
For information about Television Management students, faculty, alumni, internships and the structure and operation of the program, please visit the Graduate Television Management (http://www.drexel.edu/westphal/graduate/TVMN) website.

Admission Requirements
For information regarding admission to the program, contact:

Albert Tedesco
Program Director, Paul F. Harron Television Management Graduate Program
Antoinette Westphal College of Media Arts and Design
Office: University Crossings 049
(215) 895-2180
ast33@drexel.edu

or

David Miller
Director of Recruitment
The Antoinette Westphal College of Media Arts and Design
Nesbitt Hall 12-503
Philadelphia, PA 19104
(215) 895-1675
forms, additional application requirements, and information about application deadlines are all available on the Graduate Admissions at Drexel University (http://www.drexel.edu/grad/programs/westphal) website.

For more information about the program, visit Drexel's Graduate Studies in Television Management (http://www.drexel.edu/grad/programs/westphal/television-management) web page.

Degree Requirements
Master of Science Degree: 49.0 quarter credits

Required Courses

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<td>TVMN 710</td>
<td>Television Programming</td>
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<td>TVMN 730</td>
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<td>TVMN 630</td>
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<td>TVMN 660</td>
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<td>TVMN 670</td>
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<td>TVMN 680</td>
<td>Management of News and Sports Programming</td>
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<td>TVMN 698</td>
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<td>TVMN 700</td>
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<td>TVMN 720</td>
<td>Television Organization and Operations</td>
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<td>TVMN 750</td>
<td>Current Issues in TV Management</td>
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<td>TVMN 770</td>
<td>Promotion and PR in the Media</td>
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Total Credits 49.0

* TVMN 791 is repeatable for credit, at .5 credits per quarter, as needed for thesis completion. Students must enroll for a minimum of 2 quarters.

Master of Science Degree (Stand-alone program)

First Year

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<td>BUSN 507</td>
<td>Essentials of Economics I</td>
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<td>Scope and Methods of the Field</td>
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<td></td>
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Term Credits 12.0

Winter

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<td>MKTG 601</td>
<td>Marketing Strategy Planning</td>
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<tr>
<td>TVMN 620</td>
<td>Audience Measurement</td>
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<tr>
<td>TVMN 650</td>
<td>Structure of Television Organizations</td>
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Term Credits 12.0

Spring

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<td>Managerial Accounting</td>
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<td>TVMN 730</td>
<td>TV Technology</td>
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### Degree Requirements

**Dual MS/MBA: 79.0 quarter credits**

#### Required Courses

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<td>TVMN 605</td>
<td>Scope and Methods of the Field</td>
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</tr>
<tr>
<td>TVMN 610</td>
<td>Media Law for Television Management</td>
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<tr>
<td>TVMN 620</td>
<td>Audience Measurement</td>
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<tr>
<td>TVMN 640</td>
<td>Media Ethics of Television Management</td>
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<td>TVMN 650</td>
<td>Structure of Television Organizations</td>
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<tr>
<td>TVMN 710</td>
<td>Television Programming</td>
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<tr>
<td>TVMN 730</td>
<td>TV Technology</td>
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<tr>
<td>TVMN 740</td>
<td>Money and the Media</td>
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<tr>
<td>TVMN 790</td>
<td>Thesis in TV Management</td>
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<tr>
<td>TVMN 791</td>
<td>Thesis Completion (repeatable for credit)</td>
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#### Television Management Electives

Select two of the following: 6.0

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<tr>
<td>TVMN 600</td>
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<td>TVMN 630</td>
<td>Television Production</td>
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<tr>
<td>TVMN 660</td>
<td>The Social Impact of TV</td>
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<td>TVMN 670</td>
<td>The Art of Television</td>
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<td>TVMN 680</td>
<td>Management of News and Sports Programming</td>
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<tr>
<td>TVMN 698</td>
<td>Special Topics in TV Mgmt</td>
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<td>TVMN 699</td>
<td>Independent Study in TV Mgmt</td>
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<td>TVMN 700</td>
<td>Television Practicum</td>
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<td>TVMN 720</td>
<td>Television Organization and Operations</td>
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<td>TVMN 750</td>
<td>Current Issues in TV Management</td>
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<tr>
<td>TVMN 770</td>
<td>Promotion and PR in the Media</td>
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#### Required Business Courses

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<tr>
<td>ECON 601</td>
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</tr>
<tr>
<td>BUSN 506</td>
<td>Financial Performance of the Firm - Finance</td>
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</tr>
<tr>
<td>BUSN 507</td>
<td>Essentials of Economics I</td>
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<td>BUSN 508</td>
<td>Essentials of Economics II</td>
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<td>FIN 601</td>
<td>Corporate Financial Management</td>
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<td>MGMT 602</td>
<td>Managing Technology Innovation</td>
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<td>MGMT 652</td>
<td>New Venture Planning</td>
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<tr>
<td>MGMT 780</td>
<td>Strategic Management</td>
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</tr>
<tr>
<td>MKTG 601</td>
<td>Marketing Strategy &amp; Planning</td>
<td>3.0</td>
</tr>
<tr>
<td>MIS 611</td>
<td>Aligning Information Systems and Business Strategies</td>
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</tr>
<tr>
<td>ORGB 625</td>
<td>Leadership and Professional Development</td>
<td>3.0</td>
</tr>
<tr>
<td>ORGB 631</td>
<td>Leading Effective Organizations</td>
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<td>POM 601</td>
<td>Operations Management</td>
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<td>STAT 601</td>
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#### Suggested Business Electives:

- FIN 640 Mergers and Acquisitions
- MKTG 622 Buyer Behavior Theory
- MKTG 634 Integrated Marketing Communications Management
- MKTG 646 Services Marketing
- MGMT 640 Strategic Human Resource Management

Total Credits 79.0

* TVMN 791 is repeatable for credit, at .5 credits per quarter, as necessary for thesis completion. Students must enroll for a minimum of 2 quarters.

### Facilities

Facilities and opportunities for the program include:

- Field trips to broadcast stations and networks in Philadelphia, Washington, D.C., and New York (http://www.drexel.edu/westphal/graduate/TVMN/Curriculum/Seminars/Fall2012)
- Civic engagement projects in Philadelphia and internationally (http://www.drexel.edu/westphal/graduate/TVMN/civicengagement)
- The LeBow College of Business (http://www.lebow.drexel.edu)
- The Laurence A. Baiada Institute for Entrepreneurship (http://www.lebow.drexel.edu/Centers/Baiada)
- Professional social media groups (https://www.linkedin.com/groups?home=&gid=6613646)
- Business planning courses
- Incubator competitions sponsored by the Baiada Center
- The Henderson Challenge (business plan competition)
- The Rudman Institute for Entertainment Industry Studies
- DUTV (http://dutv.drexel.edu/television/Main.html), Drexel’s educational cable access channel

As part of their MS/MBA course of study, students take full advantage of the new Gerri C. LeBow Hall and the Leonard Pearlstein Business Learning Center, which includes The George and Lois Krall Center for Executive Education, state-of-the-art classrooms, learning facilities, conference rooms, and technology upgrades to meet the needs of MBA students so they can compete aggressively in the global marketplace.
Cinema and Television Faculty


Ted Arzt, BFA (Tyler School of Art, Temple University). Associate Professor. Digital media.

John Avarase, BS (Drexel University). Assistant Teaching Professor. Composer, film and video scores, mixing and sound design.

David Culver, AS (Graham Junior College) Manager of the Paul F. Harron Studios/DUTV. Associate Teaching Professor. Film and video.

David Deneen, BFA (Philadelphia College of Art). Associate Teaching Professor. Film & video.

Paul Diefenbach, PhD (University of Pennsylvania) Associate Program Director, Game Art & Production. Assistant Professor. Game development, real-time rendering.

Jeremy Fernsler, BA (Pennsylvania State University). Assistant Teaching Professor. Digital effects artist; compositor and animator for the feature film visual effects industry.

Troy Finamore, MS (Drexel University) Associate Program Director, Interactive Digital Media. Assistant Teaching Professor. Advertising, design and interactivity.

Bruce Graham, BA (Indiana University of Pennsylvania). Associate Teaching Professor. Playwright.

Gerard M. Hooper, MFA (Temple University). Associate Teaching Professor. Film and video; European and non-western cinema.

D. B. Jones, PhD (Stanford University) Dean, Pennoni Honors College. Professor. Film and video; cinema studies.

Nick Jushchyshyn, MFA (Academy of Art University) Associate Program Director, Animation and Visual Effects. Visual effects, digital media and animation.

Matt Kaufhold, MA (University of North Carolina). Associate Teaching Professor. Screenwriting.

Karin P. Kelly, MFA (New York University) Program Director, Film and Video. Associate Professor. Film and video; filmmaker and author.

Yvonne D. Leach, MFA (Temple University) Department Head, Cinema and Television Studies. Associate Professor. Television studies.

David Mauriello, BA (Lafayette College). Assistant Professor. 3D modeling and animation.

Jocelyn Motter, MFA (American Film Institute). Assistant Teaching Professor. Editing.

Glen Muschio, PhD (Temple University). Associate Professor. Digital media, society, communication.

Lise Raven, MFA (New York University). Assistant Professor. Filmmaker.

Philip W. Salas, BS (Temple University). Assistant Teaching Professor. Utilization of advanced set top box data to measure fragmented viewing behavior. Impact of new television distribution technologies on traditional broadcasters and multichannel program providers.

David A. Schwartz, BA (Rider University). Associate Teaching Professor. Steadicam operator; cameraman.

Andrew Susskind, BA (Harvard University) Program Director of TV Production & Media Management. Associate Teaching Professor. Independent television producer and director.

Albert S. Tedesco, MA (University of Pennsylvania) Director of the Paul F. Harron Graduate Program in Television Management. Associate Teaching Professor. Impact of digital media on broadcast television; broadcasters' response to the challenge of new media; management of publicly and privately held communications companies.

Jervis Thompson, BS (Drexel University). Associate Teaching Professor. Digital media, interactive multimedia.

Christine Vachon Visiting Professor. Independent film production.

Michael Wagner, PhD (Vienna University of Technology) Program Director, Digital Media. Associate Professor. Educational use of digital media and computer games.

Gregory S. Wolmart, MFA (University of Pennsylvania). Assistant Professor. Cinema studies; film history.

Jichen Zhu, PhD (Georgia Institute of Technology). Assistant Professor. Developing humanistic and interpretive framework of computational technology, particularly artificial intelligence (AI), and constructing AI-based cultural artifacts; interactive storytelling, games and software studies.

Interdepartmental Faculty

Lawrence Epstein, MBA (Cornell University) Interim Department Head, Arts & Entertainment Enterprise. Associate Teaching Professor.
The College of Arts and Sciences

About the College

The College of Arts and Sciences is committed to providing high-quality education in the humanities, social sciences, natural sciences and mathematics.

By pursuing excellence in research and scholarship, we train our graduate students to become ethical professionals with expertise in particular areas of inquiry and an appreciation for the fundamental interactions among disciplines in a fast-changing, challenging, and diverse world.

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

Majors

- Biological Sciences (MS, PhD) (p. 250)
- Chemistry (MS, PhD) (p. 253)
- Communication (MS) (p. 289)
- Communication, Culture and Media (PhD) (p. 256)
- Environmental Policy (MS) (p. 261)
- Environmental Science (MS, PhD) (p. 257)
- Mathematics (MS, PhD) (p. 264)
- Physics (MS, PhD) (p. 266)
- Psychology (MS, PhD) (p. 270)
- Psychology-Law (PhD/JD) (p. 260)
- Public Policy (MS) (p. 261)
- Publishing (MA) (p. 291)
- Science, Technology and Society (MS) (p. 262)

Biological Sciences

Major: Biological Sciences
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS) or 90.0 (post-bachelor's) or 45.0 (post-master's)
Classification of Instructional Programs (CIP) code: 26.0101
Standard Occupational Classification (SOC) code: 19-1029

About the Program

The Department of Biology offers graduate programs in biological sciences leading to the doctorate degree and to the thesis or non-thesis master of science degree. The curricula and research programs are designed to help students achieve success in their degree programs and pursue positions of leadership in their respective fields of research.

The intellectual life of the department relies heavily on the participation, creativity and the energy of graduate students; therefore the department expects students to be vigorously involved in courses, seminars, journal clubs, research, informal discussions, and departmental functions.

MS in Biological Sciences

Degree Requirements

Soon after matriculation the student completes a plan of study with the advisor, outlining his or her specific program. Both thesis and non-thesis options are available. Conducting formal research necessary for the thesis is dependent upon the student finding a faculty member whom will serve as their faculty advisor and supervise a mutually agreed upon research project.

Students wishing to pursue PhD candidacy are encouraged to elect the MS with thesis. After all other requirements are completed, the research MS student defends the thesis at a final oral examination. The non-thesis student takes a comprehensive examination.

Requirements for the MS Curriculum with Thesis

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<thead>
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</thead>
<tbody>
<tr>
<td>BIO 500</td>
<td>Biochemistry I</td>
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</table>
### PhD in Biological Sciences

The Doctor of Philosophy in Biological Sciences is conferred in recognition of breadth of scholarship and scientific attainment plus demonstrated ability to complete original research.

The following general requirements must be satisfied in order to complete the PhD program in Biological Sciences:

- 90 (post-bac) or 45 (post-MS) credit hours total
- establishing a plan of study
- 7 core courses
- additional courses dependent on advisor or committee recommendations
- candidacy exam/approval of dissertation proposal
- defense of dissertation/thesis
- a graduate research seminar presentation once a year for students in their second year and beyond.

### Thesis Advisor/Plan of Study

For students admitted without an identified thesis advisor, the thesis advisor must be selected by the end of winter term in the first year. All students are asked to submit a plan of study by the end of the winter quarter first year. It is anticipated that the graduate coursework will be completed during the first two years or less.

Students should check with the department for a list of available electives.

### Requirements for the Non-thesis MS Curriculum

<table>
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<tr>
<th>Course Code</th>
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<tr>
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<tr>
<td>BIO 532</td>
<td>Advanced Cell Biology</td>
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<td>BIO 635</td>
<td>Advanced Genetics and Molecular Biology</td>
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<td>BIO 679</td>
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### Bioscience Electives Include:

- Microbial Genetics
- Endocrinology
- Biochemistry of Metabolism
- Proteins
- Biomembranes
- Nucleic Acids
- Bioinformatics I
- Human Genetics
- Stem Cell Research
- Recombinant DNA Laboratory
- Virology
- Molecular Mechanisms of Neurodegeneration
- Medical Microbiology
- Advanced Immunology
- Course BIO 680 Not Found

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<td>BIO 615</td>
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<td>BIO 620</td>
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<td>BIO 649</td>
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<td>BIO 650</td>
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<td>BIO 663</td>
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<td>BIO 670</td>
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### Core Requirement Courses:

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<td>BIO 540</td>
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<td>BIO 601</td>
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<td>Advanced Genetics and Molecular Biology</td>
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<td>BIO 679</td>
<td>Issues in Scientific Research</td>
<td>3.0</td>
</tr>
<tr>
<td>ENVS 506</td>
<td>Biostatistics</td>
<td>3.0</td>
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### Sample Sequence/Sample Plan of Study

#### First Year

**Fall**
- Credits: 3.0
  - BIO 500  Biochemistry I
  - BIO 532  Advanced Cell Biology

**Winter**
- Credits: 3.0
  - BIO 540  Readings in Molecular and Cellular Bioscience and Biotechnology
  - BIO 635  Advanced Genetics and Molecular Biology

**Spring**
- Credits: 3.0
  - BIO 601  Research Methods
  - ENVS 506  Biostatistics

**Second Year**

**Fall**
- Credits: 3.0
  - BIO 679  Issues in Scientific Research
  - Elective

**Winter**
- Credits: 3.0
  - BIO 620  Biomembranes

**Spring**
- Credits: 3.0
  - BIO 620  Biomembranes

**Total Credit:** 30.0
Contact the Department of Biology (http://www.drexel.edu/biology) at (215) 895-2624 for more information.

Biology Faculty

Michael Akins, PhD (Yale University). Assistant Professor. The neural mechanisms underlying how organisms interact with the environment; circuit formation, particularly of sensory circuits, and neural diseases including autism and Fragile X syndrome (FXS).

Shivanthi Anandan, PhD (University of California, Los Angeles). Associate Professor. Microbial genetics, in particular the analysis of light-regulated signal transduction pathways and the regulation of gene expression in photosynthesizing organisms.

Joseph Bentz, PhD (State University of New York (SUNY) at Buffalo). Professor. Biophysics, biochemistry and biopharmaceutics, focused on the molecular basis of biological membrane transport and fusion.

John Bethea, PhD (University of Alabama at Birmingham) Department Head. Professor. Neuroscience and immunology.

Laura Duwel, PhD (University of Cincinnati) Assistant Department Head, Department of Biology. Teaching Professor. Immunology and microbiology.

Felice Elefant, PhD (Temple University). Associate Professor. Understanding the roles of two classes of chromatin regulatory proteins termed histone acetyltransferases (HATs) and histone demethylases.

Denise Garcia, PhD (UCLA). Assistant Professor. Neuroscience, the role of astrocytes in the central nervous system.

Tali Gidalevitz, PhD (University of Chicago). Assistant Professor. Genetic and molecular pathways regulating protein folding homeostasis, and their role in protein conformation diseases, aging, and development.

Mary Katherine Gonder, PhD (The City University of New York) Director, Bioko Biodiversity Protection Program Co-Founder, Central African Biodiversity Alliance. Associate Professor. Deciphering spatial patterns of biodiversity across the Gulf of Guinea and Congo Basin region; Conservation measures to mitigate the effects of habitat loss and climate change in western equatorial Africa.

Susan Gurney, PhD (Westfälische Wilhelms-Universität Münster (Germany)). Assistant Teaching Professor. Evolutionary genetics (human and equids); stem cell biology; forensic science

Meshagae Hunte-Brown, PhD (Drexel University). Associate Teaching Professor. Stable isotopes in aquatic food webs, ecosystem ecology.

Jiu Jiang, MD, PhD (Shanghai Second Medical University). Research Associate Professor. T cell immune response to virus infection in aged mice.

Karen Kabnick, PhD (Massachusetts Institute of Technology). Assistant Teaching Professor. Principles and techniques in molecular biology.

Joy Little, PhD (Wake Forest University). Assistant Teaching Professor. Stem education, cancer cell biology.

Robert Loudon, PhD (Thomas Jefferson University). Associate Teaching Professor. Rho GTPases, regulation of actin cytoskeleton, Regulation of G protein-coupled receptors by receptor kinases and arrestins.

Daniel Marenda, PhD (Syracuse University) Director of the Biology Graduate Program, Co-Director of the Cell Imaging Center. Associate Professor.

Eric Morschhauser, PhD (University of Pennsylvania). Assistant Teaching Professor. Systematics, paleobiology, and taphonomy of Mesozoic archosaurs, including the horned dinosaurs of North America and Western China; Biomechanics of terrestrial locomotion; Applications of high resolution CT scanning.

Donna Murasko, PhD (Penn State Hershey Medical Center) Dean, College of Arts and Sciences. Professor. The effects of aging on the adaptive immune response to influenza virus and retrovirus latency and reactivation.

Ryan Petrie, PhD (McGill University). Assistant Professor.

Nianli Sang, MB, PhD (M.B., Fudan University Shanghai Medical College; Ph.D., Thomas Jefferson University) Co-Director of the Cell Imaging Center. Associate Professor. Molecular and cellular biology of cancer; posttranslational modification, folding and quality control of proteins and their implication in cell physiology and human diseases.

Aleister Saunders, PhD (University of North Carolina, Chapel Hill) Interim Senior Vice Provost for Research, Director of the RNAi Resource Center. Associate Professor. Identification and characterization of genes and proteins involved in Alzheimer's disease.

Elias T. Spiliotis, PhD (The Johns Hopkins University) Director of the Cell Imaging Center. Assistant Professor. Cell polarity and cell division: regulation of cytoskeleton-dependent motility.

Jennifer Stanford, PhD (Harvard University). Assistant Professor. Approaches to improve undergraduate and graduate student learning in cell and molecular biology, biochemistry and genetics.

Monica M. Togna, PhD (New Jersey Institute of Technology). Assistant Teaching Professor. Examination of the structure and function of living organisms from the cellular to the organismal level in order to better understand common physiological processes.

Interdepartmental Faculty

Beth L. Leonberg, MS, MA, RD (Colorado State University, Rowan University) Director, Didactic Program in Dietetics. Instructor. Pediatric nutrition.

Donna H. Mueller, PhD (Temple University) Registered Dietitian, Nutrition and Foods. Associate Professor. Clinical nutrition; pediatric nutrition; nutrition in pulmonary diseases, especially cystic fibrosis; nutrition in developmental delay; dental nutrition; dietetic education and professional development.

Jennifer Nasser, PhD (Rutgers University). Associate Professor. Dopamine-mediated mechanisms of food intake regulation in humans and its impact on metabolic homeostasis, especially as it applies to obesity, eating disorders and aging.

Michael O'Connor, MD, PhD (MD, Johns Hopkins University; PhD, Colorado State). Associate Professor. Biophysical and physiological ecology, thermoregulation of vertebrates, ecological modeling.

Sean O'Donnell, PhD (University of Wisconsin-Madison). Professor. Tropical ecology, focusing on geographic variation and elevation effects on ecology and behavior of army ants and ant-bird interactions;
neurobiology, focusing on brain plasticity and brain evolution in social insects.

Jennifer Quintan, PhD (North Carolina State University). Associate Professor. Food microbiology; microbiological quality and safety of produce, dairy and meat products in markets in high vs. low socioeconomics areas, Bacillus and Clostridium spores in food processing.

Jacob Russell, PhD (University of Arizona). Assistant Professor. The functional significance and evolutionary histories of symbioses between insects and bacteria.

Vicki Schwartz, MS (Drexel University) Nutrition and Foods. Assistant Clinical Professor. Advanced nutrition, clinical nutrition, nutrition support.

Emeritus Faculty


Stanley Segall, PhD (Massachusetts Institute of Technology). Professor Emeritus. Flavor evaluation in foods, human organoleptic response, taste and odor, chemistry of sugars in foods, irradiation effects in foods, food science, food safety.

Chemistry

Major: Chemistry
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS); 90.0 (PhD)
Classification of Instructional Programs (CIP) code: 40-0501
Standard Occupational Classification (SOC) code: 19-2031

About the Program

The Department of Chemistry (http://drexel.edu/coas/academics/departments-centers/chemistry) offers graduate programs in analytical chemistry, atmospheric chemistry, inorganic chemistry, organic chemistry, materials chemistry, physical chemistry, educational chemistry, and polymer chemistry. The curriculum is designed to prepare students for the research and practical application of chemistry to challenges facing mankind. The department also encourages interdisciplinary activities. Faculty members are active participants in the environmental engineering science and biomedical science and engineering programs; others work with physicists and biologists in areas such as atmospheric science, biochemistry, and biophysical chemistry.

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

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

Admission/Financial Assistance

Requirements for Admission

For admission to graduate study, the department requires a BS in chemistry or the equivalent. This requirement applies to full-time and part-time students working toward either the MS or the PhD degree. All entering MS and PhD students are required to take a series of two-hour exams in analytical, inorganic, organic, and physical chemistry to help assess their preparation for graduate work in chemistry. The scores obtained on these exams are used as a basis for course selection.

It is strongly recommended that students submit Graduate Record Examination (GRE) results with their application. GRE scores are helpful to the Chemistry Department and the Office of Admissions, and are required for those students requesting financial support, i.e., a teaching assistantship (TA) and/or would like to be considered for a Dean's Scholarship or a Provost's Fellowship.

Financial Assistance

Graduate students at Drexel can obtain two main types of financial support: teaching assistantships and research assistantships. Teaching assistantships are available on a competitive basis to incoming students and are normally renewable for several years. All those requesting financial assistance must submit GRE scores.

Forms, details about requirements, and information about application deadlines are all available on the Chemistry (http://www.drexel.edu/gradprograms/coas/chemistry) page of Drexel's Graduate Admissions website.

Master of Science in Chemistry

Degree Requirements

The MS degree is awarded after satisfactory completion of a minimum of 45.0 credit hours in chemistry and related fields, at least 30.0 credits of which must be taken at Drexel. Both thesis and nonthesis options are available.

Course Requirements

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

Major Sequence 9.0
Select one of the following sequences:

Inorganic Chemistry

CHEM 521 Inorganic Chemistry I
CHEM 522 Inorganic Chemistry II
CHEM 523 Inorganic Chemistry III

Analytical Chemistry
CHEM 530 Analytical Chemistry I
CHEM 531 Analytical Chemistry II
CHEM 755 Mass Spectrometry

Organic Chemistry
CHEM 541 Organic Chemistry I
CHEM 542 Organic Chemistry II
CHEM 543 Organic Chemistry III

Physical Chemistry
CHEM 557 Physical Chemistry I
CHEM 558 Physical Chemistry II
CHEM 555 Quantum Chemistry Of Molecules I

Polymer Chemistry
CHEM 561 Polymer Chemistry I
CHEM 562 Polymer Chemistry II
CHEM 563 Polymer Chemistry III

Additional Sequence Courses* 15.0
Electives 21.0
Total Credits 45.0

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

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

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

Course Requirements
Ninety credits of graduate-level work must be completed for the PhD degree. The Chemistry Department requires 30 credits of coursework in chemistry (outlined in the Course Requirements (p. 253) section of the MS program). The balance can be made up of advanced special topics courses and research credits.

Candidacy Requirements
To become a candidate for the PhD in chemistry at Drexel, a student must pass a prescribed set of cumulative examinations.

Cumulative Examinations
Written examinations designed to test a student’s background in his or her major area are given monthly during the academic year and occasionally during the summer at the discretion of the faculty. Students should begin taking these examinations after having completed three courses in the major area (usually the main sequence courses), though beginning these exams earlier is possible for well-prepared students. Students normally begin taking these examinations in the fall term of their second year.

Research Seminar
The thesis proposal seminar is designed to help the student conduct his/her research more efficiently by (i) promoting a greater fundamental understanding about the student’s own specific research project and (ii) providing context and perspective about previous accomplishments in the field by other research groups as well as her/his own. The subject of the seminar will be a literature review and a description/defense of the student’s research project including results of experiments and investigations already conducted as well as future work. The examination at which the thesis proposal is defended is held no later than the end of the winter term of the second year for full-time students or the end of the spring term of the second year for part-time students. A written report is submitted to the committee no later than two weeks before the examination. A passing grade on this examination is required for continuation in the PhD program.

Thesis
A PhD thesis — the heart of the PhD degree — must be written, accepted by the research supervisor, presented to a PhD Thesis Examining Committee, and defended orally to the satisfaction of the Examining Committee. It is the responsibility of the student, not the research supervisor, to submit an acceptable thesis. It is expected that the student will have at least one peer-reviewed research article accepted for publication by the time of the thesis defense.

Facilities
There are seven undergraduate teaching laboratories in the department: three freshman Chemistry labs, an advanced Organic Chemistry lab, a Physical Chemistry lab, an Analytical Instrumentation Laboratory and a combined Analytical/Inorganic Chemistry lab.

Mass Spectrometry Laboratory
A Waters Autospec M high resolution mass spectrometer, a Sciex API triple quadrupole mass spectrometer, and a Bruker Autoflex III MALDI Time-of-Flight mass spectrometer.

Magnetic Resonance Laboratory
Varian INNOVA 300 MHz superconducting FT-NMR spectrometer, Varian INNOVA 500 MHz superconducting FT-NMR spectrometer, and a Varian X-band 12" EPR spectrometer.

Analytical Instrumentation Laboratory
The open-access departmental Analytical Instrumentation Laboratory includes two Perkin-Elmer (PE) Spectrum One Fourier-transform infrared absorption spectrometers each with a universal diamond ATR accessory, a PE Lambda-35 UV/visible spectrometer, a PE Lambda-950 UV/visible/NIR spectrometer with a 60-mm-diameter diffuse reflectance integrating sphere, a PE model 343 polarimeter, a PE LS55B luminescence spectrometer, a PE Clarus 500 capillary-column GC with dual FID.
detectors, a Clarus 500 capillary-column GC/MS system (with electron impact capability), a PE Series 200 Quaternary HPLC development system with UV/visible photodiode array detector, a PE Series 200 binary HPLC system interfaced to a Sciex 2000 triple quadrupole MS detector, a PE Series 2000 binary gel permeation chromatography system with refractive index detector, and a Varian AA240FS flame atomic absorption spectrometer equipped with a GTA 120 graphite furnace accessory.

Atomic Force Microscopy
The department has a Veeco multimode Atomic force microscopy (AFM) for research and education. AFM, also called scanning force microscopy (SFM), is one of the foremost tools for imaging, measuring, and manipulating matter at the nanoscale. It is when a fine tip is scanned across a surface the tip-surface force is measured to provide topographic, frictional, and adhesion information of a surface. With the ability to perform non-invasive, high-resolution surface imaging and force measurement, AFM has become an essential characterization tool in multiple disciplines in life science, biomedical engineering, nanoeengineering, chemistry, materials science, and other related fields.

Other Departmental Facilities
The department has a VEECO INNOVA N3 Multimode scanning probe microscope and also maintains a computational chemistry laboratory equipped with nine Dell Optiplex 620 computers running Hyperchem v 8.0. Research laboratories for each of the department faculty members are located in Disque and Stratton Halls. Instrumentation available in the research laboratories is described on individual faculty web pages. Additional full-time support includes an instrument specialist (for NMR and MS), a glassblower (Chemistry Department), two electronics specialists (College of Arts & Sciences Electronics Shop), and four machinists (Drexel University Machine Shop).

Chemistry Faculty
Anthony W. Addison, PhD (University of Kent at Canterbury, England). Professor. Design and synthesis of novel biomimetic and oligonuclear chelates of copper, nickel, iron, ruthenium and vanadium; their interpretation by magnetoochemical, electrochemical and spectroscopic methods, including electron spin resonance; CD and ESR spectroscopy and kinetics for elucidation of molecular architecture of derivatives (including NO) of oxygen-binding and electron-transfer heme- and non-heme iron metalloproteins of vertebrate and invertebrate origins; energy-transfer by Ru, Ir and lanthanide-containing molecules and assemblies.

Jason Cross, PhD. Assistant Teaching Professor.

Peter DeCarlo, PhD (University of Colorado). Assistant Professor. Outdoor air quality, particulate matter size and composition instrumentations and measurements, source apportionment of ambient particulate matter, climate impacts of particulate matter.

Aaron T. Fafarman, PhD (Stanford University). Assistant Professor. Colloidal nanocrystals; solution-processed solar cells; electrical and spectroscopic characterization of nanomaterials.

Fraser Fleming, PhD (University of British Columbia (Canada)) Department Head, Chemistry. Professor. Nitriles, Isonitriles, Stereochemistry, Organomeatallics

Joe P. Foley, PhD (University of Florida) Associate Department Head. Professor. Separation science, especially the fundamentals and biomedical/pharmaceutical applications of the following voltage- or pressure-driven separation techniques: capillary electrophoresis (CE), electrokinetic chromatography, supercritical fluid chromatography, and high-performance and two-dimensional liquid chromatography (LC). Within these techniques, we explore novel separation modes (e.g., dual-opposite-injection CE and sequential elution LC), novel surfactant aggregate pseudophases, and chiral separations.

Lee Hoffman, PhD (Flinders University, Adelaide, South Australia). Assistant Teaching Professor. Interfacial studies on the self-assembly of natural organic materials, understanding the nature of each component, and development of a mechanism describing this process; Dendrimer/ metal nanocomposite design and synthesis hosting metal nanoparticles, utilizing the multivalent dendritic polymer architecture for further exploitation with other molecules such as antibodies and other targeting species.

Mónica Ilies, PhD (Politechnic University of Bucharest). Assistant Teaching Professor.

Haufeng Frank Ji, PhD (Chinese Academy of Sciences). Professor. Micromechanical sensors for biological and environmental applications; nanomechanical drug screening technology; drug discovery; nanotechnology for energy applications.

Daniel B. King, PhD (University of Miami). Associate Professor. Assessment of active learning methods and technology in chemistry courses; incorporation of environmental data into chemistry classroom modules; development of hands-on activities and laboratory experiments.

Daniel A. Kleier, PhD (University of Notre Dame). Associate Teaching Professor.

Molly O’Connor, PhD (Drexel University). Assistant Teaching Professor. Synthesis and characterization of chiral and achiral metal complexes with novel multidentate ligands.

Kevin G. Owens, PhD (Indiana University). Associate Professor. Mass spectrometry research, including the development of sample preparation techniques for quantitative analysis and mass spectrometric imaging using matrix-assisted laser desorption/ionization (MALDI) time-of-flight mass spectrometry (TOFMS) techniques for both biological and synthetic polymer systems, the development of laser spectroscopic techniques for combustion analysis, and the development of correlation analysis and other chemometric techniques for automating the analysis of mass spectral information.

Lynn S. Penn, PhD (Bryn Mawr College). Professor. Surface modification for specific applications: chemically derivatize metal and ceramic solid surfaces; designing and executing sequential chemical processes, building complex and layered structures on surfaces, with specific focus on behavior of polymer brushes (investigating the fundamental transport-selective behavior of polymer brushes because of potential in drug delivery, biomedical devices and as an explanation of some biological processes).

Susan A. Rutkowski, PhD (Drexel University). Assistant Teaching Professor.

Louis Scerbo, PhD (Oregon State University at Corvallis). Associate Professor. Membrane structures and function.

Reinhard Schweitzer-Stenner, PhD (Universitat Bremen (Germany)). Professor. Exploring conformational ensembles of unfolded or partially folded peptides and proteins; determining the parameters governing peptide self-aggregation; structure and function of heme proteins;
investigating protein-membrane interactions; use of IR, VCD, Raman, NMR and absorption spectroscopy for structure analysis.

Karl Sohlberg, PhD (University of Delaware). Associate Professor. Computational and theoretical materials-related chemistry: (1) complex catalytic materials; (2) mechanical and electrical molecular devices.

Peter A. Wade, PhD (Purdue University). Associate Professor. Exploration of a newly discovered [3,3]-sigmatropic rearrangement in which O-allyl nitroesters are thermally converted to #,#-unsaturated nitro compounds; development and exploitation of a carbon-based hemiacetal mimic; and exploration of cycloaddition reactions involving nitrile oxides.

Anthony Wambsgans, PhD (Rice University). Associate Teaching Professor.

Jun Xi, PhD (Cornell University). Associate Teaching Professor. Biomacromolecular interactions both in solution and in confined environment; mechanisms of DNA replication and DNA repair; structure and function of molecular chaperones; drug target identification and new therapeutic development; single molecule enzymology; DNA directed organic synthesis.

Emeritus Faculty

Amar Nath, PhD (Moscow State University, Moscow USSR). Professor Emeritus.

Communication, Culture, and Media

Major: Communication, Culture and Media

Degrees Awarded: Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 90.0 (Post-Bachelors) or 45.0 (Post-Masters)
Classification of Instructional Programs (CIP) code: 09.0102
Standard Occupational Classification (SOC) code: 25-1122

About the Program

The PhD program in Communication, Culture and Media develops innovative scholar-teachers who know how to impart theories and studies on the interaction of social forces and communication. Our graduates are trained as committed researchers in quantitative and qualitative approaches to communication study. The program also encourages interdisciplinary approaches to the study of communication and media through faculty strengths in anthropology, communication, linguistics and sociology.

Click here for more information about the Master of Science (MS) in Communication (p. 289).

Additional Information

Visit the Department of Communication (http://www.drexel.edu/coas/academics/departments-centers/communication) website for more information.

Admission Requirements

Applicants to the PhD program will be evaluated by the Department’s Graduate Committee for admission to the program. Prospective students must submit with their application:

- a 1,500 word statement of purpose
- three letters of recommendation
- transcripts of all college-level coursework
- GRE scores
- for international students where English is not the official language, TOEFL or other English language proficiency scores are also required. For more information regarding international applicant requirements, view the International Students Admissions Information (http://drexel.edu/grad/resources/international) page.

Minimum criteria include:

- Completion of a BA or BS degree in an appropriate field
- GPA of 3.0 or higher (preferred GPA 3.5 for courses in the major)
- For international students, a TOEFL score of 600 (100 iBT) or equivalent.

Students entering the program with a Master’s degree or with some graduate credit will be evaluated by the Graduate Committee as to how many of their courses could possibly be counted toward the PhD. Students entering with an MS in an appropriate field are required by the university to take a minimum of 15 credit hours in the PhD program before being eligible to take qualifying exams.

For additional information on how to apply, visit the Drexel University Requirements for Admissions (http://www.drexel.edu/grad/programs/coas) page.

Degree Requirements

The PhD requires a minimum of 90.0 credits beyond a Bachelor’s degree, including 45.0 credit hours of coursework prior to taking qualifying exams, 15.0 credit hours of coursework after exams, and 30.0 hours of research credit.

The PhD coursework is structured around a set of required core courses, a set of required seminars with rotating topics, and electives in graduate communication lecture courses, independent study work, and dissertation credit.

All students in the program take five common core courses. They then take no less than five courses chosen from Com 800 level seminar offerings. Students are encouraged to take additional seminars after meeting that requirement, since seminar courses enable collaborative relationships with professors and introduce students to the scholarly community.

After completing the core requirements and a sequence of seminars, students are expected to take a minimum of 10 additional courses from existing graduate level lecture courses (depending on their interests and research needs). Students may take up to two graduate courses (six credits) outside the department. Additional credits to meet the 90.0 credit requirements will come from independent study and dissertation credits.

Student advising will include appointments with both graduate director and an assigned mentor during the first two weeks of fall courses, where an individualized plan of study (University form D1) will be completed and approved by the program director.

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM 701</td>
<td>Contemporary Social Theory</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 702</td>
<td>Communication Theory I</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 703</td>
<td>Communication Theory II</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Environmental Science

Major: Environmental Science
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS); 90.0 (PhD)
Classification of Instructional Programs (CIP) code: 03.0104
Standard Occupational Classification (SOC) code: 19-2041

About the Program

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

The program's areas of focus include: ecology, biodiversity, conservation, environmental chemistry and assessment, and paleoecology-geology. A student may alternatively craft a specialized plan of study outside of these strength areas under the guidance of an academic advisor.

The master's degree may be completed with either a thesis or non-thesis option. Those choosing to prepare a thesis must complete 45.0 credits (up to 12.0 credits may be research). Students choosing the non-thesis option must complete coursework totaling 45.0 credits (6.0 of which may be research). Most courses carry three credits.

Part-time Study

The MS degree may be completed on a part-time basis. Most courses are scheduled in the late afternoon and evening, usually on a rotating basis from year to year. Part-time students should plan to take courses in the appropriate sequence to comply with the necessary prerequisites. Scheduling of course is dependent on student demand and faculty resources; however, most prescribed courses are offered at least once every other year (schedules are published each term). Required courses should be taken at the first opportunity.

Additional Information

For more information, visit the Department of Biodiversity, Earth & Environmental Science (http://drexel.edu/coas/academics/departments-centers/bees) website.

Susan Cole is the Graduate Coordinator for Environmental Science. Susan Cole can be reached by telephone at 215.895.2905 or e-mail at coless@drexel.edu.

Admission Requirements

In addition to the general entrance requirements for all applicants, entrance to the MS Program in Environmental Science requires a bachelor of science degree in science, mathematics, or engineering. Minimally, students must have completed a year each of calculus, general biology, general chemistry, physics, and, preferably, a semester of organic chemistry.

PhD Program

Applicants to the doctoral program are judged on the basis of academic excellence and the alignment of their research interests with those of
the faculty in the department. Prospective PhD students are welcome to contact the program to discuss their research interests.

Additional information about how to apply is available on the Graduate Admissions at Drexel University (http://www.drexel.edu/grad/programs/coas/environmental-science) website.

Degree Requirements: MS in Environmental Science

The Master of Science in Environmental Science (MSES) program requires three core courses that form the basis for further specialization. Students choose to complete the remainder of the program with elective courses based on interest. 45.0 total credits are required for program completion.

Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVS 501</td>
<td>Chemistry of the Environment</td>
<td>3.0</td>
</tr>
<tr>
<td>ENVS 506</td>
<td>Biostatistics</td>
<td>3.0</td>
</tr>
<tr>
<td>ENVS 511</td>
<td>Evolutionary Ecology</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Elective Areas

Please see Course Descriptions for a list of Environmental Science (ENVS) electives. Students may also take Environmental Policy (ENVP) and Environmental Engineering (ENVE) courses with prerequisites. Other departmental courses with approval.

Degree Requirements: PhD in Environmental Science

The following general requirements must be satisfied in order to complete the PhD program in Environmental Science:

- 90.0 (post-bachelor's) or 45.0 (post-master's) quarter credits
- qualifying exam
- establishing a plan of study
- 3 core courses recommended, not required
- additional courses dependent on advisor or committee recommendations
- candidacy exam/approval of dissertation proposal
- dissertation/thesis
- defense of dissertation/thesis
- a graduate research seminar presentation once a year for second, third, and fourth-year students.

Thesis Advisor/Plan of Study

For students admitted without an identified Thesis Advisor, the Thesis Advisor must be selected by the end of Winter term in the first year. All students are asked to submit a Plan of Study (that has been agreed upon by Thesis Advisor and student) by the end of Winter term first year. It is anticipated that the graduate coursework will be completed during the first two years or less. Generally there is no prescribed coursework -- students must take courses needed to complete their research under guidance of an faculty advisor.

Curriculum

The following courses are recommended, but not required:

- ENVS 501 Chemistry of the Environment
- ENVS 506 Biostatistics
- ENVS 511 Evolutionary Ecology

Candidacy Examination

The function of the Candidacy Examination is to test the breadth and depth of the student's capabilities in their chosen area of study. The graduate student becomes a PhD candidate only after successfully completing the Candidacy Examination and completing 15 or 45 credits (for post-master’s or post-bachelor’s degree students, respectively). The candidacy exam is comprised of three parts whose order will be determined by the Candidacy Committee: written examination (or qualifying exam), dissertation research proposal, and oral examination.

Students entering the program with a master’s degree are expected to complete the candidacy examination by the end of the summer quarter of their first year. Students entering the PhD program with a bachelor’s degree are expected to complete this examination by the end of the summer quarter of their second year.


The student will finalize their dissertation only after approval to write is granted by the Dissertation Research Committee. Approval is based upon an evaluation of the breadth and depth of original research being conducted by the student. The dissertation must follow the format specifications set forth in the Drexel’s Office of Research and Graduate College of Drexel University (http://www.drexel.edu/graduatecollege). Research conducted for the dissertation must be presented in a lecture open to the public and then defended, privately, before the student’s Dissertation Research Committee.

Facilities

Facilities include fully equipped research laboratories in microbiology, ecology, hydrology, and chemistry. Field ecology research augments lab facilities with field-specific equipment, including two boats (14- and 25-foot) and vans with towing capacity. A full range of sampling equipment exists in the department from seine nets, sediment dredges and coring devices, water sampling bottles, flow meters and acoustic tracking devices. Some additional research facilities in environmental biotechnology, chemistry and atmospheric engineering are located in other locations on Drexel's campus.

Among the equipment available for student research are atomic absorption spectrophotometers, UV-visible spectrophotometers, gas-liquid chromatographs, ion chromatograph, ICP-Mass Spectrometer, GC-Mass Spectrometer, high performance liquid chromatographs, total organic carbon analyzer, elemental analyzer for carbon and nitrogen, stable isotope mass spectrometer, high-speed refrigerated centrifuge, nutrient analyzers, and UV photochemical reactor. In addition, the department and university have various microscopes including a scanning electron microscope (SEM). Within the department and in the Department of Biology there is a large capacity for genomics including preparatory equipment for DNA extraction and enhancement.
Drexel University is a national leader in the use of computers for educational and research functions. Several facilities on campus are available for student use.

**Biodiversity, Earth and Environmental Science Faculty**

Walter F. Bien, PhD *(Drexel University)* Director, Laboratory of Pinelands Research. Research Professor. Natural resource management, restoration ecology, conservation biology, and New Jersey Pinelands community dynamics.

Elizabeth Burke Watson, PhD *(University of California, Berkeley)*. Assistant Professor. The implications of global and regional environmental change, and unraveling the interacting effects of multiple anthropogenic stressors on coastal ecosystems to promote more informed management, conservation, and restoration.

Donald F. Charles, PhD *(Indiana University)* Senior Scientist and Section Leader, Physiological Section, Academy of Natural Sciences. Professor. Diatoms as water quality indicators; paleolimnological approaches for inferring change in biology and chemistry of lakes; lake management; assessment of perturbations in aquatic ecosystems due to municipal and industrial effluents, land-use change, acid deposition, eutrophication and climate change.

Ted Daeschler, PhD *(University of Pennsylvania)* Associate Curator of Vertebrate Zoology; Vice President for Systematic Biology and the Library: Academy of Natural Sciences. Associate Professor. Vertebrate fauna of the Late Devonian Period in eastern North America; fossil collecting; systematic work focusing on freshwater vertebrates; nature of early non-marine ecosystems.

Daniel P. Duran, PhD *(Vanderbilt University)*. Assistant Teaching Professor. Phylogeography, systematics and taxonomy, population and conservation genetics, ecological niche modeling, focusing on insect systems to better understand fundamental evolutionary processes and maintain biodiversity.

Jon Gelhaus, PhD *(University of Kansas)* Curator, Department of Entomology: Academy of Natural Sciences. Professor. Systematic expertise in crane flies (Tipuloidea); phylogenetic reconstruction; historical and ecological biogeography; biodiversity measures and evolution of morphological character systems.

Richard J. Horwitz, PhD *(University of Chicago)* Senior Scientist; Fisheries Section Leader; Ruth Patrick Chair of Environmental Sciences. Associate Professor. Reproductive ecology, life history and distribution of freshwater fishes; effects of land use, habitat structure and hydrology on population dynamics and species composition in aquatic systems; ecological modeling and biometry; anthropogenic contaminants in fishes.

Susan S. Kilham, PhD *(Duke University)*. Professor. Aquatic ecology; phytoplankton; physiological ecology, especially of diatoms in freshwater and marine systems; large lakes; food webs; biogeochemistry.

Danielle Kreeger, PhD *(Oregon State University)*. Research Associate Professor. Trophic interactions in aquatic ecosystems.

Tatyana Livshultz, PhD *(Cornell University)* Assistant Curator of Botany. Assistant Professor. Expertise of the milkweed and dogbane family (Apocynaceae); evolution and species diversity of the genus Dischidia; differences in floral form and function.

Richard McCourt, PhD *(University of Arizona)* Associate Curator of Botany, Academy of Natural Sciences of Drexel University; 2010-2012: Program Director, Division of Graduate Education, National Science Foundation. Professor. Biodiversity, evolution, ecology, and systematic of green algae, specifically charophyte algae.

Jerry V. Mead, PhD *(SUNY ESF)* Assistant Scientist and Section Leader, Watershed and Systems Ecology Section. Assistant Research Professor. Spatial modeling of aquatic ecosystems; bioenergetics of aquatic invertebrates and fishes; effects of water level management on aquatic organisms; biophysical economics and watershed planning; stream geomorphology and environmental conditions; economics and biocorsservation; energy and fisheries.


Sean O'Donnell, PhD *(University of Wisconsin-Madison)*. Professor. Tropical ecology, focusing on geographic variation and elevation effects on ecology and behavior of army ants and ant-bird interactions; neurobiology, focusing on brain plasticity and brain evolution in social insects.

Marina Potapova, PhD *(Russian Academy of Sciences)* Assistant Curator. Assistant Professor. Taxonomy, ecology, and biogeography of freshwater diatoms; methods of quantifying morphological characters of diatom frustules based on geometric morphometrics; systematic of monoraphid freshwater diatoms.

Gary Rosenberg, PhD *(Harvard University)* Pilsbry Chair of Malacology. Professor. Magnitude and origin of species-level diversity in the Mollusca.

Jacob Russell, PhD *(University of Arizona)*. Assistant Professor. The functional significance and evolutionary histories of symbioses between insects and bacteria.

Ron Smith, MS *(Rutgers University)*. Instructor. Shorebird Ecology and Conservation; Amphibians of the NJ Pine Barrens; Restoration Ecology; Climate Change – Regional Effects and Education.

James R. Spotila, PhD *(University of Arkansas)* L. D. Betz Chair Professor. Professor. Physiological and biophysical ecology, thermoregulation of aquatic vertebrates, biology of sea turtles.

Loyc Vanderkluysen, PhD *(University of Hawaii)*. Assistant Professor. The cyclicity of volcanic eruptions, volcanic degassing processes, and large igneous provinces.

David J. Velinsky, PhD *(Old Dominion University)* Department Head, Biodiversity, Earth and Environmental Science. Professor. Geochemical cycling of organic and inorganic constituents of sediments and waters; Sedimentary diagenesis of major and minor elements; Isotope biogeochemistry of carbon, nitrogen and sulfur in marine and freshwater systems.

Jason Weckstein, PhD *(Louisiana State University)* Associate Curator of Ornithology. Associate Professor. Avian phylogenetics, comparative biology and evolutionary history; biodiversity surveys of birds and their parasites and pathogens; coevolutionary history of birds and their parasites.
Emeritus Faculty

John G. Lundberg, PhD (University of Michigan). Professor Emeritus. Diversity and diversification of fishes; documenting and interpreting the morphological, molecular, and taxonomic diversity of living and fossil fishes in the interrelated fields of systematic, faunistics and biogeography and paleobiology; exploration and collecting in poorly-known tropical freshwater habitats and regions.

Daniel Otte, PhD (University of Michigan) Senior Curator, Systematics and Evolutionary Biology. Professor Emeritus. Taxonomy and biogeography of Orthoptera (grasshoppers, crickets, katydids and their relatives).

Joint JD/PhD Law-Psychology Program

Major: Law and Psychology
Degree Awarded: Juris Doctor (JD) and Doctor of Philosophy (PhD)
Calendar Type: Semester and Quarter
Total Credit Hours: 85.0 Semester (JD) and 91.0 Quarter (PhD)
Classification of Instructional Programs (CIP) code: 22.0208
Standard Occupational Classification (SOC) code: 11-9199; 23-1011

About the Program

The Kline School of Law (http://drexel.edu/law) and the Department of Psychology (http://drexel.edu/coas/academics/departments-centers/psychology) in the College of Arts and Sciences offer a joint and integrated JD/PhD Program in Law and Psychology. The program melds two already ongoing successful endeavors, the JD degree in the School of Law and the PhD in clinical psychology in the Department of Psychology. See the JD-PhD Program webpage (http://drexel.edu/coas/academics/graduate-programs/psychology-law) for more information.

Students in the program complete all 85.0 semester credits required for graduation from the law school and all 91.0 quarter credits required to complete the doctorate. The program allows those students who wish to pursue professional degrees in both law and psychology a more efficient plan of study. The program is designed to be completed in seven (7) years, including required psychology practica, a year’s internship in an American Psychological Association accredited predoctoral mental health/forensic setting, a master’s thesis, a doctoral dissertation, and 20 hours per week of cooperative training and 50 hours of pro bono service in law.

Students who are accepted into the JD/PhD program will receive full tuition remission for all psychology coursework, plus a guaranteed annual stipend that is currently at least $15,000 per year for all six years they are at the university prior to completing the clinical internship. Students with outstanding LSAT scores are eligible for full tuition remission from the School of Law.

For information on the Admissions process, visit the JD/PhD Application Instructions (http://drexel.edu/coas/academics/graduate-programs/psychology-law/application-instructions) page.

Philosophy

The program bridges the gap between legal and psychological training. By and large, lawyers and social scientists come from different cultures, with different interests, different cognitive approaches to solving problems, different research methodologies, and different attitudes toward confrontation and argument. Each profession arrives at the “truth” in different ways, and its members are exposed to different styles of education during their post-baccalaureate training. Legal education develops an understanding of case analysis, statutory interpretation, the evolution of legal traditions, and methods for resolving disputes. Education in psychology develops research and clinical skills and understanding of behavioral theories, techniques, and statistical methods. Law, which has special rules concerning evidence and proof, relies heavily on precedent and the application of legal principles to specific facts toward the goal of settling conflicts that need immediate resolution. By contrast, psychology looks at problems through an empirical lens, using psychometrically-based tools and techniques to systematically evaluate questions, but rarely reaching a “final verdict.” Because the limits of evidence and the meaning of “proof” in psychological research may differ sharply from the limits of evidence and proof in law, conflict may result when the two disciplines interact.

Goals

Within the broad framework of the program’s philosophy, the JD/PhD Program in Law & Psychology has three specific goals:

• Develop scientist-practitioners who will produce legally sophisticated social science research to aid the legal system to make better empirically-based decisions;
• Produce lawyer-psychologists who will participate in the development of more empirically and theoretically sophisticated mental health policy by legislatures, administrative tribunals, and the courts; and
• Educate highly trained clinicians who can contribute to the advancement of forensic psychology in such areas as criminal law, domestic relations, and civil commitment.

In fulfilling these goals, the program trains students in an integrated and conceptually unified curriculum so they acquire a mature understanding of the interaction between the two disciplines.

Curriculum

Students attend the School of Law and the Department of Psychology simultaneously for six years, integrating course work in both disciplines each year. Students maintain continuous contact with the faculties of both schools and the developments in both disciplines over the course of each year.

In the seventh year, after obtaining the JD, students undertake a year-long supervised internship and complete their doctoral dissertation. They are awarded the PhD at the end of their seventh year.

Training consists of seven elements:

• The required existing core program in law and psychology at both schools;
• Interdisciplinary courses; e.g., Mental Health Law, Behavioral Sciences and the Law, Expert Witnesses, Law and the Mind Sciences;
• Supervised psycholegal research experience on teams of students’ faculty mentors;
• Legal clinics and psychology practica and internships that combine knowledge from both fields in a practical setting;
• Electives in both fields, e.g., bioethics, education law, health law, health psychology, employment discrimination, neuropsychology;
• Cooperative experience and pro bono service in legal settings; and
• Employment for at least one summer in a legal setting, e.g., public interest law firm, governmental agency, private law firm, nonprofit association.

Environmental Policy

Major: Environmental Policy
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 03.0201
Standard Occupational Classification (SOC) code: 19-1031

About the Program

The Master of Science in Environmental Policy program provides a comprehensive, multi-disciplinary approach to the development, implementation and evaluation of environmental policy. The program prepares students for careers as policy analysts who have a strong commitment to environmental values, are scientifically and methodologically competent, and can work effectively in the policy process with the various groups and institutions engaged in environmental issues.

To earn the degree, students must complete 45.0 credits of coursework designed to teach:

• knowledge of how policies are developed and implemented;
• the scientific and engineering basis of environmental policies;
• best practices in environmental policies at local, federal and international levels;
• an understanding of who the key players are in environmental politics, and how to work with them to accomplish environmental improvements.

For more information about this program, visit the MS in Environmental Policy page.

Admission Requirements

Environmental policy applicants must meet the general requirements for admission to graduate studies at Drexel University. The application also requires a personal statement (up to 500 words) describing the prospective student’s interest in environmental policy. Entering students typically begin study during the fall quarter. Students are able, though, to start the program during any quarter.

For additional information on how to apply, visit Drexel’s Admissions page for Environmental Policy.

Degree Requirements

Core Courses

<table>
<thead>
<tr>
<th>Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENVP 523</td>
<td>Environmental Regulations</td>
<td></td>
</tr>
<tr>
<td>ENVP 550</td>
<td>International Climate Finance</td>
<td></td>
</tr>
<tr>
<td>ENVP 552</td>
<td>Political Economy of Climate Change</td>
<td></td>
</tr>
<tr>
<td>ENVP T580</td>
<td>Special Topics in ENVP</td>
<td></td>
</tr>
<tr>
<td>ENVP 720</td>
<td>Environmental Cost-Benefit Analysis</td>
<td></td>
</tr>
<tr>
<td>ENVP 760</td>
<td>Social Change &amp; Environment</td>
<td></td>
</tr>
<tr>
<td>ENVP 798</td>
<td>Master's Project</td>
<td></td>
</tr>
<tr>
<td>ENVP I799</td>
<td>Independent Study in ENVP</td>
<td></td>
</tr>
<tr>
<td>ENVP 865</td>
<td>Special Topics</td>
<td></td>
</tr>
<tr>
<td>ENVP 870</td>
<td>Human Dimensions of Global Climate Change</td>
<td></td>
</tr>
<tr>
<td>ENVP 875</td>
<td>Environmental Justice</td>
<td></td>
</tr>
<tr>
<td>ENVP 880</td>
<td>Environment and Society</td>
<td></td>
</tr>
<tr>
<td>ENVS 501</td>
<td>Chemistry of the Environment</td>
<td></td>
</tr>
<tr>
<td>ENVS 506</td>
<td>Biostatistics</td>
<td></td>
</tr>
<tr>
<td>ENVS 528</td>
<td>Conservation Biology</td>
<td></td>
</tr>
<tr>
<td>ENVS 708</td>
<td>Environmental GIS</td>
<td></td>
</tr>
<tr>
<td>ENVS 726</td>
<td>Environmental Assessment</td>
<td></td>
</tr>
<tr>
<td>ENVP T880</td>
<td>Special Topics in ENVP</td>
<td></td>
</tr>
<tr>
<td>PLCY 503</td>
<td>Theory and Practice of Policy Analysis</td>
<td></td>
</tr>
<tr>
<td>PLCY 504</td>
<td>Methods of Policy Analysis</td>
<td></td>
</tr>
<tr>
<td>PLCY 506</td>
<td>Institutional Dynamics of the Policy Process</td>
<td></td>
</tr>
<tr>
<td>PLCY 509</td>
<td>Sustainability &amp; Public Policy</td>
<td></td>
</tr>
<tr>
<td>PBHL 520</td>
<td>Principles of Biostatistics</td>
<td></td>
</tr>
<tr>
<td>PBHL 701</td>
<td>Introduction to Descriptive Epidemiology and Biostatistics</td>
<td></td>
</tr>
<tr>
<td>SCTS 571</td>
<td>Science and Technology Policy</td>
<td></td>
</tr>
<tr>
<td>SCTS 641</td>
<td>Risk and Disaster Policy</td>
<td></td>
</tr>
<tr>
<td>STAT 601</td>
<td>Business Statistics</td>
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</tr>
</tbody>
</table>

Total Credits 45.0

• Within the first quarter of study, a student must meet with an assigned advisor and work out a plan of study.

Public Policy

Major: Public Policy
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 44.0501
Standard Occupational Classification (SOC) code: 11-1031; 19-3094

About the Program

The Master of Science in Public Policy program is a general professional masters degree designed for people who work, or who would like to work, for government or a nonprofit organization.

The program has a required core curriculum of nine courses, specifically designed for students to:

• develop an understanding of the social, political and ethical context of policy research, and how this understanding can be applied to an applied practice of policy analysis;
• conceptualize, design and conduct social research for policy purposes, as well as comprehensively analyze existing social research data;
• recognize the history of public policy institutions in America and the
  management and governance of nonprofit organizations; and
• understand the concept of sustainability as it relates to policy
  planning, design, and implementation.

In addition to the core courses, the program has a focus on case
study research as a unifying element of the curriculum. The curriculum
reinforces coursework with a series of accompanying 1-credit, online,
Case Study Research co-requisites. Students are required to choose a
specific case study topic that they will work on for the duration of the core
curriculum. In each subsequent Case Study Research course, students
continue further research and writing on their chosen case study topic.
Thus by the end of the program students will have produced a polished,
in-depth analysis of a specific case that they can use to demonstrate
expertise in a given policy area.

With the approval and support of the program director, students can craft
a specialized course of study with their three electives, or they can take
courses in the following:

• Educational Policy
• Science and Technology Policy
• Information Policy
• Environmental Policy
• City Management and Governance

For additional information, view the Center for Public Policy (http://
drexel.edu/coas/academics/departments-centers/public-policy) page on
the College of Arts and Sciences' website.

Admission Requirements

Acceptance for graduate study at Drexel University requires a four-year
bachelor's degree from an accredited institution in the United States or an
equivalent international institution. Although admission requirements vary
by program, regular acceptance typically requires a minimum grade point
average (GPA) of 3.0 for the last two years of undergraduate work. The
GPA for any graduate work must be at least 3.0.

The admission committee evaluates all credentials submitted by
applicants to determine a student's ability and potential to succeed in
graduate study. In addition, the committee is interested in the applicant’s
ability to contribute to his/her program of study and to the University
community as a whole.

Though part-time at 8.0 credits, Drexel is extending the same scholarship
opportunities to Master of Science in Public Policy students who enroll
that are usually only available for full-time programs.

Visit the Graduate Admissions (http://www.drexel.edu/grad/programs/
coas) website for more information about requirements and deadlines, as
well as instructions for applying online.

Degree Requirements

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 502</td>
<td>Essentials of Economics</td>
<td>3.0</td>
</tr>
<tr>
<td>ECON 616</td>
<td>Public Finance and Cost Benefit Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 601</td>
<td>Business Statistics</td>
<td></td>
</tr>
<tr>
<td>STAT 610</td>
<td>Statistics for Business Analytics</td>
<td></td>
</tr>
</tbody>
</table>

Take one of the following courses: 3.0

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ECON 550</td>
<td>Econometrics</td>
</tr>
<tr>
<td>COM 705</td>
<td>Data Analysis in Communication</td>
</tr>
<tr>
<td>INFO 680</td>
<td>US Government Information</td>
</tr>
<tr>
<td>PLCY 503</td>
<td>Theory and Practice of Policy Analysis</td>
</tr>
<tr>
<td>PLCY 504</td>
<td>Methods of Policy Analysis</td>
</tr>
<tr>
<td>PLCY 506</td>
<td>Institutional Dynamics of the Policy Process</td>
</tr>
<tr>
<td>PLCY 507</td>
<td>Nonprofit Organizations</td>
</tr>
</tbody>
</table>

Case Study Courses 9.0

The curriculum reinforces coursework with a series of accompanying
1-credit, online, Case Study Research courses. In the first, students
are introduced to case study methodology and practice, and required
to choose a specific case that they will work on for the duration of the core
curriculum. In each subsequent Case Study Research course, students
continue further research and writing on their chosen case study topic. Thus by the end of the program students have produced a polished, in-depth analysis of a specific case that they can use to demonstrate expertise in a given policy area.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLCY 510</td>
<td>Introduction to Case Study Research</td>
</tr>
<tr>
<td>PLCY 511</td>
<td>Case Study Literature Review</td>
</tr>
<tr>
<td>PLCY 512</td>
<td>Case Study Document Review</td>
</tr>
<tr>
<td>PLCY 513</td>
<td>Case Study Interviews</td>
</tr>
<tr>
<td>PLCY 515</td>
<td>Case Study Colloquium</td>
</tr>
<tr>
<td>PLCY 516</td>
<td>Case Study Research II (1-credit course taken 3 times)</td>
</tr>
<tr>
<td>PLCY 517</td>
<td>Case Study Final Project</td>
</tr>
</tbody>
</table>

Elective Courses 9.0

Elective courses are taught under the PLCY 590: Special Topics
in Policy, or one of the participating departments. Students are required to take three 3-credit graduate level courses to fulfill
the electives requirement. Public Policy students are able to select
any graduate level courses (pending department approval) to create
an electives “track” based on their own interests. Students have
taken this opportunity to explore areas such as Education Policy,
Environmental Policy and Urban Systems.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PLCY 509</td>
<td>Sustainability &amp; Public Policy</td>
</tr>
<tr>
<td>PLCY 590</td>
<td>Course PLCY 590 Not Found</td>
</tr>
</tbody>
</table>

Total Credits 45.0

Science, Technology, and Society

Major: Science, Technology, and Society
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 30.1501
Standard Occupational Classification (SOC) code: 11-9121

About the Program

The Science, Technology, and Society (STS) program systemically
investigates the social dimensions of science, technology and medicine.
Faculty from a range of disciplines contribute to a curriculum that features
a broad set of perspectives, all grounded in a foundation of critical
thinking, research methods, and writing and presentation skills. The
STS program emphasizes three interrelated areas: environment and
sustainability; health and medicine; and information, identities and
networks. The STS Lab course is a unique feature of the curriculum—
it prepares students to work as a team to address meaningful science
and technology related topics. Working with a faculty adviser, graduate students develop an individualized plan of study that allows them to pursue their interests in depth.

STS students are independent, out-of-the-box thinkers who are dedicated to understanding the intersections of society, science, medicine and technology. While STS students vary widely in their professional and educational backgrounds and career ambitions, they share a common commitment to a critical approach to our world’s most pressing technoscientific challenges.

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

For additional information, visit the Master's Program in Science, Technology, and Society (http://drexel.edu/coas/academics/graduate-programs/science-technology-society) web page.

**Admission Requirements**

Applicants to the program must meet the general requirements for admission to graduate studies at Drexel University.

Prospective students must also submit a 500-word essay explaining why they want to enter the program and some of the issues related to science, technology and society that they would like to study. These statements are read carefully by the faculty screening committee to evaluate each applicant's sense of purpose. Entering students typically begin during the fall quarter. Students are able, though, to start the program during any quarter.

Visit the Graduate Admissions (http://www.drexel.edu/grad/programs/coas/science-technology-society) website for more information about requirements and deadlines, as well as instructions for applying online.

**Degree Requirements**

The program requires 45.0 credits of coursework. Required courses total 24.0 credits. Remaining credits are chosen from a list of electives.

**Basic Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCTS 501</td>
<td>Introduction to Science, Technology and Society</td>
<td>3.0</td>
</tr>
<tr>
<td>SCTS 502</td>
<td>Research Methods</td>
<td>3.0</td>
</tr>
<tr>
<td>SCTS 503</td>
<td>Advanced Research Methods</td>
<td>3.0</td>
</tr>
<tr>
<td>SCTS 504</td>
<td>Science, Technology &amp; Society Theories</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Advanced Requirements**

- Ethics, Values, Identities, and Culture: 6.0 credits
- Select two of the following:
  - SCTS 600 Contemporary Feminist Theory
  - SCTS 610 Material Culture
  - SCTS 612 Medical and Healthcare Ethics
  - SCTS 614 Technology, Progress, and Determinism
  - SCTS 615 The Biopolitics of Health
  - SCTS 620 Medicine, Technology and Science
  - SCTS 650 Global Subjects of Biocapital
  - SCTS 651 Transnational Science & Technology

**Select one of the following:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCTS 570</td>
<td>Environmental Policy</td>
<td>3.0</td>
</tr>
<tr>
<td>SCTS 571</td>
<td>Science and Technology Policy</td>
<td>3.0</td>
</tr>
<tr>
<td>SCTS 641</td>
<td>Risk and Disaster Policy</td>
<td>3.0</td>
</tr>
<tr>
<td>SCTS 643</td>
<td>Contemporary Stem Workforces; Organizations of</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Labor in Lab, Shop and Clinic</td>
<td></td>
</tr>
<tr>
<td>SCTS 645</td>
<td>War and Technoscience</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 650</td>
<td>Telecommunications Policy in the Information Age</td>
<td></td>
</tr>
<tr>
<td>PLCY 509</td>
<td>Sustainability &amp; Public Policy</td>
<td></td>
</tr>
<tr>
<td>INFO 725</td>
<td>Information Policy</td>
<td></td>
</tr>
</tbody>
</table>

**Science, Technology & Society Lab**: 3.0 credits

**Select one of the following:**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCTS 703</td>
<td>Connected Mobility Lab</td>
<td></td>
</tr>
<tr>
<td>SCTS 705</td>
<td>Identity and Intersectionality</td>
<td></td>
</tr>
<tr>
<td>SCTS 710</td>
<td>Special Topics in Science, Technology and Society</td>
<td></td>
</tr>
</tbody>
</table>

**Thesis and Electives**: 21.0 credits

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>SCTS 798</td>
<td>Master's Thesis</td>
<td>21.0</td>
</tr>
</tbody>
</table>

**Suggested Electives**

- SCTS 584 Historiography of Science
- SCTS 639 Politics of Life
- SCTS 640 STS Perspectives on Risk and Disaster
- SCTS 660 Theoretical and Sociological Aspects of Measurement
- SCTS 665 Advanced Topics in Philosophy of Science
- SCTS 697 Internship in Science, Technology and Society
- SCTS 790 Special Topics in Science, Technology & Society
- SCTS 799 Independent Study in Science, Technology and Society
- COM 690 Course COM 690 Not Found
- COM 701 Contemporary Social Theory
- COM 704 Research Methods in Communication
- COM 705 Data Analysis in Communication
- COM 720 Critical Theory
- COM 801 Seminar in Contemporary Theory
- MGMT 602 Managing Technology Innovation
- PBHL 516 Introduction to Public Health
- PLCY 504 Methods of Policy Analysis
- PSY 612 Psychology of Human-Computer Interaction Design
- PSY 712 History and Systems

**Total Credits**: 45.0

* Students who elect to pursue the Thesis option should complete 9.0 credits of SCTS 798 - Master's Thesis and select 12 credits from the list of suggested electives.

** Additional electives may be taken from other schools and colleges in the University with approval from the Director of the MS in Science, Technology & Society program.
Mathematics

Major: Mathematics
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS) or 90.0 (PhD)
Classification of Instructional Programs (CIP) code: 27.0101
Standard Occupational Classification (SOC) code: 15-2021; 15-2041

About the Program

The Department of Mathematics is a broadly based academic unit offering instructional programs and carrying on research activities in mathematics. Doctor of Philosophy and Master of Science degrees are offered.

Areas of research specialty among the faculty include applied mathematics, algebraic combinatorics, biomathematics, discrete mathematics, optics, analysis, number theory, numerical analysis, probability and statistics, matrix and operator theory, fluid mechanics, and partial differential equations.

Additional Information

For more information about theses graduate programs, visit Department of Mathematics (http://drexel.edu/coas/academics/graduate-programs/mathematics) webpage.

Admission Requirements

Applicants should hold a BS degree in mathematics or the equivalent and meet the University’s graduate admission standards. In particular, the student should have had intensive exposure to proof oriented courses, such as real analysis and abstract algebra. Students requesting financial aid are required to take the Graduate Record Examination General Test. Because many of the core courses are two- or three-term sequences beginning in the fall, new students are typically admitted to the programs only in the fall term. Admissions standards for the MS and PhD programs are equivalent.

For additional information on how to apply, visit Drexel University’s Graduate Admissions (http://www.drexel.edu/grad/programs/coas/mathematics) website.

Master of Science in Mathematics

Students must complete a minimum of 45.0 graduate credits for the MS degree. Of these 15 courses, the following six are required:

Required Courses

- MATH 504 Linear Algebra & Matrix Analysis 3.0
- MATH 505 Principles of Analysis I 3.0
- MATH 506 Principles of Analysis II 3.0
- MATH 533 Abstract Algebra I 3.0
- MATH 630 Complex Variables I 3.0
- MATH 633 Real Variables I 3.0

The remaining 9 courses may be any graduate mathematics courses. In some cases, course substitutions may be made with courses from other departments. Elective courses taken outside the department must receive prior departmental approval in order to be counted toward the degree.

There are no thesis, language, or special examination requirements for the master’s degree.

Students seeking a dual MS must satisfy core requirements for both degree programs.

Students should note that some departmental courses, such as Advanced Engineering Mathematics, are foundation courses and do not contribute to the departmental requirements for the degree. They do count toward the University requirements for a degree.

PhD in Mathematics

Students must complete a minimum of 45 graduate credits for the PhD degree, in addition to the 45.0 required by the MS program, for a total of 90.0 credits. Of the 45.0 credits of MS program courses, the following six are required:

Required Courses

- MATH 504 Linear Algebra & Matrix Analysis 3.0
- MATH 505 Principles of Analysis I 3.0
- MATH 506 Principles of Analysis II 3.0
- MATH 533 Abstract Algebra I 3.0
- MATH 630 Complex Variables I 3.0
- MATH 633 Real Variables I 3.0

The remaining 27.0 credits, comprising the MS segment of the PhD program, may be any graduate mathematics courses. In some cases, course substitutions may be made with courses from other departments. Elective courses taken outside the department must receive prior departmental approval in order to be counted toward the degree.

The student must pass a written qualifying exam. The student is allowed two attempts. Students must take exam at the end of their first year, and have a second opportunity in September of their second year.

Students must take a PhD candidacy exam at the end of their second year. Additional coursework to reach the 90.0 credits required for the PhD will be agreed upon with the student’s Graduate Advisor. Students should note that some departmental courses, such as MATH 544 Advanced Engineering Mathematics, are foundation courses and do not contribute to the departmental requirements for the degree. They do count toward the University requirements for a degree.

Facilities

Department computers are accessible from residence halls over the campus network, and from off-campus via modem or an Internet Service Provider (ISP). Departmental and university networks provide access to the Internet and the Pennsylvania Education Network (PrepNET). Departmental research computers have a connection to the campus backbone at 100 Mbps and are also on the vBNS via a campus OCS ATM connection.

The computing resources of the Mathematics Department include:

- Math Resource Center (Korman 247): 6 Dell Optiplex (Core 2 Duo 2.8 GHz, 3 GB RAM) running Windows XP Professional SP3.
- Faculty Center (Korman 207): 2 Lenovo ThinkCentre (Pentium 4 3.0 GHz, 1 GB RAM) running Windows XP Professional SP3.
- Computer Server: One Penguin Server (Dual 2.2 GHz Opteron, 8 GB RAM) running Ubuntu Linux.
- File/Print/Mail/Web Server: 2 Penguin Servers (Dual 2.8 GHz Zeon, 1 GB RAM) running Ubuntu Linux and connected to 600GB RAID
5 Disk over a fully switched gigabit Ethernet network, 2TB mirrored RAID.

Mathematics Faculty

David M. Ambrose, PhD (Duke University) Associate Department Head, Mathematics. Associate Professor. Applied analysis and computing for systems of nonlinear partial differential equations, especially free-surface problems in fluid dynamics.

Jason Aran, MS (Drexel University). Assistant Teaching Professor.

Jonah D. Blasiak, PhD (University of California at Berkeley). Associate Professor. Algebraic combinatorics, representation theory, and complexity theory.

Robert P. Boyer, PhD (University of Pennsylvania) Associate Head of the Mathematics Department. Professor. Functional analysis, C*-algebras and the theory of group representations.

Patrick Clarke, PhD (University of Miami). Assistant Professor. Homological mirror symmetry, Landau-Ginzburg models, algebraic geometry, symplectic geometry.

Daryl Falco, MS (Drexel University). Assistant Teaching Professor. Discrete mathematics and automata theory.

Raymond Favocci, MS (Drexel University). Assistant Teaching Professor.

Carlo Fazioli, PhD (University of Illinois at Chicago). Assistant Teaching Professor. Computational Fluid Dynamics, Free Boundary Problems.

Pavel Grinfeld, PhD (Massachusetts Institute of Technology). Associate Professor. Intersection of physics, engineering, applied mathematics and computational science.

Anatolii Grinshpan, PhD (University of California at Berkeley). Assistant Teaching Professor. Function theory and operator theory, harmonic analysis, matrix theory.

Yixin Guo, PhD (University of Pittsburgh). Associate Professor. Biomathematics, dynamical systems, ordinary and partial differential equations and math education.

R. Andrew Hicks, PhD (University of Pennsylvania). Professor. Geometry; optics; computer vision.


Robert Immordino, MS (Drexel University). Assistant Teaching Professor.

Ryan Kaliszewski, PhD (The University of North Carolina at Chapel Hill). Visiting Assistant Professor. Algebraic Combinatorics and Algebraic Geometry--specifically positivity results for generating polynomials.

Dmitry Kaliuzhnyi-Verbovetskyi, PhD (Kharkov University). Associate Professor. Operator theory, systems theory, complex analysis, C*-algebras and harmonic analysis.

Hwan Yong Lee, PhD (University of Utah). Assistant Teaching Professor. Electromagnetic wave propagation in composite media, optimization and inverse problem.

Huilan Li, PhD (York University). Assistant Teaching Professor. Algebraic combinatorics.

Georgi S. Medvedev, PhD (Boston University). Associate Professor. Ordinary and partial differential equations, mathematical neuroscience.

Taoufik Meklachi, PhD (University of Houston). Visiting Assistant Professor. Inverse Problems

Jennifer Morse, PhD (University of California, San Diego) Undergraduate Advisor. Professor. Algebraic combinatorics.

Shari Moskow, PhD (Rutgers University) Department Head. Professor. Partial differential equations and numerical analysis, including homogenization theory, numerical methods for problems with rough coefficients, and inverse problems.

Marna A. Mozef, MS (Drexel University). Associate Teaching Professor.

Oksana P. Odintsova, PhD (Omsk State University). Associate Teaching Professor. Math education; geometrical modeling.

Dimitrios Papadopoulos, MS (Drexel University). Instructor.

Ronald K. Perline, PhD (University of California at Berkeley). Associate Professor. Applied mathematics, numerical analysis, symbolic computation, differential geometry, mathematical physics.

Marc A. Perlstadt, PhD (University of California at Berkeley). Associate Professor. Applied mathematics, computed tomography, numerical analysis of function reconstruction, signal processing, combinatorics.

Adam C. Rickert, MS (Drexel University). Associate Teaching Professor.

Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

Gideon Simpson, PhD (Columbia University). Assistant Professor. Homotopy theory, operad theory, quantum mechanics, quantum computing.

Justin R. Smith, PhD (Courant Institute, New York University). Professor. Complex analysis, large deviation theory, mathematical physics, probabilistic combinatorics.

Jennifer Morse, PhD (University of California, San Diego). Assistant Professor. Partial differential equations, scientific computing and applied mathematics.

Justin R. Smith, PhD (Courant Institute, New York University). Professor. Complex analysis, large deviation theory, mathematical physics, probabilistic combinatorics.

Xiaoming Song, PhD (University of Kansas). Assistant Professor. Applied statistics, data analysis, calculus, discrete mathematics, biostatistics.

Vaishalee T. Wadke, MS (Columbia University). Instructor.
Richard D. White, MS (Penn State University). Assistant Teaching Professor.

Hugo J. Woerdeman, PhD (Vrije Universiteit, Amsterdam). Professor. Matrix and operator theory, systems theory, signal and image processing, and harmonic analysis.

J. Douglas Wright, PhD (Boston University) Graduate Advisor. Associate Professor. Partial differential equations, specifically nonlinear waves and their interactions.

Dennis G. Yang, PhD (Cornell University). Assistant Teaching Professor. Dynamical systems, neurodynamics.

Thomas (Pok-Yin) Yu, PhD (Stanford University). Professor. Multiscale mathematics, wavelets, applied harmonic analysis, subdivision algorithms, nonlinear analysis, applied differential geometry and data analysis.

Emeritus Faculty

Loren N. Argabright, PhD (University of Washington). Professor Emeritus. Functional analysis, wavelets, abstract harmonic analysis, the theory of group representations.

Robert C. Busby, PhD (University of Pennsylvania). Professor Emeritus. Functional analysis, C*-algebras and group representations, computer science.


William M.Y. Goh, PhD (Ohio State University). Associate Professor Emeritus. Number theory, approximation theory and special functions, combinatorics, asymptotic analysis.

Bernard Kolman, PhD (University of Pennsylvania), Professor Emeritus. Lie algebras; theory, applications, and computational techniques; operations research.

Charles J. Mode, PhD (University of California at Davis). Professor Emeritus. Probability and statistics, biostatistics, epidemiology, mathematical demography, data analysis, computer-intensive methods.


Physics

Major: Physics
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS); 90.0 (PhD)
Classification of Instructional Programs (CIP) code: 40.0801
Standard Occupational Classification (SOC) code: 19-2010

About the Program

The Department of Physics offers opportunities for students to study with leading researchers in astrophysics, biophysics, nonlinear dynamics, particle physics, and solid state physics, as well as to participate in international collaborations. Coursework for the MS and PhD degrees includes advanced training in core areas of physics and in the topics of current research. PhD students begin research early in the program, commencing thesis work in their second year of study.

To learn more about the graduate program in physics visit the Department of Physics (http://drexel.edu/coas/academics/graduate-programs/physics) webpage.

Admission Requirements

For admission to the graduate programs, a bachelor's degree in an approved program is required with a minimum undergraduate GPA of 3.0/4.0 specified.

The GRE Subject Test is required for PhD applicants to be considered for assistantships.

- minimum Quantitative Score = 150 (650 on previous 800-point scale)
- minimum Verbal Score = 150 (450 on previous 800-point scale).

Students from non-English speaking countries are required to demonstrate proficiency in English via the TOEFL exam. TOEFL scores are required for international applicants or applicants who earned a degree outside the US (minimum scores: 100/600/250). Scores will be reviewed based on section scores and total scores. IELTS scores may be submitted in lieu of TOEFL scores. The minimum IELTS band score is 7.0. Teaching assistants educated in non-English speaking countries must complete a special English program.

Visit the Graduate Admissions (http://www.drexel.edu/grad/programs/coas/physics) website for more information about requirements and deadlines, as well as instructions for applying online.

Master of Science in Physics

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

There are no thesis, language, or special examination requirements for the master's degree.

The degree requires 45.0 graduate credits, with at least 30.0 credits from the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 501</td>
<td>Mathematical Physics I</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 502</td>
<td>Mathematical Physics II</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 506</td>
<td>Dynamics I</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 511</td>
<td>Electromagnetic Theory I</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 512</td>
<td>Electromagnetic Theory II</td>
<td>3.0</td>
</tr>
<tr>
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<td>Quantum Mechanics I</td>
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<tr>
<td>PHYS 517</td>
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<tr>
<td>PHYS 518</td>
<td>Quantum Mechanics III</td>
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<tr>
<td>PHYS 521</td>
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<tr>
<td>PHYS 522</td>
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</table>

PHD in Physics

90.0 quarter credits
The Department of Physics offers opportunities for students to study with leading researchers in astrophysics, biophysics, nonlinear dynamics, particle physics, and solid state physics, as well as to participate in international collaborations. Coursework for the PhD degree includes advanced training in core areas of physics and topics of current research. PhD students begin research early in the program, commencing thesis work in their second year of study.

The usual schedule for physics graduate students consists of two years of coursework, qualifying exams, and research training, followed by dissertation research. All PhD students follow a common set of ten core courses during their first two years of study. In addition to these core courses, students also take four special topics courses.

**PhD students Admitted with Post-Master’s Status**

Students who are admitted for PhD study with “post-masters” status must take 15.0 credits of graduate coursework with a minimum GPA of 3.0 to become doctoral candidates. Courses are to be chosen in consultation with the Director of Graduate Studies. Post-masters students are expected to pass the written and oral qualifying exams by the end of the Spring quarter of their first year of study. Ordinarily, this means taking the written qualifying exam in September before the start of classes. To be prepared for the oral exam, post-masters students should begin research as soon as possible.

**Program Requirements**

Doctoral candidates are required to complete a minimum of 45.0 credits of coursework and research work beyond the master’s requirement of 45.0 credits while maintaining a minimum of 3.0 GPA.

**Core Courses**

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>PHYS 501 Mathematical Physics I</td>
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<tr>
<td>PHYS 506 Dynamics I</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 502 Mathematical Physics II</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 516 Quantum Mechanics I</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 521 Statistical Mechanics I</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 517 Quantum Mechanics II</td>
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<table>
<thead>
<tr>
<th>Second Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PHYS 522 Statistical Mechanics II</td>
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<tr>
<td>PHYS 518 Quantum Mechanics III</td>
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<tr>
<td>PHYS 511 Electromagnetic Theory I</td>
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<tr>
<td>PHYS 512 Electromagnetic Theory II</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Select four of the following: 12.0

- PHYS 531 Galactic Astrophysics
- PHYS 532 Cosmology
- PHYS 561 Biophysics
- PHYS 553 Nanoscience
- PHYS 562 Computational Biophysics
- PHYS 563 Single Molecule Methods
- PHYS 571 Nonlinear Dynamics
- PHYS 576 Introduction to Particle Physics
- PHYS 626 Solid State Physics I
- PHYS 750 Course PHYS 750 Not Found

**Research Training**

Students begin research in the first year with two small projects. In the spring quarter, this project culminates in a talk presented to the other students and Director of Graduate Studies. In the summer quarter, the project requires a written report to the research advisor. Research during the second year is toward the oral qualifying exam, described below.

**Candidacy Examination**

PhD candidates must pass a Candidacy Examination, which consist of two parts: written and oral:

- The written portion of the qualifying examination is given twice a year, during the week before the fall quarter begins and during the first week of classes of the winter term. Students must pass the written qualifying examination no later than the winter quarter of their second year. At most two attempts may be made at passing the exam. The qualifying examination covers four general areas at the advanced undergraduate level: classical mechanics, electricity and magnetism, quantum mechanics, and statistical physics.
- The oral portion of the qualifying exam is based on original research performed by the student, which consists in an oral presentation and a written report of no less than 15 pages, submitted to the examination committee and the Director of Graduate Studies at least one week prior to the exam. Immediately after the public presentation, the Examination Committee will privately conduct an oral examination. This exam must be passed by the end of the second year of study.

**Dissertation Defense**

This dissertation defense includes a final public presentation and defense of the dissertation. The dissertation must be submitted to the Examination Committee at least two weeks prior to the oral defense. The oral presentation involves a public 45-60 minute presentation by the candidate followed by an unspecified period during which the Examination Committee will ask questions. All doctoral dissertations, in addition to originality and scholarly content, must conform to University format requirements.

**Plan of Study (PhD)**

The following sample plan of study contains the required courses for full-time PhD students entering without a previous Master’s degree. Post-master’s students should consult the Director of Graduate Studies.

<table>
<thead>
<tr>
<th>Term</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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<td>PHYS 501 Mathematical Physics I</td>
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<tr>
<td>PHYS 506 Dynamics I</td>
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</tr>
<tr>
<td>Special Topics Course*</td>
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</tr>
<tr>
<td>Term Credits</td>
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</tr>
<tr>
<td>Winter</td>
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</tr>
<tr>
<td>PHYS 502 Mathematical Physics II</td>
<td>3.0</td>
</tr>
<tr>
<td>PHYS 516 Quantum Mechanics I</td>
<td>3.0</td>
</tr>
<tr>
<td>Special Topics Course*</td>
<td>3.0</td>
</tr>
<tr>
<td>Term Credits</td>
<td>9.0</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>PHYS 521 Statistical Mechanics I</td>
<td>3.0</td>
</tr>
</tbody>
</table>
PHYS 517 Quantum Mechanics II 3.0

Term Credits 6.0

Second Year

Fall
PHYS 522 Statistical Mechanics II 3.0
PHYS 518 Quantum Mechanics III 3.0
Special Topics Course* 3.0

Term Credits 9.0

Winter
PHYS 511 Electromagnetic Theory I 3.0
Special Topics Course* 3.0

Term Credits 6.0

Spring
PHYS 512 Electromagnetic Theory II 3.0
PHYS 997 Research 1.0-12.0

Term Credits 4.0-15.0

Total Credit: 43.0-54.0

* Special topics courses are an introduction to current topics of experimental and theoretical interest. They are offered in alternate years.

Academic Year 2013/2014 (odd)

Fall
PHYS 531 Galactic Astrophysics 3.0
PHYS 561 Biophysics 3.0

Term Credits 6.0

Winter
PHYS 532 Cosmology 3.0
PHYS 562 Computational Biophysics 3.0

Term Credits 6.0

Spring
PHYS 563 Single Molecule Methods 3.0
PHYS 750 Course PHYS 750 Not Found (Quantum Field Theory) 3.0

Term Credits 6.0

Total Credit: 18.0

Academic Year 2014/2015 (even)

Fall
PHYS 626 Solid State Physics I 3.0
PHYS 576 Introduction to Particle Physics 3.0

Term Credits 6.0

Winter
PHYS 553 Nanoscience 3.0
PHYS 571 Nonlinear Dynamics 3.0

Term Credits 6.0

Spring
To be announced

Term Credits 0.0

Total Credit: 12.0

Additional information for graduate students is available at the Department of Physics (http://www.physics.drexel.edu).

Facilities

Astrophysics Facilities:

- The Numerical Astrophysics Facility emphasizes theoretical and numerical studies of stars, star clusters, the early Universe, galaxy distributions, cosmology modeling, and gravitational lensing. The facility employs special purpose high-performance computers, such as the Gravity Pipeline Engine (GRAPE), a new Beowulf cluster (128 processors, 128G RAM, 2 TB RAID disk), and a system using Graphics Processing Units to achieve computational speeds of up to a trillion floating point operations per second. The Joseph R. Lynch Observatory houses a 16-inch Mead Schmidt-Cassegrain telescope equipped with SBIG CCD camera. Drexel faculty and students are active in analyzing data from the Sloan Digital Survey, which operates a 2.5-m telescope at Apache Point, N.M., and the Large Synoptic Survey Telescope to be built in Chile (first light 2020).

Biophysics Facilities:

- Bio-manipulation and microscopy laboratories. Four optical tables and six research grade microscopes are configured to perform microscopic spectroscopy and manipulation on solutions and individual cells. A spatial light modulator allows spatial patterns to be encoded on samples and explored; all microscopes are temperature controlled with state of the art cameras, including a 2,000 frame per second high speed system. Each optical table is also equipped with high power lasers for photolysis or fluorescence spectroscopy. Microfluidic attachments are present on one table, and in an adjacent laboratory, a small microfluidic fabrication facility has been established.
- Fluorescence microscope to resolve fast biomolecular dynamics in living cells.
- Experimental biophysics lab for studies of proteins and biomimetic lipids.
- The Computational Biophysics facility also includes: (i) a Beowulf cluster with 46 dual Quad-core hyperthreaded Xeon CPU (736 cores) and 12Gb of RAM nodes plus a master with 1Tb of storage and 24Gb of RAM, (ii) a Beowulf cluster with 44 dual-core Xeon CPU (344 cores), (iii) a dual Quad-core hyperthreaded Xeon CPU workstation with 24Gb RAM and 3Tb disk with two Tesla C2050 GPU CUDA-accelerated graphics card, (iv) a dual Quad-core hyperthreaded Xeon CPU workstation with 8Gb RAM and 4Tb disk with an NVIDIA N280 GPU CUDA-accelerated graphics card, (v) a quad 8-core hyperthreaded Xeon CPU workstation with 128Gb RAM and 16Tb total disk, (vi) a 72Tb file server with 12Gb RAM, (vii) a 96Tb quad 6-core file server with 64Gb RAM, (viii) and several Linux workstations connected through a gigabit network.

Condensed Matter Facilities:

- Ultra-low temperature laboratory has a dilution refrigerator, 3He and 4He cryostats and microwave sources to study quantum phenomena in nano- and microscale devices, superconducting qubits, nanostructures and quantum fluids and solids.
- The Energy Materials Research Laboratory includes a Variable Temperature UHV Scanning Probe Microscope installed in an STC-50 rated acoustic chamber.
- The Magnetic material laboratory conducts research on amorphous magnetic thin films and fiber optical sensors.
• The Surface science laboratory has a scanning probe microscopy to study surface structure interfaces at the atomic level.

**Particle Physics Facilities:**
- The Detector Development Laboratory provides experimental support for an international research program in non-accelerator nuclear and particle physics, including measurements of neutrino properties, tests of conservation laws, and searches for rare interactions.

**Laboratory for High-Performance Computational Physics:**
- This computer lab has 15 powerful workstations each with Intel Core i5 3570 running at 3.4 Ghz, 16 Gb RAM, and an nVidia GTX 650 graphics card. They are running Ubuntu 13.04 operating system. Each workstation has a 24 inch screen monitor. These workstations are connected to our main file server via the highest quality gigabyte network connectors.

**Physics Faculty**

Alexey Aprelev, PhD (St Petersburg State University). Assistant Teaching Professor. Experimental biophysics.

Shyamalendu Bose, PhD (University of Maryland). Professor. Theory of surfaces and interfaces, disordered systems, electron and X-ray spectroscopy of solids, high-temperature superconductivity.

Luis R. Cruz Cruz, PhD (MIT). Associate Professor. Correlation studies and density map analysis of the loss of spatial organization of neurons in the aged brain: computational studies of the folding of the Alzheimer amyloid beta protein using all-atom molecular dynamics; cellular automata models of the growth of plaques in Alzheimer’s disease; fluid flow through porous media using computer lattice models.

N. John Dinardo, PhD (University of Pennsylvania) Vice Provost for Academic Affairs. Professor. Vibrational and electron dynamics at semiconductor surfaces and interfaces, metal-semiconductor interfaces, polymer surfaces and interfaces, diamond-like carbon thin films, and protein and cell interactions with biomaterials surfaces.

Michelle Dolinski, PhD (University of California, Berkeley). Assistant Professor. Neutrino physics, rare nuclear decays, cryogenic detector technologies.


Robert Gilmore, PhD (Massachusetts Institute of Technology). Professor. Applications of compact and non-compact Lie algebras for problems in nuclear, atomic, and molecular physics; nonlinear dynamics and chaos and the analysis of chaotic data.

David M. Goldberg, PhD (Princeton University) Associate Dean for Research and Graduate Education, Associate Department Head for Undergraduate Studies. Professor. Theoretical and computational cosmology, extragalactic astrophysics, parallel computing.

Maher Harb, PhD (University of Toronto). Assistant Professor. Solid state physics; ultrafast Electron diffraction; time-resolved X-ray diffraction; nanofabrication; nano/microfluidics; instrument development; vacuum technologies.

Goran Karapetrov, PhD (Oregon State University). Associate Professor. Experimental solid state physics, scanning probe microscopy, nanoscale catalysis, mesoscopic superconductivity.

Charles Lane, PhD (California Institute of Technology). Professor. Experimental tests of invariance principles and conservation laws, experimental search for magnetic monopoles and high-energy cosmic neutrinos, solar neutrinos and neutrino oscillations.


Christina Love, PhD (Temple University). Assistant Teaching Professor. Educational methods and technology, STEM education, science literacy and outreach, particle physics, astrophysics.

Stephen L. W. McMillan, PhD (Harvard University) Department Head. Professor. Stellar dynamics, large-scale computations of stellar systems, and high-performance special-purpose computers.

Naoko Kurahashi Neilson, PhD (Stanford University). Assistant Professor. Neutrino physics, high energy astro-particle physics.

Russell Neilson, PhD (Stanford University). Assistant Professor. Dark matter, neutrino physics.

Gordon Richards, PhD (University of Chicago). Professor. Quasars, active galactic nuclei, supermassive black holes, sky surveys, gravitational lensing, galaxy evolution.

Richard I Steinberg, PhD (Yale University). Professor. Experimental tests of invariance principles and conservation laws, experimental search for magnetic monopoles and high-energy cosmic neutrinos (MACRO experiment at Gran Sasso Laboratory, Italy), solar neutrinos and neutrino oscillations (CHOOZ project).

Somdev Tyagi, PhD (Brigham Young University) Associate Head of Non-Major Studies in Physics. Professor. Nanobiophysics, Raman spectroscopy, magnetic materials.

Brigita Urbanc, PhD (University of Ljubljana, Slovenia). Associate Professor. Landau-Ginsburg theory of ferroelectric liquid crystals; cellular automaton model of Alzheimer’s senile plaque growth; protein folding and assembly relevant to Alzheimer’s and Parkinson’s diseases; discrete (discontinuous) molecular dynamics simulations and coarse-grain protein models; applications of automated neuron recognition and density map methods to quantify spatial correlations in aging brain.

Michel Vallières, PhD (University of Pennsylvania). Professor. Shell-model and mean field studies of nuclei on and off beta-stability, chaotic scattering, computational physics.

Michael Vogeley, PhD (Harvard University) Associate Head of Graduate Studies in Physics. Professor. Cosmology; galaxy formation and evolution; statistical analysis of large data sets; active galactic nuclei.

Jian-Min Yuan, PhD (University of Chicago). Professor. Protein folding, signal transduction pathways, computational biophysics, nonlinear dynamics and chaos in atomic and molecular systems, protein folding.

**Interdepartmental Faculty**

Jonathan E. Spairier, PhD (Columbia University) Associate Dean, Strategic Planning, College of Engineering. Professor. Electronic, ferroic and plasmonic nanostructures and thin-film materials and interfaces;
scanning probe microscopy; laser spectroscopy, including Raman scattering.

Emeritus Faculty

Leonard D. Cohen, PhD (University of Pennsylvania), Professor Emeritus.

Leonard X. Finegold, PhD (University of London), Professor Emeritus.

Biological physics and granular physics.

Richard D. Haracz, PhD (Wayne State University). Professor Emeritus.

Frederick House, PhD (University of Wisconsin). Professor Emeritus.

Arthur P. Joblin, PhD (Drexel University). Professor Emeritus.

Donald C. Larson, PhD (Harvard University). Professor Emeritus.

Arthur E. Lord, PhD (Columbia University). Professor Emeritus.

James McCray, PhD (California Institute of Technology). Professor Emeritus.


Programs in Psychology and Clinical Psychology

Major: Psychology
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS) or 91.0 (PhD)
Classification of Instructional Programs (CIP) code: 42.0101
Standard Occupational Classification (SOC) code: 19-3031; 19-3032; 19-3039

About the Programs

The MS in Psychology program is designed for students interested in advanced education in scientific psychology in order to obtain further educational or career opportunities.

The PhD in Psychology with the specialization in Clinical Psychology program places equal emphasis on clinical research and the application of scientific principles.

The PhD in Psychology with a specialization in Applied Cognitive and Brain Science program is designed for students who wish to pursue a research based career in human experimental psychology with a concentration in applied cognitive and brain science.

For more information, visit the Department of Psychology (http://drexel.edu/coas/academics/departments-centers/psychology) website.

Master of Science in Psychology

The master of science degree in the Department of Psychology, College of Arts & Sciences, is ideal for students interested in pursuing graduate education in scientific psychology and research methods.

The program is an opportunity for students to take their first step into graduate education, and to begin a path toward further educational and career opportunities. These opportunities may include further graduate-level training leading to a PhD, a career in research, or other educational and administrative opportunities. The curriculum is focused on training in a range of research experience in neurocognitive and behavioral sciences. In addition to required coursework, students are required to complete a minimum of eight hours per week with a research mentor in laboratory activities. These activities culminate with the successful completion of an empirical thesis.

Requirements for Admission

Applicants must meet the general University requirements for admission, including a minimum 3.0 GPA (on a 4.0 scale) for the last two years of undergraduate study. Applicants to the graduate program in psychology are also required to submit scores from the Graduate Record Examination (GRE) general tests. Only applications for full-time status are considered.

Various factors are considered in choosing students. These include background in psychology, undergraduate (and, if applicable, graduate) GPA, GRE scores, a personal essay, and letters of recommendation. The minimum expected combined GRE score is 302, with scores 150 on each section (verbal, quantitative) of the GRE.

For additional information on how to apply, visit Drexel’s Admissions Requirements for Psychology (http://www.drexel.edu/grad/programs/coas/psychology) page.

Degree Requirements

The general requirements for earning the MS degree in psychology are as follows:

• Completion of all required coursework with a minimum grade point average of 3.0, with no grade lower than a B in any required (non-elective) course and no more than two course grades of C or lower.
• Successful completion of a minimum of 45.0 course credits. Students take required courses and select additional electives.
• Successful completion of required research laboratory hours (8 hours per week for 2 years).
• Completion of an empirical thesis.

For more information on specific requirements, consult the Master’s of Science in Psychology (http://drexel.edu/coas/academics/graduate-programs-psychology) website.

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tr>
<td>PSY 699</td>
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</tr>
<tr>
<td>PSY 701</td>
<td>Research Methods II</td>
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</tr>
<tr>
<td>PSY 702</td>
<td>Cognitive Psychology</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 850</td>
<td>Data Analysis in Psychology</td>
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<tr>
<td>PSY 851</td>
<td>Behavior Analysis</td>
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<td>PSY 852</td>
<td>Data Analysis II</td>
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<tr>
<td>PSY 853</td>
<td>Master’s Thesis in Psychology</td>
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<tr>
<td>PSY 855</td>
<td>Additional Electives</td>
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</table>

Total Credits 45.0

PhD in Psychology: Clinical Psychology

The Ph.D. Program in Clinical Psychology program is a scientist-practitioner-oriented program that is fully accredited by the American Psychological Association (APA). It encompasses five years of full-time study and provides graduate students with a strong foundation in relevant psychological theory, experience in the practice of psychological assessment and intervention, experience in conducting meaningful clinical
research, and opportunities to develop teaching competencies. See the Clinical Psychology Program's website (http://drexel.edu/coas/academics/graduate-programs/psychology-clinical) for more information.

**Requirements for Admission**

All students are admitted with the expectation that they intend to complete the PhD degree. However, before advancing to doctoral-level studies, students must earn the MS, including completion of a master’s thesis. Admitted students who hold a bachelor’s degree are expected to complete both the master’s degree and post-master’s portions of the Drexel curriculum. Applicants who already hold a master’s from another university may be admitted with post-master’s status if their graduate-level preparation is deemed equivalent to the master’s portion of the Drexel curriculum.

**Requirements for Students Enrolling with a Bachelor’s Degree**

For those entering with a bachelor’s degree, the PhD program requires approximately five years to complete. The first two years of training correspond to the master’s-level studies: focusing on clinical areas such as entry-level assessment and intervention skills, psychopathology, and specialized study in Clinical Neuropsychology, Clinical Health psychology, Cognitive and Behavioral Psychology, Clinical Child Psychology and/or Forensic Psychology. These two years also include a major focus on research skills, involving statistics, research design, and supervised research experience with the mentor. Entry-level assessment, intervention, and teaching skills are also developed.

By the end of the first two years of study, students should have completed 45.0 credits of coursework, maintained a GPA of at least 3.5, developed and defended a thesis, passed comprehensive examinations and completed practicum experience, both internally (Psychological Service Center) and external clinical practicum experiences. Students demonstrating satisfactory performance in these areas will be admitted to post-master’s status.

**Requirements for Students Who Already Hold a Master’s Degree**

Students entering with a master’s degree from another university complete the PhD requirements in 4-5 years. The master’s degree should have included an experimental thesis. Students lacking this prerequisite will still be considered for admission, but such students will be required to complete a research project equivalent to the Drexel master’s thesis. In addition, students must demonstrate a GPA of at least 3.5 in master’s-level courses in order to be accepted for post-master’s status.

For additional information on how to apply, visit Drexel’s Admissions Requirements for Psychology (http://www.drexel.edu/grad/programs/coas/psychology-phd) page.

**Curriculum**

The program in Clinical Psychology curriculum follows the scientist-practitioner model and APA guidelines on accreditation of doctoral clinical psychology programs. It also considers state licensing guidelines and various publications that have been written on the topic of doctoral education, training, and credentialing in clinical psychology, as well as the specialty areas of Clinical Neuropsychology, Clinical Health Psychology, Cognitive and Behavioral Psychology, Clinical Child Psychology and/or Forensic Psychology.

The following section outlines the courses required for graduation for entering Bachelor’s-level students. The PhD program curriculum requires the student to earn a minimum of 90.0 credits. Typically, students enroll in 27.0 credits during the first year, 22.0 credits during the second and third years, 12.0 credits in the fourth year, and 8.0 credits during the fifth/final internship year. Drexel University operates on a calendar of four eleven-week terms. Students in the program do not take courses during summer term in order to complete research projects and continue clinical practicum training.

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

**Required Courses**

**Foundations of Psychology**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 516</td>
<td>Developmental Psychology</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 712</td>
<td>History and Systems</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Statistics/Research Methods**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 510</td>
<td>Research Methods I</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 610</td>
<td>Data Analysis in Psychology</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 710</td>
<td>Data Analysis II</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 711</td>
<td>Data Analysis III: Advanced Topics</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 898</td>
<td>Master's Thesis in Psychology</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 998</td>
<td>Ph.D. Dissertation in Psychology</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Biological Bases of Behavior**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 630</td>
<td>Biological Basis of Behavior and Treatment</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Select one of the following:

- PSY 530 Neuroanatomy and Behavior
- PSY T880 Special Topics in Psychology

**Cognitive/Affecive Bases of Behavior**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 812</td>
<td>Cognitive Neuroscience</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Select one of the following:

- PSY 512 Cognitive Psychology
- PSY 614 Problem Solving & Creativity
- PSY 616 Motivation and Emotion

**Social Bases of Behavior**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 518</td>
<td>Social Psychology</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 550</td>
<td>Multicultural Perspectives in Psychology</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Clinical and Professional Training General Foundations of Practice**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 520</td>
<td>Psychopathology</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 524</td>
<td>Professional Issues and Ethics</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 560</td>
<td>Teaching, Consultation and Supervision in Psychology</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Foundations of Psychological Evaluation/Measurement**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 515</td>
<td>Clinical Case Conceptualization</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 522</td>
<td>Psychological and Intellectual Assessment</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 620</td>
<td>Personality Assessment</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Foundations of Intervention**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PSY 721</td>
<td>Principles of Psychotherapy</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 722</td>
<td>Theories of Intervention</td>
<td>3.0</td>
</tr>
<tr>
<td>PSY 820</td>
<td>Cognitive-Behavioral Therapy</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Forensic psychology involves the application of assessment and intervention techniques to informing legal decision-makers and attorneys regarding the range of human functioning and disability. The student is able to pursue specific interests in geriatrics, pediatrics, traumatic brain and clinical experiences designed to train the students for professional practice in neuropsychology. Clinical neuropsychology involves the application of psychological assessment and intervention to the problems encountered by people with brain injury or illness. The knowledge of brain-behavior functioning and the incorporation of neuropsychological conceptualizations with traditional clinical conceptualizations of functioning are aimed at providing the student with a wider perspective regarding the range of human functioning and disability. The student is able to pursue specific interests in geriatrics, pediatrics, traumatic brain injury, and rehabilitation.

In addition to the core curriculum:

- One neuropsychology practicum
- A neuropsychology-focused thesis and dissertation
- Required classes: Neuropsychological Assessment, Neuropsychological Case Analysis and Integration
- At least two neuropsychology electives: Learning and Memory, Rehabilitation, Psychology, Principles of Neuroscience, Advanced Neuropsychological Assessment and Intervention: Children and Adolescents, Neuropsychology and Brain Imaging

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

In addition to the core curriculum:

- One forensic psychology practicum
- A forensic psychology-focused thesis and dissertation
- At least two years of research in an area related to forensic psychology
- Required classes: Forensic Assessment I and II, Mental Health Law
- At least two forensic psychology electives.

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

In addition to the core curriculum:

- One health psychology practicum
- A health psychology-focused thesis and dissertation
- Required classes: Health Psychology, Evidence-Based Assessment and Psychotherapy, Behavioral Stress Management
- At least three Health Psychology electives

Cognitive and Behavioral Psychology
Cognitive behavior therapy (CBT) represents a broad family of psychological interventions that are grounded in scientific theories and principles derived from psychology and related disciplines, and that stress the empirical validation of intervention methods. Various theories, principles, models, and techniques fall under the general rubric of CBT, and these approaches have been applied to the full range of human experience, from the assessment and treatment of severe psychopathology and profound developmental delays to primary prevention efforts to enhancing peak performance among athletes.

Common features of the various CBT approaches include a focus primarily on the present rather than the past, an emphasis on parsimony in theoretical explanations, grounding in learning principles (including principles related to how we interpret the world and/or how we related to our own experience), and the emphasis on epistemological empiricism. The aim of this major area of study is to provide pre-specialty training in order to prepare graduate students for academic and/or clinical positions in which CBT is a primary focus.

Additional requirements beyond the core curriculum include:

- One Cognitive and Behavioral Psychology-oriented practicum
- A Cognitive and Behavioral Psychology-focused thesis and/or dissertation
- Required classes: Advanced Cognitive Behavioral Therapy, Evidence Based Assessment and Treatment, Acceptance Based Behavioral Therapy
- At least two Cognitive and Behavioral Psychology electives
Clinical Child Psychology

The clinical child psychology major area of study is designed for students who have strong clinical and/or research interests in working with children and adolescents. Students in this major area of study will complete the required courses taken by all clinical psychology students and will also enroll in child-related elective courses designed to help them develop a greater degree of expertise in working with child and adolescent populations. It is expected that students completing this specialization will develop an appreciation of the research literature in the clinical child area and will possess specialty skills that enable them to function as competent practitioners in the child/adolescent area upon graduation.

Additional requirements beyond the core curriculum include:

- One Clinical Child Psychology oriented practicum
- A Clinical Child Psychology focused thesis and/or dissertation
- Required classes: Child Psychopathology, Pediatric Psychology, Neuropsychological Evaluation and Intervention of Children and Adolescents
- At least two Clinical Child Psychology electives

For more information on the PhD program requirements, contact the Clinical Psychology PhD Program (http://drexel.edu/coas/academics/graduate-programs/psychology-clinical/contact).

PhD in Psychology: Applied Cognitive and Brain Science (ACBS)

The Department of Psychology’s program in Applied Cognitive and Brain Sciences (ACBS) program is a research-oriented, non-clinical program in experimental psychology and/or cognitive neuroscience. The program places equal emphasis on basic research and the application of scientific principles. Please visit the ACBS website (http://drexel.edu/coas/academics/graduate-programs/psychology-applied-cognitive-and-brain-science) for more information.

Admissions

Drexel University is seeking applicants with a strong academic record, as evidenced by their GRE scores (a quantitative plus verbal sum of 1250 or greater is desirable), strength of undergraduate institution and GPA (3.5 or greater is preferred). In addition, applicants should have outstanding letters of recommendation (from doctoral-level academic, research oriented psychologists, if possible), high-quality research experience, and include a statement of purpose that convinces Drexel that a potential student is an excellent “match” for one or more of our research groups.

For more details on how to apply to this program, please visit the Graduate Admissions Psychology (http://www.drexel.edu/grad/programs/coas/psychology-phd-applied-cognitive-and-brain-sciences) page.

Curriculum

The PhD program curriculum requires student to earn a minimum of 90.0 credits. Students completing the concentration in Applied Cognitive and Brain Science take all or most of their core courses within the first two years. The third and fourth years, following the receipt of the master’s degree, successful passing of the qualifying examinations, and advancement to doctoral candidacy, will be spent in enrichment or specialization courses negotiated with their research supervisor and in research activities.

The following section outlines the courses required for graduation for entering Bachelor’s-level student

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fall</td>
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</tr>
<tr>
<td>PSY 512</td>
<td>Cognitive Psychology 3.0</td>
</tr>
<tr>
<td>PSY 610</td>
<td>Data Analysis in Psychology 3.0</td>
</tr>
<tr>
<td>PSY 812</td>
<td>Cognitive Neuroscience 3.0</td>
</tr>
<tr>
<td>PSY 560</td>
<td>Teaching, Consultation and Supervision in Psychology 1.0</td>
</tr>
<tr>
<td>Term Credits</td>
<td>10.0</td>
</tr>
<tr>
<td>Winter</td>
<td></td>
</tr>
<tr>
<td>PSY 710</td>
<td>Data Analysis II 3.0</td>
</tr>
<tr>
<td>PSY 611</td>
<td>Computer-Based Research Methods for Psychological Research 3.0</td>
</tr>
<tr>
<td>PSY 530</td>
<td>Neuroanatomy and Behavior (or other elective) 3.0</td>
</tr>
<tr>
<td>Term Credits</td>
<td>9.0</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>PSY 711</td>
<td>Data Analysis III: Advanced Topics 3.0</td>
</tr>
<tr>
<td>PSY 614</td>
<td>Problem Solving Creativity (or other elective) 3.0</td>
</tr>
<tr>
<td>PSY 562</td>
<td>Consciousness (or other elective) 3.0</td>
</tr>
<tr>
<td>Term Credits</td>
<td>9.0</td>
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</table>

<table>
<thead>
<tr>
<th>Second Year</th>
<th></th>
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</thead>
<tbody>
<tr>
<td>Fall</td>
<td></td>
</tr>
<tr>
<td>PSY 811</td>
<td>Multilevel Regression 3.0</td>
</tr>
<tr>
<td>PSY 632</td>
<td>Sensory and Motor Systems (or other elective) 3.0</td>
</tr>
<tr>
<td>Term Credits</td>
<td>6.0</td>
</tr>
<tr>
<td>Winter</td>
<td></td>
</tr>
<tr>
<td>PSY 532</td>
<td>Introduction to Cognitive Modeling 3.0</td>
</tr>
<tr>
<td>PSY 865</td>
<td>Course PSY 865 Not Found 3.0</td>
</tr>
<tr>
<td>Term Credits</td>
<td>6.0</td>
</tr>
<tr>
<td>Spring</td>
<td></td>
</tr>
<tr>
<td>PSY 898</td>
<td>Master’s Thesis in Psychology 3.0</td>
</tr>
<tr>
<td>PSY 712</td>
<td>History and Systems (or other elective) 3.0</td>
</tr>
<tr>
<td>Term Credits</td>
<td>6.0</td>
</tr>
</tbody>
</table>

Total Credit: 46.0

Sample Electives

| PSY 510 | Research Methods I |
| PSY 511 | Research Methods II |
| PSY 516 | Developmental Psychology |
| PSY 517 | Social Cognition |
| PSY 562 | Consciousness |
| PSY 610 | Data Analysis in Psychology |
| PSY 612 | Psychology of Human-Computer Interaction Design |
| PSY 616 | Motivation and Emotion |
| PSY 617 | Empirical Unconscious Process |
| PSY 621 | Theories of Personality |
| PSY 630 | Biological Basis of Behavior and Treatment |
| PSY 632 | Sensory and Motor Systems |
| PSY 648 | Forensic Assessment I |
| PSY 649 | Forensic Assessment II |
Facilities

Computers
Computer resources for student use include more than 20 personal computers (IBM, Macintosh) available in the library and 10 IBM PCs available in the computer laboratory. Both facilities are near the department. In both locations, word processing and biostatistics software is available.

By using computers from their homes or in the library, students have free access to e-mail and a wide array of online services (e.g., the Internet, World Wide Web, and literature databases such as PsychLit and Medline).

Library
Psychology books and journals are located at the Center City Hahnemann Campus library, Moore Campus Library on Henry Avenue, Queen Lane Library on the Queen Lane Campus, and the W. W. Hagerty Library on the University City Campus. The combined holdings represent one of the best psychology libraries on the East Coast.

Equipment
Testing equipment for classroom instruction is available to psychology graduate students. The program also has videotape and audiotape equipment available for classroom instruction and research activities.

Enrichment Courses from other Disciplines

Computer Science
- CS 510 Introduction to Artificial Intelligence 3.0
- CS 530 Developing User Interfaces 3.0
- CS 610 Advanced Artificial Intelligence 3.0

Information Systems
- INFO 608 Human-Computer Interaction 3.0
- INFO 610 Analysis of Interactive Systems 3.0
- INFO 611 Design of Interactive Systems 3.0

Biomedical Engineering and Sciences
- BMES 531 Chronobioengineering I 3.0
- BMES 532 Chronobioengineering II 3.0
- BMES 551 Biomedical Signal Processing 3.0
- BMES 710 Neural Signals 3.0

For more information on the PhD program requirements, consult Department of Psychology's (http://psychology.drexel.edu) web site.

Psychology Faculty

Meg Butryn, PhD (Drexel University). Assistant Research Professor. Treatment and prevention of obesity and eating disorders, behavioral treatment, acceptance and commitment therapy.

Dorothy Charbonnier, PhD (SUNY Stony Brook). Assistant Teaching Professor. The nature of the creative process and writing.

Douglas L. Chute, PhD (University of Missouri) Louis and Bessie Stein Fellow. Professor. Neuropsychology and rehabilitation; technological applications for the cognitively compromised and those with acquired brain injuries.

Brian Daly, PhD (Loyola University, Chicago). Assistant Professor. Pediatric neuropsychology, intervention with at-risk youth.

David DeMatteo, PhD, JD (MCP Hahnemann University; Villanova University School of Law) Director of the JD-PhD Program in Law and Psychology. Associate Professor. Psychopathy, forensic mental health assessment, drug policy; offender diversion.

Evan M. Forman, PhD (University of Rochester) Director of Graduate Studies. Associate Professor. Clinical psychology: mechanisms and measurement of psychotherapy outcome, cognitive-behavioral and acceptance based psychotherapies, the development and evaluation of acceptance-based interventions for health behavior change (for problems of obesity and cardiac disease) as well as mood and anxiety disorders; neurocognition of eating.

Jennifer Gallo, PhD (Drexel University). Associate Teaching Professor. Geropsychology, neuropsychology, and assessment of dementia.

Pamela Geller, PhD (Kent State University). Associate Professor. Stressful life events and physical and mental health outcomes, particularly in the area of women's reproductive health (e.g. pregnancy, pregnancy loss, infertility, medical education).

Maureen Gibney, PsyD (Widener University). Associate Teaching Professor. Clinical psychopathology; neuropsychological evaluation and intervention with the elderly.

Naomi Goldstein, PhD (University of Massachusetts) Co-Director of the JD-PhD Program. Associate Professor. Forensic psychology; juvenile justice; Miranda rights comprehension; false confessions; juvenile justice treatment outcome research; anger management intervention development; child and adolescent behavior problems.

Kirk Heilbrun, PhD (University of Texas at Austin). Professor. Forensic psychology, violence risk communication, juvenile and adult criminality, violence risk assessment, forensic psychological assessment, treatment of mentally disordered offenders, academic-sports mentoring.

James D. Herbert, PhD (University of North Carolina) Department Head, Psychology. Professor. Assessment and treatment of anxiety disorders; acceptance and mindfulness-based psychotherapies; the role of empiricism in clinical psychology; evidence-based practice in behavioral health.

Marlin Killen, PhD (Trident University International) Faculty Coordinator of ePsychology. Associate Teaching Professor.

Jacqueline D. Kloss, PhD (Binghamton University). Associate Professor. Health psychology; clinical psychology; written emotional expression
and health; women and sleep; college students and sleep and cognitive-behavioral approaches to insomnia.

John Kounios, PhD (*University of Michigan*) Director, PhD Program in Applied Cognitive and Brain Sciences. Professor. Cognitive neuroscience, especially creativity, problem solving, and cognitive enhancement.

Michael Lowe, PhD (*Boston College*). Professor. Prevention and treatment of eating disorders and obesity; effects of appetitive responsiveness and dietary restraint on eating regulation; psychobiology of obesity-proneness; empirical foundations of unconscious processes.

Tamara Medina, PhD (*Johns Hopkins University*). Assistant Teaching Professor. Developmental psychology, cognitive psychology, statistics.

Dan Mirman, PhD (*Carnegie Mellon University*). Assistant Professor. Recognition, comprehension, and production of spoken words; organization and processing of semantic knowledge; computational models of brain and behavior; statistical methods for analysis of time course data.

Arthur Nezu, PhD (*State University of New York at Stony Brook*). Distinguished Professor. Behavioral medicine applications of problem-solving therapy and other cognitive-behavior therapies (e.g., to decrease emotional and psychosocial risk factors; improve adherence), particularly with regard to patients with cardiovascular disease; assessment.

Christine Maguth Nezu, PhD (*Fairleigh Dickinson University*). Professor. Cognitive-behavioral assessment and treatment for mood, anxiety, personality disorders, and coping with chronic illness; mind/body studies; stress and coping; developmental disabilities and comorbid behavioral and emotional disorders; spirituality and psychology.

Karol Osipowicz, PhD (*Thomas Jefferson University*). Assistant Teaching Professor. The application of advanced neuroimaging to the study of human brain function and anatomy.

Ludo Scheffer, PhD (*University of Pennsylvania*) Director of Undergraduate Studies. Teaching Professor. Metacognition; early literacy and language acquisition; program evaluation and measurement to improve student achievement and teacher performance.

Maria Schulteis, PhD (*Drexel University*) Director of Clinical Training. Associate Professor. Clinical Neuropsychology and rehabilitation following neurological compromise (brain injury, stroke, multiple sclerosis); application of technologies in psychology. Specialization in the use of virtual reality (VR) simulation, and evaluation of the demands of driving after disability.

Jennifer Schwartz, PhD (*Idaho State University*) Director of Psychological Services Center. Associate Teaching Professor. Adult psychopathology; evidence-based clinical practice; competency-based training; competency-based clinical supervision.

Chris Sims, PhD (*Rensselaer Polytechnic Institute*). Assistant Professor. Learning and decision-making under uncertainty; visual memory and perceptual expertise; sensorimotor control and motor learning; computational models of cognition.

Julia Sluzenski, PhD (*Temple University*). Assistant Teaching Professor. Spatial and episodic memory, memory loss across the lifespan, developmental psychology.

Mary Spiers, PhD (*University of Alabama at Birmingham*) Director, Psychology Master’s Program. Associate Professor. Clinical neuropsychology and medical psychology; memory and practical applications for memory disorders in the elderly; cognitive health of women.

J. Michael Williams, PhD (*University of Vermont*). Associate Professor. Memory disorder; traumatic brain injury; auditory neglect; neuropsychological assessment; recovery and rehabilitation of brain function; functional magnetic resonance imaging.

Eric A Zillmer, PsyD (*Florida Institute of Technology*) Carl R. Pacilio Professor of Neuropsychology and the Director of Athletics. Professor. Psychological assessment (neuropsychological, cognitive, personality), psychiatric and neurological disorders, behavioral medicine, neurogerontology, mathematical modeling, sports psychology, psychology of genocide.

**Interdepartmental Faculty**

Charles A. Williams, PhD (*Temple University*). Associate Teaching Professor. Prevention of school-aged violence.

**Emeritus Faculty**

Thomas T. Hewett, PhD (*University of Illinois at Urbana-Champaign*). Professor Emeritus. Human computer interaction and cognitive engineering; development of computing environments to support knowledge, workers, and high performance experts.

Myrna Shure, PhD (*Cornell University*). Professor Emeritus. Child development, problem-solving interventions with children, prevention programs.
The College of Engineering

About the College

The College of Engineering prepares a new generation of engineers dedicated to discovery and the application of technology to promote economic development and improve quality of life.

Drexel University’s College of Engineering is guided by five core values that shape the curriculum and experience for all students: excellence in academics and research; personal, intellectual and professional development; diversity; innovation and exploration; internal and external collaborations and partnerships. We provide a research agenda for our PhD students that addresses society’s most pressing challenges regionally, nationally and globally. Our Master of Science students are trained in strategic leadership and entrepreneurial risk-taking to address the opportunities and challenges of a rapidly changing industry.

The graduate programs at Drexel College of Engineering integrate evolving engineering science with the growing fields of engineering applications and processes. As Drexel moves though the 21st century, the College of Engineering will continue to offer students a diverse academic learning and research environment, while continuing to build on its national reputation for excellence in engineering and research.

Majors

- Architectural Engineering (MS, PhD) (p. 276)
- Chemical Engineering (MS, PhD) (p. 281)
- Civil Engineering (MS, PhD) (p. 286)
- Computer Engineering (MS) (p. 292)
- Construction Management (MS) (p. 320)
- Cybersecurity (MS) (p. 298)
- Electrical Engineering (MS, PhD) (p. 301)
- Engineering (ME) (p. 319)
- Engineering Management (MS) (p. 314)*
- Engineering Technology (MS) (p. 322)
- Environmental Engineering (MS, PhD) (p. 317)
- Materials Science and Engineering (MS, PhD) (p. 331)
- Mechanical Engineering (MS, PhD) (p. 335)
- Project Management (MS) (p. 323)
- Property Management (MS) (p. 324)
- Systems Engineering (MS) (p. 326)
- Telecommunications Engineering (MS) (p. 308)

Certificates

- Construction Management (p. 279)
- Engineering Management (p. 316)
- Power Engineering Management (p. 280)
- Project Management (p. 280)
- Real Estate (p. 281)
- Sustainability and Green Construction (p. 281)
- Systems Design and Development (p. 328)
- Systems Engineering Analysis (p. 329)
- Systems Engineering Fundamentals (p. 329)
- Systems Engineering Integrated Logistics (p. 330)
- Systems Reliability Engineering (p. 330)
- Multidisciplinary program, offered in concert with other Drexel University Colleges.

About Graduate Co-op

Drexel University’s long tradition in the field of experiential learning has now been extended into many of its master’s programs in science, business, and engineering.

This option, called the Graduate Co-op Program (http://www.drexel.edu/scdc/co-op/graduate) (GCP), provides students with the opportunity to gain work experience directly related to their career goals while earning academic credit. Students who have earned a minimum of 24 credits with a GPA of at least 3.0 are eligible to participate. Employment typically lasts six months, during which students enroll in a special 3 credit GCP course coinciding with their term of employment. Students gain work experience while earning salaries. It is important to note that the GCP program does not guarantee a job. It is a market-driven process for the candidates as well as employers. GCP provides the tools and contacts; the student must qualify for the job on the basis of merit, qualifications, and skills.

Further information on the GCP program is available at the Drexel Steinbright Career Development Center. (http://www.drexel.edu/scdc)

Architectural Engineering

About the Program

Architectural Engineering is inherently an interdisciplinary enterprise that is centered on the design, construction, and operation of the built environment. Architectural Engineering MS or PhD graduates may include students with expertise in one or more of the following sub-disciplines (usually housed in civil/environmental engineering and elsewhere in traditional disciplinary constructs or newly developing fields of focus or expertise):

1. Building energy efficiency and alternative energy
2. Indoor environmental quality

Our graduates are engineers and researchers trained in integrated building design and operation practices, who can work on interdisciplinary teams that are able to develop creative solutions combined with technological advances to produce functional, efficient, attractive and sustainable building infrastructure.

Admission Requirements

Applicants to the MS or PhD in Architectural Engineering must meet the following requirements:

- A BS in Engineering OR
- For students without an Engineering degree, the following courses, or their approved equivalents from other departments, will meet these requirements:
  - Fundamental Fluids – CIVE 320
  - Thermodynamics – ENGR 210
  - Heat Transfer – MEM 345 – for Building Energy students
The application package will include:

- undergraduate and graduate transcripts;
- three letters of recommendation from faculty or professionals who can evaluate the applicant’s promise as a graduate student;
- GRE scores;
- a written statement of career and educational goals.

Competitive applicants will possess an undergraduate GPA of 3.30 or higher and GRE scores above the 60th percentile.

**MS in Architectural Engineering**

**Major:** Architectural Engineering  
**Degree Awarded:** Master of Science (MS)  
**Calendar Type:** Quarter  
**Total Credit Hours:** 45.0  
**Classification of Instructional Programs (CIP) code:** 14.0401  
**Standard Occupational Classification (SOC) code:** 11-9041

**Degree Requirements**

The goal of the MS in Architectural Engineering (AE) is to produce graduates who have a solid understanding of the Architectural Engineering discipline as well as an understanding of the interrelationships between the major AE sub-disciplines. Graduates will have demonstrated the ability and capacity to apply that understanding and skill, and the curriculum and project requirements are designed to provide to the students and then ask them to demonstrate the ability to effectively engage in professional-level performance.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 510</td>
<td>Intelligent Buildings</td>
<td>3.0</td>
</tr>
<tr>
<td>AE 550</td>
<td>Comfort Analysis and Indoor Air Quality</td>
<td>3.0</td>
</tr>
<tr>
<td>AE 544</td>
<td>Building Envelope Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>AE 551</td>
<td>Building Energy Systems I</td>
<td>3.0</td>
</tr>
<tr>
<td>MEM 591</td>
<td>Applied Engr Analy Methods I</td>
<td>3.0</td>
</tr>
<tr>
<td>MEM 592</td>
<td>Applied Engr Analy Methods II</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Building Energy Theme**

Complete three of the following: 9.0

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 552</td>
<td>Building Energy Systems II</td>
</tr>
<tr>
<td>CHE 513</td>
<td>Chemical Engineering Thermodynamics</td>
</tr>
<tr>
<td>CHE 525</td>
<td>Transport Phenomena I</td>
</tr>
<tr>
<td>MEM 611</td>
<td>Conduction Heat Transfer</td>
</tr>
<tr>
<td>MEM 612</td>
<td>Convection Heat Transfer</td>
</tr>
<tr>
<td>MEM 621</td>
<td>Foundations of Fluid Mechanics</td>
</tr>
</tbody>
</table>

**Indoor Air Quality (IAQ) Theme**

Complete three of the following: 9.0

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
</tr>
</thead>
<tbody>
<tr>
<td>AE 790</td>
<td>Course AE 790 Not Found *</td>
</tr>
<tr>
<td>CHE 525</td>
<td>Transport Phenomena I</td>
</tr>
<tr>
<td>ENVE 560</td>
<td>Fundamentals of Air Pollution Control</td>
</tr>
<tr>
<td>ENVE 660</td>
<td>Chemical Kinetics in Environmental Engineering</td>
</tr>
<tr>
<td>ENV 501</td>
<td>Chemistry of the Environment</td>
</tr>
<tr>
<td>MEM 621</td>
<td>Foundations of Fluid Mechanics</td>
</tr>
</tbody>
</table>

**Total Credits** 45.0

**PhD in Architectural Engineering**

**Major:** Architectural Engineering  
**Degree Awarded:** Doctor of Philosophy (PhD)  
**Calendar Type:** Quarter  
**Total Credit Hours:** 90.0  
**Classification of Instructional Programs (CIP) code:** 14.0401  
**Standard Occupational Classification (SOC) code:** 11-9041

**Degree Requirements**

The following general requirements must be satisfied in order to complete the PhD in Architectural Engineering:

- 90.0 quarter credit hours total (or 45 credit hours post-MS)
- Plan of study established with Advisor
- Qualifying courses
- Candidacy exam
- Approval of dissertation proposal
- Defense of dissertation
- Full-time residency for one continuous academic year is usually desired for the PhD degree to ensure students the opportunity for intellectual association with other scholars.

Students entering with a master’s degree may be exempted from some or all of the courses in the breadth requirement; however, they are still required to meet all milestones of the program. Individual courses may also be transferred with approval of the Graduate Advisor. The total credit amount, candidacy exam, and dissertation are University Requirements. Additional requirements are determined by the department offering the degree.

MSAE coursework plus research and courses defined by the dissertation Committee 90.0

**Qualifying Courses**

To satisfy the qualifying requirements, students must earn a grade of B+ or better in the first 6 Architectural Engineering graduate courses taken at Drexel, and must earn an overall GPA of 3.5 or better in these courses. Normally these courses comprise at least 4 “core” courses and either 2 more courses, either “core” or in one of the Architectural Engineering themes taken as part of the PhD program; however, they may in some cases include more advanced courses (e.g., if the student has received transfer credit for a core course).

Undergraduate courses, independent studies, research credits, and courses from other departments cannot be counted toward the qualifying requirements. Student progress toward these requirements will be assessed in the Annual Review following the student’s first year in the PhD program. For more information visit the Department’s PhD Program Requirements page.
Candidacy Exam
After approximately one year of study beyond the master’s degree, doctoral students take a candidacy examination, consisting of written and oral parts. The Architectural Engineering candidacy examination serves to define the student’s research domain and to evaluate the student’s knowledge and understanding of various fundamental and seminal results in that domain. At this point the student is expected to be able to read, understand, analyze, and explain advanced technical results in a specialized area of Architectural Engineering at an adequate level of detail. The candidacy examination will evaluate those abilities using a defined set of published manuscripts. The student will prepare a written summary of the contents of the material, present the summary orally, and answer questions about the material. The examination committee will evaluate the written summary, the oral presentation, and the student’s answers.

Thesis Proposal
After completing the candidacy examination successfully, the PhD candidate must prepare a thesis proposal that outlines, in detail, the specific problems that will be solved in the PhD dissertation. The quality of the research proposal should be at the level of, for example, a peer-reviewed proposal to a federal funding agency, or a publishable scientific paper. The candidate is responsible for sending the research proposal to the PhD committee two weeks before the oral presentation. The PhD committee need not be the same as the candidacy exam committee, but it follows the same requirements and must be approved by the Office of Graduate Studies. The oral presentation involves a 30-40-minute presentation by the candidate followed by an unspecified period during which the committee will ask questions.

After the question and answer period, the candidate will be asked to leave the room and the committee will determine if the research proposal has been accepted. The research proposal can be repeated at most once. A thesis proposal must be approved within two years of becoming a PhD candidate.

After approval of the proposal, the committee meets from time to time to review the progress of the research.

Thesis Defense
After completing the research proposal successfully, the PhD candidate must conduct the necessary research and publish the results in a PhD dissertation. The dissertation must be submitted to the PhD committee two weeks prior to the oral defense and at least 90 days before the graduation date. The oral presentation involves a 45-minute presentation by the candidate, open to the public, followed by an unspecified period during which the committee will ask questions. The question and answer period is not open to the public.

After the question and answer period, the candidate will be asked to leave the room and the committee will determine if the candidate has passed or failed the examination. The candidate will be granted one more chance to pass the final defense if he or she fails it the first time. Paperwork selecting the thesis committee and indicating the results of the thesis defense must be filed with the Department of Civil, Architectural and Environmental Engineering and the Office of Graduate Studies.

The PhD degree is awarded for original research on a significant Architectural Engineering problem. Graduate students who have an MS degree or have completed work equivalent to that required for of an MS degree will continue to work closely with individual faculty members to pursue the PhD degree (see Faculty Research Interests on the department website). PhD dissertation research is usually supported by a research grant from a government agency or an industrial contract.

Many doctoral students take three to five years of full-time graduate study to complete their degrees.

Indoor Air Quality - Sample Plan of Study

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td></td>
</tr>
<tr>
<td>AE 544</td>
<td>Building Envelope Systems 3.0</td>
</tr>
<tr>
<td>AE 550</td>
<td>Comfort Analysis and Indoor Air Quality 3.0</td>
</tr>
<tr>
<td>MEM 591</td>
<td>Applied Engr Analy Methods I 3.0</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
<td><strong>9.0</strong></td>
</tr>
<tr>
<td>Term 2</td>
<td></td>
</tr>
<tr>
<td>AE 510</td>
<td>Intelligent Buildings 3.0</td>
</tr>
<tr>
<td>AE 551</td>
<td>Building Energy Systems I 3.0</td>
</tr>
<tr>
<td>MEM 592</td>
<td>Applied Engr Analy Methods II 3.0</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
<td><strong>9.0</strong></td>
</tr>
<tr>
<td>Term 3</td>
<td></td>
</tr>
<tr>
<td>AE 790</td>
<td>Course AE 790 Not Found 3.0</td>
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<tr>
<td>Free Elective</td>
<td>3.0</td>
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<tr>
<td>Free Elective</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
<td><strong>9.0</strong></td>
</tr>
<tr>
<td><strong>Second Year</strong></td>
<td></td>
</tr>
<tr>
<td>Term 1</td>
<td></td>
</tr>
<tr>
<td>Free Elective</td>
<td>3.0</td>
</tr>
<tr>
<td>ENVS 501</td>
<td>Chemistry of the Environment 3.0</td>
</tr>
<tr>
<td>MEM 621</td>
<td>Foundations of Fluid Mechanics 3.0</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
<td><strong>9.0</strong></td>
</tr>
<tr>
<td>Term 2</td>
<td></td>
</tr>
<tr>
<td>CHE 525</td>
<td>Transport Phenomena I 3.0</td>
</tr>
<tr>
<td>ENVE 560</td>
<td>Fundamentals of Air Pollution Control 3.0</td>
</tr>
<tr>
<td>ENVE 660</td>
<td>Chemical Kinetics in Environmental Engineering 3.0</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
<td><strong>9.0</strong></td>
</tr>
<tr>
<td><strong>Total Credit: 45.0</strong></td>
<td></td>
</tr>
</tbody>
</table>

Undergraduate Course Prerequisites for students without an Engineering Degree:

The following courses, or their approved equivalents from other departments, will meet these requirements:

- CIVE 320 - Fundamental Fluids
- CHEM 102 - Basic Chemistry
- ENGR 210 - Thermodynamics

Building Energy - Sample Plan of Study

<table>
<thead>
<tr>
<th>First Year</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Term 1</td>
<td></td>
</tr>
<tr>
<td>AE 550</td>
<td>Comfort Analysis and Indoor Air Quality 3.0</td>
</tr>
<tr>
<td>MEM 591</td>
<td>Applied Engr Analy Methods I 3.0</td>
</tr>
<tr>
<td><strong>Term Credits</strong></td>
<td><strong>9.0</strong></td>
</tr>
</tbody>
</table>
MEM 611  Conduction Heat Transfer  3.0

**Term Credits**  9.0

**Term 2**

AE 510  Intelligent Buildings  3.0
MEM 592  Applied Engr Analy Methods II  3.0
MEM 612  Convection Heat Transfer  3.0

**Term Credits**  9.0

**Term 3**

AE 551  Building Energy Systems I  3.0
Free Elective  3.0
Free Elective  3.0

**Term Credits**  9.0

**Second Year**

**Term 1**

AE 544  Building Envelope Systems  3.0
CHE 513  Chemical Engineering Thermodynamics  3.0
MEM 621  Foundations of Fluid Mechanics  3.0

**Term Credits**  9.0

**Term 2**

CHE 525  Transport Phenomena I  3.0
ENVE 727  Risk Assessment  3.0
AE 552  Building Energy Systems II  3.0

**Term Credits**  9.0

**Total Credit**: 45.0

**Undergraduate Course Prerequisites for students without an Engineering Degree**

The following courses, or their approved equivalents from other departments, will meet these requirements:

- CIVE 320 - Fundamental Fluids
- MEM 345 - Heat Transfer
- ENGR 210 - Thermodynamics

**PhD in Architectural Engineering**

Upon entering the PhD program, each student will be assigned an academic advisor, and with the help of the advisor will develop and file a plan of study (which can be brought up to date when necessary). The plan of study should be filed with the Graduate Coordinator no later than the end of the first term.

**Certificate in Construction Management**

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 52.2001
Standard Occupational Classification (SOC) Code: 11-9021

The certificate in construction management has been designed for professionals to develop the multidisciplinary skills required of effective construction managers.

Students have the option of completing this 18.0 credit certificate in construction management as a stand-alone professional development credential, or as a step toward the MS in Construction Management program (http://drexel.edu/engmgmt/cmg/academics/ms).

The admissions process for this program is the same as for the MS in Construction Management (http://www.drexel.edu/grad/apply/overview).

**Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMGT 510</td>
<td>Construction Control Techniques</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 512</td>
<td>Cost Estimating and Bidding Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 515</td>
<td>Risk Management in Construction</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 525</td>
<td>Applied Construction Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 528</td>
<td>Construction Contract Administration</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 538</td>
<td>Strategic Management in Construction</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits**: 18.0

**Certificate in Infrastructure Engineering Management**

Certificate Level: Graduate
Admissions Requirements: Bachelor's degree in engineering
Certificate Type: Graduate Certificate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Maximum Time Frame: 2 years
Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 15.1501
Standard Occupational Classification (SOC) Code: 17-3026

Note: Effective Fall 2014, students are no longer being accepted into this certificate program.

The graduate certificate in infrastructure engineering management is designed to prepare engineers to manage large-scale infrastructure projects and key personal interactions with external stakeholders. The program builds upon the College of Engineering's excellence in areas such as engineering management, civil engineering, and environmental risk analysis. Courses focus on decision making, planning and management and explore the impact of regulations on work with public funding and how contractual relationships dominate its execution.

Upon successful completion of the program, graduates will be skilled at managing the flow of public resources, integrating an array of projects into a long-term program, and incorporating public values and participation in infrastructure decisions. The six-course sequence is an 18-credit graduate certificate students can utilize either as a professional development credential or to apply as electives toward the completion of a Master's in Engineering Management.

**Required Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGMT 501</td>
<td>Engineering Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 515</td>
<td>Infrastructure Systems &amp; Performance Evaluation</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 516</td>
<td>Infrastructure Project &amp; Program Planning</td>
<td>3.0</td>
</tr>
</tbody>
</table>
are using project management to achieve business results. This requires a solid foundation in business fundamentals, communication, and leadership, as well as skills in program management and portfolio management.

The graduate certificate in Project Management is designed to support the growing need for project management graduate education. It provides students with the knowledge and skills necessary for successful professional and leadership careers in the rapidly-expanding field of project management and will prepare students to pursue the Certified Associate in Project Management (CAPM)® or Project Management Professional (PMP)® credential from the Project Management Institute (PMI)®.

**Program Requirements**

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJ 501</td>
<td>Introduction to Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 502</td>
<td>Project Planning &amp; Scheduling</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 510</td>
<td>Project Quality Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 515</td>
<td>Project Estimation &amp; Cost Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 603</td>
<td>Project Leadership &amp; Teamwork</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Elective courses**

Select 1 of the following:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJ 520</td>
<td>Project Risk Assessment &amp; Management</td>
</tr>
<tr>
<td>PROJ 530</td>
<td>Managing Multiple Projects</td>
</tr>
<tr>
<td>PROJ 535</td>
<td>International Project Management</td>
</tr>
<tr>
<td>PROJ 540</td>
<td>Project Procurement Management</td>
</tr>
<tr>
<td>PROJ 604</td>
<td>Project Management Elective (5XX or higher)</td>
</tr>
</tbody>
</table>

**Total Credits** 18.0

**Admission Requirements**

- **Bachelor's degree** from a regionally accredited institution with a cumulative Grade Point Average (GPA) of 3.0 or higher; graduate degree GPAs will be considered along with the undergraduate GPA. Applicants with a cumulative GPA below 3.0 may be considered.

- **Official transcripts** from all universities or colleges and other post-secondary educational institutions, including trade schools, attended. Instead of hard copy transcripts, you may email official electronic transcripts issued by a post-secondary institution directly to Drexel University Online. All transcripts must be supplied, regardless of the number of credits earned or the type of school attended. If all post-secondary institutions are not listed on the application, and then listed on transcripts received from other institutions, application processing will be delayed until the remaining transcripts are submitted. Use Drexel's Transcript Lookup Tool to assist you in contacting your previous institutions.

- **Two letters of recommendation**, professional or academic. Drexel University Online now accepts electronic letters of recommendation. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.

- **Personal essay** of between 500–750 words describing your interest in the program. Specifically discuss the following:
  - How the program relates to your current line of work
  - How you plan to apply the program to your future goals
Certificate in Real Estate

Certificate Level: Graduate
Admission Requirements: Bachelor’s degree
Certificate Type: Graduate certificate
Number of Credits to Completion: 18.0
Instructional Delivery: Campus, Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 52.1501
Standard Occupational Classification (SOC) Code: 11-9141

This graduate certificate seeks to produce professionals with the knowledge, skills, and perspective required to be successful in the real estate development process and the industry as a whole. Students explore the knowledge and skills required to create, maintain, and build environments for living, working and entertainment purposes.

Relevant issues include project finance, real estate as investments, design and construction, operations, development law, environmental remediation, public policy, market analysis, and architecture.

Students wishing to complete this certificate in the context of a master's degree should consider the MS in Construction Management (http://www.drexel.edu/catalog/grad/goodwin/ms0cmgt/) with a concentration in Real Estate.

Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>REAL 568</td>
<td>Real Estate Development</td>
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</tr>
<tr>
<td>REAL 571</td>
<td>Advanced Real Estate Investment &amp; Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>REAL 572</td>
<td>Advanced Market Research &amp; Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>REAL 575</td>
<td>Real Estate Finance</td>
<td>3.0</td>
</tr>
<tr>
<td>REAL 577</td>
<td>Legal Issues in Real Estate Development</td>
<td>3.0</td>
</tr>
<tr>
<td>REAL 573</td>
<td>Sales &amp; Marketing of Real Estate</td>
<td>3.0</td>
</tr>
<tr>
<td>REAL 574</td>
<td>Real Estate Economics in Urban Markets</td>
<td></td>
</tr>
<tr>
<td>REAL 576</td>
<td>Real Estate Valuation &amp; Analysis</td>
<td></td>
</tr>
</tbody>
</table>

Total Credits: 18.0

Certificate in Sustainability and Green Construction

Certificate Level: Graduate
Admission Requirements: Bachelor’s degree
Certificate Type: Certificate
Number of Credits to Completion: 15.0
Instructional Delivery: Online, Campus
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 52.2001
Standard Occupational Classification (SOC) Code: 11-9021

The architectural, engineering, and construction community faces the daunting task of providing a built environment which is in harmony with the natural environment—meeting the current needs of society without jeopardizing the ability of future generations to meet their needs. Sustainable development means integrating the decision-making process across the project team, so that every decision is made with an eye to the greatest long-term benefits.

The certificate in Sustainability and Green Construction is a flexible, part-time post-baccalaureate program, focused on the sustainable aspects of the construction process. Students have the opportunity to complete all requirements within one and a half years.

Currently, in the Leadership in Energy and Environmental Design (LEED) green building rating system, the construction process represents a significant portion of the effort required to achieve high performance building programs. This certificate program is intended to explore these concepts in detail. Credits from this certificate will transfer toward a Master of Science in Construction Management.

Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMGT 501</td>
<td>Leadership in Construction</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 512</td>
<td>Cost Estimating and Bidding Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 515</td>
<td>Risk Management in Construction</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 535</td>
<td>Community Impact Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 538</td>
<td>Strategic Management in Construction</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 545</td>
<td>Sustainable Principles &amp; Practices</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 546</td>
<td>Sustainable Technologies</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 547</td>
<td>LEED Concepts</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 558</td>
<td>Community Sustainability</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits: 27.0

Chemical Engineering

Major: Chemical Engineering
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS); 90.0 (PhD)
Classification of Instructional Programs (CIP) code: 14.0701
Standard Occupational Classification (SOC) code: 17-2041

About the Program

The graduate program in the Chemical and Biological Engineering Department integrates current chemical engineering science with the growing fields of engineering applications and processes, emphasizing engineering design and scientific analysis. The department intends to develop broadly educated individuals who are knowledgeable in modern theories, cognizant of the behavior of engineering systems, and aware of current mathematical and engineering tools that are useful for the solution of problems in complex processes and systems, especially those in the fields of chemical, environmental, biochemical, and materials process engineering. Areas of particular strength include biological engineering, energy and the environment, multiscale modeling and process systems engineering, and polymer science and engineering.

Programs are arranged to meet the needs and interests of individual students. The plan of study is initially formulated in consultation with the
departmental graduate advisor and subsequently guided by the thesis advisor.

Graduates have pursued a variety of careers, ranging from faculty positions in academia to research and development in industry, in the U.S. and overseas.

**Additional Information**
For more information about this program, visit Drexel University's Department of Chemical and Biological Engineering (http://drexel.edu/cbe) web page.

**Admission Requirements**
Students should fulfill Drexel University's general requirements for admission to graduate studies. The subjects normally included in an undergraduate program in chemical engineering provide a satisfactory background. Decisions regarding prerequisite qualifications for students who may be deficient in some areas are made after consultation with the departmental graduate advisor.

The core courses are designed for students with undergraduate training in chemical engineering. However, students with a background in biological sciences and engineering can also enroll in the core courses after completing the necessary basic engineering courses and disciplinary chemical engineering courses. Programs for such students are determined on an individual basis after consultation with the departmental graduate advisor.

Graduate study in chemical engineering is offered on a regular full-time basis and on a part-time basis. Details not covered in the following information may be obtained by contacting the departmental graduate advisor. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study.

**Financial Assistance**
Financial aid in the form of teaching assistantships, research assistantships, and fellowship grants is available to qualified full-time PhD students. Awards are made annually on a competitive basis.

For additional information on how to apply, visit Drexel's Admissions page for Chemical Engineering (http://www.drexel.edu/grad/programs/coe/chemical-engineering).

**Master of Science in Chemical Engineering**

**Degree Requirements**
In general, each program leading to the Master of Science in Chemical Engineering must meet the following requirements: core chemical engineering, 15.0 credits; area of concentration, at least 15.0 credits; electives, at most 6.0 credits; research, at most 15.0 credits. Core courses in the chemical engineering Master's program are listed below. A Master's Thesis is optional.

**Thesis option:** The thesis may be based on either a theoretical or an experimental investigation, or both, of limited scope but involving a significant degree of originality. The nature of the research may involve multidisciplinary areas such as biological engineering, materials processing and engineering, energy and the environment, and other topics. The scope and content of the thesis is guided by the thesis advisor. All students pursuing a Master's with Thesis must complete 9.0 credits of thesis research (CHE 898) and, at the discretion of the research advisor, up to 6.0 credits of independent study (CHE 1799). Credits not devoted to independent study may be applied to general (non-concentration) graduate-level electives or to additional credits of thesis research.

**Coursework-only (non-Thesis) option:** Students not pursuing Master's with Thesis may take up to 9.0 credits of independent study (CHE 1799) and 6.0 credits of general graduate-level electives. Independent study is not required for a non-thesis Master's. Non-thesis students may also take additional concentration electives beyond the required 15.0-credit series. Non-thesis students may not register for thesis research.

**Concentration:** All Master's students must complete a 15-credit series of concentration electives. Concentration electives may be chosen from course offerings in chemical engineering, mathematics, science, and other engineering disciplines, and are subject to approval by the departmental graduate advisor. Sample concentration series courses are listed below; there are many other possibilities. Non-concentration electives need only be graduate-level.

Full-time students usually take the core courses in the first year. Other courses may be substituted for the core courses, if equivalent courses are available and if the substitution is approved by the graduate advisor. Full-time students normally require a minimum of one calendar year to complete their study and research. Some courses are offered in the late afternoon or evening for the convenience of part-time students. The current schedule of evening courses for part-time students are available upon request.

**Curriculum**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CHE 502</td>
<td>Mathematical Methods in Chemical Engineering</td>
<td>3.0</td>
</tr>
<tr>
<td>CHE 513</td>
<td>Chemical Engineering Thermodynamics</td>
<td>3.0</td>
</tr>
<tr>
<td>CHE 525</td>
<td>Transport Phenomena I</td>
<td>3.0</td>
</tr>
<tr>
<td>CHE 543</td>
<td>Kinetics &amp; Catalysis I</td>
<td>3.0</td>
</tr>
<tr>
<td>CHE 554</td>
<td>Process Systems Engineering</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>Area of Concentration</td>
<td>15.0</td>
</tr>
<tr>
<td>Thesis/Research</td>
<td></td>
<td>9.0</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>6.0</td>
</tr>
</tbody>
</table>

**Sample Areas of Concentration**

**Biochemical Engineering**

**Sample Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>BIO 500</td>
<td>Biochemistry I</td>
</tr>
<tr>
<td>BIO 610</td>
<td>Biochemistry of Metabolism</td>
</tr>
<tr>
<td>BMES 501</td>
<td>Medical Sciences I</td>
</tr>
<tr>
<td>CHE 562</td>
<td>Bioreactor Engineering</td>
</tr>
<tr>
<td>CHE 564</td>
<td>Unit Operations in Bioprocess Systems</td>
</tr>
</tbody>
</table>

**Computer Science**

**Sample Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CS 543</td>
<td>Operating Systems</td>
</tr>
<tr>
<td>CS 551</td>
<td>Compiler Construction I</td>
</tr>
<tr>
<td>CS 552</td>
<td>Compiler Construction II</td>
</tr>
<tr>
<td>CS 550</td>
<td>Programming Languages</td>
</tr>
</tbody>
</table>

**Engineering Management**

**Sample Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGMT 501</td>
<td>Engineering Management</td>
</tr>
<tr>
<td>EGMT 502</td>
<td>Advanced Engineering Management</td>
</tr>
<tr>
<td>EGMT 504</td>
<td>Engineering Management Communications</td>
</tr>
</tbody>
</table>
PhD in Chemical Engineering

Superior students with MS or BS degrees will be considered for the doctoral program in chemical engineering. Students joining with a Master’s degree may satisfy up to 45.0 credit hours of the PhD course/research credit requirements depending on the courses taken and/or research carried out in their Master’s programs, subject to approval by graduate program advisor.

Requirements

The following general requirements must be satisfied in order to complete the PhD in chemical engineering:

- 90 credit hours total
- Qualifying exam (first year)
- Establishing a plan of study (first term)
- 18 core credits
- 15 credit hours of specialized plan of study
- 57 credit hours of research
- Candidacy exam (5th term)
- Dissertation/Thesis
- Defense of Dissertation/Thesis
- GPA requirements: 3.0 overall; 3.0 in graduate Chemical Engineering (CHE) courses; 3.0 core graduate courses

Qualifying Exam

The qualifying exam takes place in the first year. The department administers the exam twice a year – in January and June. The objective of the exam is to evaluate proficiency in core undergraduate chemical engineering material. The format is made up of seven problems, each covering a separate core topic from the undergraduate curriculum, including thermodynamics, heat transfer, mass transfer, fluid mechanics, kinetics, control, and separations. Students must display mastery of five out of the seven topics to pass the qualifying exam. Each student will be given two opportunities to pass the qualifying exam.

Thesis Advisor/Plan of Study

All students must meet with their advisor in their first term to work out a plan of study.

Core Requirements

- CHE 502 Mathematical Methods in Chemical Engineering 3.0
- CHE 513 Chemical Engineering Thermodynamics 3.0
- CHE 525 Transport Phenomena I 3.0
- CHE 543 Kinetics & Catalysis I 3.0
- CHE 614 Chemical Engineering Thermodynamics II 3.0
- CHE 626 Transport Phenomena II 3.0

Specialized Plan of Study Courses 15.0

15.0 credit hours of courses approved by research advisor. All students are expected to develop competence in their area(s) of specialization.

Research 57.0

57.0 credit hours of research (CHE 998), which may include up to 6.0 credit hours of electives.

Candidacy Exam

The components of the candidacy exam are as follows:

- Proposal Document (Written): The student is required to write a research proposal of about 15 pages, including background, preliminary results, and a research plan (with his/her advisor’s input). The proposal must be submitted to each member of the student’s thesis committee and to the Graduate Program Advisor before 5:00 pm on the first day of the student’s 5th term.
- Proposal Defense (Oral): The student provides a formal defense of his/her proposal to his/her thesis committee before the end of the student’s 5th term.

Thesis/Dissertation and Defense

As the culmination of intensive study and independent research, the doctoral dissertation represents a major scholarly endeavor; accordingly, it is recognized as the most important requirement of the degree. All doctoral candidates must present an acceptable dissertation based on significant work. The dissertation must represent a unique contribution to chemical engineering or biochemical engineering knowledge. A final oral examination is conducted, in part, as a defense of the dissertation.

A preliminary exam is targeted for the student's 12th term, with this scheduling subject to the research advisor's discretion. This preliminary exam is to ensure that the student has made adequate progress in his/her project and that he/she has gained skills to write an independent research proposal.

The requirements of the thesis/dissertation and defense include:

- Proposal Document, a.k.a. “Second Proposal”: The student is required to write a research proposal of about 15 pages, including background, summary of results to date, and a plan for completion of the thesis work (with minimal advisor input). The proposal must be submitted to each member of the student’s thesis committee well in advance of the oral exam date.
• Preliminary Defense (Oral Examination): The student must defend the second proposal and the thesis work to-date in an oral examination by his/her thesis committee.

• Manuscript Submission: Before taking the preliminary exam, the student is required to submit at least one paper based on his/her PhD research to a refereed journal. This must be an original article, not a review.

• A copy of the written proposal, together with a copy of the submitted paper with acknowledgment of submission from the journal editor, must be submitted to the Graduate Program Advisor before the Preliminary Defense and at least 6 months before the Thesis Defense.

• The student is responsible for scheduling the Preliminary Defense

• Students should submit a copy of the Preliminary Exam Reporting Form (http://drexel.edu/cbe/resources/forms) no later than three days after the exam.

For more information, visit the Chemical and Biological Engineering Department (http://drexel.edu/cbe) web page.

Facilities

Abrams Laboratory (ABRAMS)
Cat-472 (Server room) and Cat-361 (Student offices)

- High-performance computer clusters
  - lamneth -- 90-core DDR Infiniband
  - narpet -- 40-core DDR Infiniband
- Workstation computers (panacea, maelstrom, cygnus, redstar, syrinx, presto)
- 24TB RAID server (nlgn)

Access to:

- The University Research Computing Facility (URCF)
- The Draco Cluster (Dept. Physics)
- TeraGrid/XSEDE Allocation (TACC Stampede)

Nanomaterials for Energy Applications and Technology Laboratory (BAXTER)

Cat-266

- Amplified Ti:Sapphire laser with time-resolved terahertz spectroscopy and femtosecond UV/vis/NIR transient absorption spectroscopy (Bossone 106)
- Solar simulator with monochromator and photovoltaic/photoelectrochemical test station
- Electrochemical impedance spectroscopy
- Layer-by-layer deposition robot
- Dip coater
- Spin coater
- Electrodeposition station
- Continuous flow microreactors

Biofuels Laboratory (CAIRNCROSS)

Cat-265

- Bubble column biodiesel reactors
- Recirculating heated oil baths
- Quartz crystal microbalance / heat conduction calorimeter (Masscal G1)
- Maxtek quartz crystal microbalance with phase lock oscillator
- Parr reactor

Elabd Laboratory (ELABD)

Cat-262, 263, 264

- Electrochemical Impedance Spectrometer (EIS) (Solartron: 1260 impedance analyzer, 1287 electrochemical interface, Zplot software) with many custom made 4 and 2 electrode cells
- Fuel Cell Test Station (Scribner 850C with fuel cell software) equipped for gas and liquid fuels and PEM and AEM test cells
- FTIR spectrometer ( Nicolet Nexus 6700) equipped with multiple multiboard ATR flow-through cell attachments (Specac)
- FTIR spectrometer ( Nicolet Nexus 6700)
- Golden GateTM diamond single-bounce ATR attachment (Specac)
- Silver GateTM zirc selenide single-bounce ATR attachment (Specac)
- Silver GateTM germanium single-bounce ATR attachment retrofit for electrochemical measurements (Specac)
- Dynamic Vapor Sorption (DVS) (TA Instruments Q5000 SA)
- Dynamic Vapor Sorption (DVS) with Cahn balance (Surface Measurement Systems)
- Differential Scanning Calorimeter (DSC) (TA Instruments Q200) with cooling accessory with temperature range of -180 to 725°C
- Gel Permeation Chromatography (GPC) (Waters Breeze 2) with 1525 Binary HPLC Pump for two separate columns (columns for THF and DMF), 214 Refractive Index Detector
- Environmental Chamber (Tenney) with high temperature/humidity control ranging from 25-200°C and 5-95%RH and integrated with vapor permeation and EIS
- Electrospinning Apparatus with custom-built enclosed chamber, 2 syringe pumps, and high voltage power supply (Glassman High Voltage, Inc. Series EL)
- Multipycnometer (Quantachrome)
- Two Liquid Diffusion Cells (PermeGear) integrated to flow-through ATR cell for detection with temperature control
- Vapor Sorption Apparatus (custom-built) with pressure transducer, temperature-controlled chamber, and quartz springs for the measurement of vapor and vapor mixture diffusion and sorption in polymers. This equipment is also integrated to an FTIR-ATR spectrometer for the measurement of molecular transport of pure vapors and vapor mixtures in polymers
- Gas Permeation and Sorption Apparatus (custom-built) with pressure and sorption cells, pressure transducer, and temperature-controlled chamber for the measurement of gas permeation and sorption in polymers
- Mass Spectrometer (MS) (HP 5999B), Gas Chromatograph (GC) (HP 5890), Liquid Chromatograph (LC) (HP 1090)
- Gravimetric Balances (Precisa XR 125 SM-FR, 10 µg accuracy; Mettler Toledo AB 54-S, 100 µg accuracy; Mettler Toledo B2002-S, 10 mg accuracy)
• Sonicators (QSONICA Q125, Cole-Parmer 8890)
• Heat Press (Carver 3351-0)
• Charged-Coupled Device (CCD) camera (Cognex in-sight 5403 vision
  sensor with patmax)
• Tube Furnace (Barnstead/Thermolyne 21100)
• Convection Oven
• Three Vacuum Ovens
• Three Vacuum Pumps
• 2x Water Bath (Thermo Scientific Neslab RTE 10)
• Rotary Evaporator (Buchi Rotovapor®)
• Many stir/hot plates and other wet chemistry accessories

Nanofibers for Energy Storage and Conversion Laboratory (KALRA)

Cat-471
• Four Electrospinning Stations (with core-shell spinning capability)
• Tube Furnaces/Convection Ovens/Vacuum Ovens
• Mbraun Dual User Glove Box
• Carver Heat Press
• Gamry Ref 3000 Potentiostat
• 32-channel Maccor Battery Cycler

Access to:
• Drexel’s Centralized Research Facilities (SEM, TEM, Ultramicrotome,
  FTIR, XPS, XRD, Multi-angle x-ray scattering)
• XSEDE Compute Hours Allocation
• Synchrotron at Brookhaven National Lab
• BET Surface are and Porosity Analyzer

Thin Film and Devices Laboratory (LAU)

CAT-382
• Chemical Vapor Deposition Thin Film Reactor System I
• Chemical Vapor Deposition Rotating Bed Reactor System
• Gamry Reference 600 Electrochemical Testing Station
• Solar Illuminator
• Nicolet 6700 FTIR Spectrometer
• Laurell Technologies Spin Coater

Bossone-521
• Chemical Vapor Deposition Thin Film Reactor System II

Access to:
• Centralized Research Facilities (SEM, TEM, XRD, SAXS, XPS,
  Raman, Profilometer)
• Thermogravimetric Analyzer
• Differential Scanning Calorimeter
• Dynamic Mechanical Analyzer
• UV-Vis Spectrophotometer

Biosensor and Bioanalytics Laboratory
(MUTHARASAN)

Cat-466, 469
• Custom-built bio-analytical flow apparatus for conducting in situ
  surface chemistry and detection assays of pathogens, biomarkers,
  DNA and RNA
• Impedance Analyzers Agilent 4294A and Agilent HP4192A with bridge
  circuits for device characterization
• Electrochemical Impedance Spectrometer, Gamry Interface 1000 with
  three electrode cells, and interfaces to biosensor flow cell; Ag/AgCl
  and Pt electrodes
• Stanford Research System QCM200 and flow cells
• Signal Recovery 875 Lock-In amplifier (plus computer-interface)
• Function/Arbitrary Waveform Generator, 80 MHz Agilent 33250A
• Agilent precision Giga-ohmmeter
• Bausch & Lomb optical Microscopes interfaced with image acquisition
  system
• Olympus OM-10 Fluorescence Microscope, coupled to Canon digital
  imaging and video systems
• PTI SS Fluorescence Spectrometer with PMT 750 detector
• UV-VIS spectrometer – Shimadzu UV-1800
• Denton Desktop high vacuum sputtering system; 6-inch target, one or
two cathode configuration, Base vacuum 10^-6
• Harrick RF Plasma Reactor (Model PDC-001, 200 W) modified for
  conducting plasma-assisted surface reactions
• UVP UV Radiation Oven, Model OG-1. Radiation at 185 and 254 nm
• 1550 nm DFB laser (Anritsu GB5A016) and 1310 nm DFB laser
  (QPhotonics), and associated power supplies
• High speed micro-centrifuge (200 – 15000 rpm)
• Vacuum ovens
• Incubators, 9 ft³, 20-70°C
• Spectrum analyzer (ANDO AQ-6310B), LabView interface
• Ericsson FSU 975 fusion splicer
• Laminar Flow Hoods, Precision CO₂ Incubators, Spinners, bioreactors
  (0.1L to 1L)

Access to:
• Bruker Daltonics Autoflex III Smartbeam TOF-MALDI mass spectrometer
• 8 M#, Milli-Q system
• Autoclave
• Hot room 37°C, 100 ft²
• Refrigerated room 4°C, 100 ft²

Polymers and Composites Laboratory
(PALMESE)

Bossone-521
• TA Instruments TGA Q50 Thermogravimetric Analyzer
• KSV Instruments CAM 200 Contact Angle and Surface Tension Meter
• TA Instruments DSC Q2000 Differential Scanning Calorimeter
• Instron 8872
• Thermo Nicolet Nexus 870 FTIR
Civil Engineering

- TA Instruments DMA Dynamic Mechanical Analysis
- Perkin Elmer DSC7 Differential Scanning Calorimeter
- Waters GPC/HPLC (RI, UV Detectors)
- Electrospinning station
- TA Instruments AR Rheometer
- Thinky planetary centrifugal mixer ARE-250
- Melt Press
- Portable Near Infrared Spectrometer
- Brookfield digital viscometer
- Glove Box
- Supercritical Dryer (2x)
- Dielectric Barrier Discharge (DBD) plasma reactor

Process Systems Engineering Laboratory (SOROUSH)
- Interacting liquid level tanks
- 2-liter RC1 Calorimeter

Wrenn Laboratory (WRENN)
Cat-470
- PTI, Inc. C-71 Time-Resolved Fluorescence Spectrometer (pulsed nitrogen and dye lasers)
- PTI, Inc. A-710 Steady State Fluorescence Spectrometer
- Brookhaven 90Plus Dynamic Light Scattering Apparatus
- Brookhaven Goniometer-based, Static Light Scattering Apparatus
- Perkin-Elmer BUV40XW0 UV-Visible Absorbance Spectrometer
- Zeiss Axioskop2 Fluorescence microscope
- Zeiss Ultraviolet Digital Image Analysis System (contains Orca Camera, Sony 17” monitor, and Axiovision II software)
- Beckman Coulter Allegra64 Centrifuge
- Misonix, Inc. XL2020 Sonicator
- Lipex Biomembranes, Inc. Lipid Extruder (10 mL)

Chemical and Biological Engineering Faculty
Cameron F. Abrams, PhD (University of California, Berkeley). Professor. Molecular simulations in biophysics and materials; receptors for insulin and growth factors; and HIV-1 envelope structure and function.

Jason Baxter, PhD (University of California, Santa Barbara). Associate Professor. Solar cells, semiconductor nanomaterials, ultrafast spectroscopy.

Richard A. Cairncross, PhD (University of Minnesota). Associate Professor. Effects of microstructure on transport and properties of polymers; moisture transport and degradation on biodegradation on biodegradable polymers; production of biofuel.

Nily R. Dan, PhD (University of Minnesota). Associate Professor. Design of synthetic gene and drug carriers; design of polymeric drug carriers; metal cluster formation in polymeric matrices; colloidal absorption in patterned surfaces.

Yossef A. Elabd, PhD (Johns Hopkins University). Professor. Fuel cells; polymer membranes; diffusion in polymers.

Vibha Kalra, PhD (Cornell University). Assistant Professor. Nanotechnology, polymer nanocomposites.

Kenneth K.S. Lau, PhD (Massachusetts Institute of Technology). Associate Professor. Surface science; nanotechnology; polymer thin films and coatings; chemical vapor deposition.

Raj Mutharasan, PhD (Drexel University) Frank A. Fletcher Professor. Biochemical engineering; cellular metabolism in bioreactors; biosensors.

Giuseppe R. Palmese, PhD (University of Delaware) Department Head, Chemical and Biological Engineering. Professor. Reacting polymer systems; nanostructured polymers; radiation processing of materials; composites and interfaces.

George F. Rowell, PhD (University of Pennsylvania). Associate Teaching Professor. Undergraduate laboratory supervising.

Masoud Soroush, PhD (University of Michigan). Professor. Process systems engineering; polymer engineering.

John H. Speidel, BSHE, MCHE (University of Delaware; Illinois Institute of Technology). Teaching Professor.

Stephen P. Wrenn, PhD (University of Delaware) Assistant Dean of Graduate Affairs, College of Engineering. Associate Professor. Biomedical engineering; biological colloids; membrane phase behavior and cholesterol transport.

Emeritus Faculty

Civil Engineering

Major: Civil Engineering

Degree Awarded: Master of Science in Civil Engineering (MSCE) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MSCE); 90.0 (PhD)

Classification of Instructional Programs (CIP) code: 14.0801
Standard Occupational Classification (SOC) code: 17-2015

About the Program

Objectives

The graduate program in civil engineering offers students the opportunity to develop a more fundamental and complete understanding of the principles that govern their field as well as current design methodology. Students are encouraged to be innovative and imaginative in their quest for recognizing, stating, analyzing, and solving engineering problems.

The goal of the master's program is to develop technical depth of expertise for a professional career in the planning, design, construction, and operation of large-scale infrastructure systems, built facilities, and water resources management. The goal of the PhD program is to develop the abilities to discover, pursue, and apply basic knowledge. PhD recipients are prepared to engage in teaching and research or in an industrial career in the development of new concepts and innovative systems.
General Information

The civil engineering programs comprise the following areas of specialization: building systems, geotechnical engineering, hydraulic and coastal engineering, structural engineering, and water resources.

For more information, visit the Department of Civil, Architectural and Environmental Engineering (http://www.cae.drexel.edu) web page.

Admission Requirements

MS admission is based on an academic record demonstrating adequate preparation and potential for successful graduate study. This typically includes a BS from an engineering curriculum accredited by the Accrediting Board for Engineering and Technology (ABET) or the equivalent from a non-U.S. institution. Submission of results from the Graduate Record Exam (GRE) is required. A grade point average (GPA) of 3.0 is usually required. Graduates who do not have a bachelor's degree in either Civil, Architectural or Environmental Engineering may be required to take preparatory undergraduate courses.

For additional information on how to apply, visit Drexel's Admissions page for Civil Engineering (http://www.drexel.edu/grad/programs/coe/civil-engineering).

Master of Science in Civil Engineering

The programs of study at the master's level continue the specialization developed at the senior level of the undergraduate program or newly developed interests. The Master of Science in Civil Engineering program may be elected by graduates of ABET-accredited undergraduate programs in civil engineering and related fields. Admission and prerequisites are determined on the basis of a student's undergraduate transcript.

Most MSCE graduates work as professional engineers in consulting firms, industry, or governmental agencies. A number of our graduates have started consulting and construction firms in the Philadelphia area and have been very successful. Other former students hold prominent positions in public utilities, local government agencies, and industry.

The full-time graduate academic program is closely associated with the research efforts of the faculty. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study.

The master's degree requires a total of 45.0 credits, of which 24.0 credits must be in the major field of interest and 6.0 credits are to fulfill math requirements. The remaining credits are taken as electives in related areas. The choice of core and elective courses is made in consultation with the student's graduate advisor.

Areas of concentration include:

- Structural
- Geotechnical/geoenvironmental/geosynthetics
- Water resources
- Building systems/energy

Dual graduate degrees are possible. Among the more popular programs are combining the MS in Civil Engineering with an MS in Environmental Engineering, or Engineering Management. The required credits must meet all civil engineering program requirements and will be determined on the basis of the student's proposed program of study.

PhD in Civil Engineering

The PhD degree is awarded for original research on a significant civil engineering problem. Graduate students who have completed their MS degrees work closely with individual faculty members (see Faculty Research Interests below). PhD dissertation research is usually supported by a research grant from a government agency or an industrial contract.

The full-time graduate academic program is closely associated with the research efforts of the faculty. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study.

Doctoral students normally take at least 45.0 credits, including research credits, beyond the master's degree requirements. Full-time residency for one continuous academic year is required for the PhD degree to ensure students the opportunity for intellectual association with other scholars. Many doctoral students take two, three, or four years of full-time graduate study to complete their degrees. Involvement in the teaching activity of the Civil, Architectural and Environmental Engineering Department is required of all PhD applicants.

After approximately one year of study beyond the master's degree, doctoral students take a candidacy examination, consisting of written and oral parts. Each PhD candidate is supervised by a major professor and a doctoral committee chaired by the major professor.

PhD candidates submit a detailed proposal for dissertation research to the doctoral committee. The students then take a proposal examination; successful completion of this examination is required to become a PhD candidate. After approval of the proposal, the committee meets from time to time to review the progress of the research. The dissertation must be submitted to the doctoral committee at least 90 days before the graduation date. The committee schedules and conducts a final oral examination before approval of the dissertation.

Areas of research include:

- Structural
- Geotechnical/geoenvironmental/geosynthetics
- Water resources
- Sustainable engineering
- Building systems/energy

Dual Degree Programs

Civil Engineering students may find it useful to pursue dual MS degrees. Such programs have been pursued in concert with Environmental Engineering/Science, Mechanical Engineering, Information Studies and Engineering Management. A dual degree student must complete the required coursework for each degree. Depending upon the concentration, up to 15.0 credits from another program may count as electives for the MSCE, with the advisor's approval. The student is responsible for obtaining approval of MSCE courses that apply to the second degree.

Bachelor's/Master's Dual Degree Program

Exceptional undergraduate students can also pursue a master of science degree in the same period as the bachelor of science. Many students deepen their knowledge with a Master's degree in Civil Engineering,
while others have broadened their knowledge with a Master’s degree in related areas such as Environmental Science, Engineering Management, Software Engineering and Information Technology.

For more information about this program, visit the Department’s BS/MS Dual Degree Program (http://www.drexel.edu/cae/academics/bs-environmental-engineering/Accelerated%20and%20Dual%20Degree%20Programs%20CAEE) web page.

Facilities

Construction Materials Laboratory
This laboratory contains facilities for the study of concrete, asphalt, mortar, soil-cement, and timber materials, and moist cure facilities.

Geosynthetics Laboratory
This laboratory contains a complete suite of physical, mechanical, hydraulic, endurance, and environmental test devices for assessing behavior of geotextiles, geogrids, geonets, geomembranes, and geocomposites.

HVAC and Refrigeration Laboratory
This laboratory contains complete models of heating, ventilation, air conditioning, refrigeration, and pumping system models.

Hydromechanics Laboratory
This laboratory contains a wave channel tilting flume, pipe friction equipment, bench demonstration equipment, and a beach erosion model.

Soil Mechanics and Geoenvironmental Laboratory
This laboratory contains triaxial and direct shear equipment, controlled environmental chambers, consolidation tests, flexwall permeameters, and a test bed.

Structural Testing Laboratory
This laboratory contains universal testing machines with 150,000- and 300,000-pound capacity and test beds with MTS dynamic load equipment.

Civil, Architectural and Environmental Engineering Faculty

Emin A. Aktan, PhD (University of Illinois at Urbana-Champaign) John Roebling Professor of Infrastructure Studies. Professor. Structural engineering; infrastructure; evaluation; intelligent systems.

Ivan Bartoli, PhD (University of California, San Diego). Assistant Professor. Non-destructive evaluation and structural health monitoring; dynamic identification, stress wave propagation modeling.

Robert Brehm, PhD (Drexel University). Associate Teaching Professor. International infrastructure delivery; response to natural catastrophes; risk assessment and mitigation strategies; project management techniques.

S.C. Jonathan Cheng, PhD (West Virginia University). Associate Professor. Soil mechanics; geosynthetics; probabilistic design; landfill containments.

Louis DaSaro, MS (University of Delaware). Associate Teaching Professor. Failure analysis and restoration of existing structures, blast resistant structures, green structures, engineering education.

Patricia Gallagher, PhD (Virginia Polytechnic Institute). Associate Professor. Soil mechanics; geoenvironmental; ground improvement; sustainability.


Charles N. Haas, PhD (University of Illinois-Urbana) L. D. Betz Professor and Department Head. Civil, Architectural and Environmental Engineering. Professor. Control of human exposures to and risk assessment of pathogenic organisms; water and waste treatment; homeland security.

Ahmad Hamid, PhD (McMaster University). Professor. Engineered masonry; building; cladding; prestressed concrete.

Y. Grace Hsuan, PhD (Imperial College). Professor. Polymeric and cementitious materials; geosynthetic reliability and durability.

Joseph B. Hughes, PhD (University of Iowa) Dean of the College of Engineering and Distinguished Professor. Biological processes and applications of nanotechnology in environmental systems.

Joseph P. Martin, PhD (Colorado State University). Professor. Geoenvironmental engineering; urban environmental hydrology; transportation.

James E. Mitchell, MArch (University of Pennsylvania). Associate Professor. Architectural engineering design; building systems.

Franco Montalto, PhD (Cornell University). Associate Professor. Effects of built infrastructure on societal water needs, ecohydrologic patterns and processes, ecological restoration, green design, water interventions.

Franklin Moon, PhD (Georgia Institute of Technology). Associate Professor. Full-scale structural testing, structural dynamics, evaluation and rehabilitation of existing structures.

Joseph V. Mullin, PhD (Pennsylvania State University). Senior Lecturer. Structural material behavior, engineering economy and design.

Mira S. Olson, PhD (University of Virginia). Associate Professor. Groundwater; environmental fluid mechanics; hydrology.

Anu Pradhan, PhD (Carnegie Mellon University). Assistant Professor. Infrastructure management, construction engineering, transportation engineering, sensing system, geographic information system, statistical machine learning.

Yared Shifferaw, PhD (Johns Hopkins University). Assistant Professor. Computational and experimental mechanics, structural stability, optimization, health monitoring and hazard mitigation, sustainable structures, emerging materials, thin-walled structures and metallic structures.

Kurt Sjoblom, PhD (Massachusetts Institute of Technology). Assistant Professor. Laboratory testing of geomaterials, geotechnical engineering, foundation engineering.

Sabrina Spatari, PhD (University of Toronto). Assistant Professor. Research in industrial ecology; development and application of life cycle assessment (LCA) and material flow analysis (MFA) methods for guiding engineering and policy decisions; specific interest in biomass and bioenergy, biofuels, and urban infrastructure.

Michael Waring, PhD (University of Texas-Austin). Assistant Professor. Indoor air quality and building sustainability; indoor particulate matter fate
and transport; indoor chemistry and particle formation; secondary impacts of control technologies and strategies.

Jin Wen, PhD (University of Iowa). Associate Professor. Architectural engineering, building control systems, indoor air quality.

Aspasia Zerva, PhD (University of Illinois). Professor. Earthquake engineering; mechanics; seismicity; probabilistic analysis.

Interdepartmental Faculty

Eugenia Ellis, PhD (Virginia Polytechnic State University). Associate Professor. Registered architect; interior design, extended-care facilities design, research on spatial visualization, perception and imagination.

Bakhtier Farouk, PhD (University of Delaware) Billings Professor of Mechanical Engineering. Professor. Heat transfer; combustion; numerical methods; turbulence modeling; materials processing.

Emeritus Faculty

Harry G. Harris, PhD (Cornell University). Professor Emeritus. Structural models, dynamics of structures, plates and shells, industrialized building construction.

Robert M. Koerner, PhD (Duke University). Harry Bownam Professor Emeritus. Geosynthetic engineering; soil mechanics; water resources.

Richard Weggel, PhD (University of Illinois) Samuel S. Baxter Professor Emeritus; Civil and Environmental Engineering. Professor Emeritus. Coastal engineering; hydraulics engineering; hydrology.


Communication

Major: Communication
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS)
Classification of Instructional Programs (CIP) code: 09.9999
Standard Occupational Classification (SOC) code: 11-2011; 11-2031; 25-1122

About the Program

The MS in Communication program, with a hands-on approach, prepares students for careers in technical communication, science communication, and public communication. A scholarly track in communication, culture and media is also offered.

Drexel's Master of Science in Communication program prepares students for careers in a wide range of professional activities. The program specializes in four areas:

- public communication
- communication, culture, and media
- technical communication
- science communication

Technical communication is for those seeking employment as technical writers, computer documentation specialists, and training specialists. Science communication has much to offer those who aspire to medical, science, and pharmaceutical writing. A concentration in public communication leads to careers in journalism and public relations. In addition, the program provides a strong foundation in theoretical approaches to communication. This theoretical basis is designed to ensure that, as the field changes, students will continue to have an intellectual framework for evaluating and implementing new technology and changing media. The communication, culture and media concentration parallels requirements in Drexel's PhD program, and prepares students for doctoral level work in the field.

Throughout the curriculum, in all the concentration options, students may use electives to increase communication skills, to broaden theoretical backgrounds, or to further develop areas of specialization.

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

The program accommodates students from widely varying educational backgrounds; many have backgrounds in science and mathematics, and an equal number come from humanities-related areas. Some students pursue their degrees while already working at demanding jobs.

Admission Requirements

Applicants must meet the general requirements for admission to graduate studies. Applicants with a GPA below 3.0 must provide scores from the Graduate Record Examination. Prospective students must also submit with their applications a 1,500-word statement explaining why they want to enter the program. The program's screening committee carefully reads the essays to evaluate each applicant's writing skills and sense of purpose.

The program accommodates students from various backgrounds. For students without appropriate prior work experience, the program features a 6-month internship. For students applying with appropriate work experience, the internship requirement may be waived at the discretion of the Department's Graduate Committee.

Degree Requirements

Requirements

The MS degree requires 45.0 credits of coursework, a professional portfolio of three to five items developed by the student, and six months of internship for those who lack significant experience in communication related fields. For students in the communication, culture and media track, the internship may be a research internship done with a graduate faculty member.

Portfolio

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

Internship

An internship is required and may be completed at any time during the student's tenure at Drexel. Students who need professional experience consult with their advisors and the program director to develop a suitable internship. Normally, this placement begins after the student has completed at least half the required coursework. Students who already have the equivalent of six months of professional experience or who
gain the equivalent by working part time during their course of study can request exemption from this requirement.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM 500</td>
<td>Reading &amp; Res Communication</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 610</td>
<td>Theories of Communication and Persuasion</td>
<td>3.0</td>
</tr>
<tr>
<td>Electives</td>
<td></td>
<td>24.0</td>
</tr>
</tbody>
</table>

**Required Concentration Courses**

Students must select and complete one of the following concentration options:

**Technical Communication**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM 510</td>
<td>Technical Writing</td>
</tr>
<tr>
<td>COM 570</td>
<td>Technical and Science Editing</td>
</tr>
<tr>
<td>COM 612</td>
<td>Ethics for Science and Technical Communication</td>
</tr>
<tr>
<td>COM 620</td>
<td>Message Design and Evaluation</td>
</tr>
<tr>
<td>COM 630</td>
<td>Software Documentation</td>
</tr>
</tbody>
</table>

**Science Communication**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM 520</td>
<td>Science Writing</td>
</tr>
<tr>
<td>COM 570</td>
<td>Technical and Science Editing</td>
</tr>
<tr>
<td>COM 612</td>
<td>Ethics for Science and Technical Communication</td>
</tr>
<tr>
<td>COM 620</td>
<td>Message Design and Evaluation</td>
</tr>
<tr>
<td>COM 670</td>
<td>Medical Writing</td>
</tr>
</tbody>
</table>

**Public Communication**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM 613</td>
<td>Ethics for Public Communication</td>
</tr>
<tr>
<td>COM 635</td>
<td>Electronic Publishing</td>
</tr>
<tr>
<td>COM 650</td>
<td>Telecommunications Policy in the Information Age</td>
</tr>
<tr>
<td>COM 663</td>
<td>Event Planning</td>
</tr>
<tr>
<td>COM 680</td>
<td>Public Relations Writing and Strategies</td>
</tr>
</tbody>
</table>

**Communication, Culture, and Media**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM 710</td>
<td>Mass Communication and American Social Thought</td>
</tr>
<tr>
<td>COM 715</td>
<td>Media, Advocacy and Public Spaces</td>
</tr>
<tr>
<td>COM 725</td>
<td>Political Communication</td>
</tr>
<tr>
<td>Select 2 of the following:</td>
<td></td>
</tr>
<tr>
<td>COM 720</td>
<td>Critical Theory</td>
</tr>
<tr>
<td>COM 801</td>
<td>Seminar in Contemporary Theory</td>
</tr>
<tr>
<td>COM 802</td>
<td>Seminar in Discourse and Semiotics</td>
</tr>
<tr>
<td>COM 803</td>
<td>Seminar in Structural and Cultural Dynamics</td>
</tr>
<tr>
<td>COM 804</td>
<td>Seminar in Research Methodology</td>
</tr>
<tr>
<td>COM 805</td>
<td>Seminar in Communication Ethics</td>
</tr>
</tbody>
</table>

**Total Credits** 45.0

* Any appropriate graduate course offered in the University can serve as an elective if the student has sufficient background to take the course. In addition, the program offers its own elective courses including special topics (COM 690). Qualified students may also pursue independent study for elective credit in special cases.

**Communication Faculty**

Ronald Bishop, III, PhD (Temple University). Professor. Investigative reporting, sports journalism, journalism history, journalism sourcing patterns, textual narrative and ideological analysis, cultural history of fame.


Karen Cristiano, PhD (Temple University) Assistant Department Head of Communication. Associate Teaching Professor. Journalism, medical writing, feature writing, copy editing, mass media and society.

Paul Evangelista, PhD (Temple University). Assistant Teaching Professor. Public relations, communication theory, new technologies in communication (classroom and online); business communication; electronic publishing; social media.

Richard Forney Instructor. Broadcast journalism technology and the effects of new technologies on personal and corporate communication skills.

Alexander Friedlander, PhD (Carnegie Mellon University) Associate Dean for Undergraduate Education, College of Arts and Sciences. Associate Professor. Rhetorical theory and practice, document design, writing and technology.

Julia Hagemann-May, PhD (Drexel University). Assistant Teaching Professor. Political communication; international politics and its news coverage; public opinion; transatlantic relations; war, torture and human rights; debate in the public sphere.

Ernest A. Hakanen, PhD (Temple University). Professor. Telecommunications policy, adolescent media use, communication theory and history, global media, and semiotics.

Barbara Jean Hoekje, PhD (University of Pennsylvania) Director of English Language Center. Associate Professor. Sociolinguistic theory, discourse analysis, applied linguistics (language teaching, learning, and testing).

Frank Kelley, PhD (Temple University). Associate Teaching Professor. Corporate university systems online, power structure of media enterprises, public relations, event planning.

Jordan McClain, PhD (Temple University). Assistant Teaching Professor. Media framing and music journalism; relationship between television and music; American popular culture; celebrity, consumerism, and consumer behavior; branding, brand positioning, and advertising criticism.

Alexander Nikolaev, PhD (Florida State University). Associate Professor. Public relations, political communication, organizational communication, mass communication, international communications and negotiations, communications theory.

Devon Powers, PhD (New York University) Director, Communication Undergraduate Programs. Associate Professor. Popular music, cultural intermediaries, promotional culture, 20th-century history, journalism studies.

David Ridgway, MS (St. Joseph's University). Instructor. Deviant behaviors, social problems.

Rosemary Rys, MA. Instructor. Public relations and marketing.
Lawrence Souder, PhD (Temple University). Associate Teaching Professor. Science and technical writing, communication ethics, nonprofit communication.

Allan Stegeman, MA (University of Houston). Teaching Professor. Communication, technology and mass media, video.

Susan Stein, PhD (University of Wisconsin). Director, Professional MS Programs. Associate Teaching Professor. Science, environmental, and health communication.

Asta Zelenkauskaite, PhD (Indiana University). Assistant Professor. Social media; user-generated content; computer-mediated communication; interactivity; active audience analysis; mobile communication; gender and online identity; prosumer culture; internet of things; quantitative/qualitative research.

**Interdepartmental Faculty**

Michelle Sahl, PhD, MEd, MBA, MBE (The University of the Sciences in Philadelphia). Assistant Teaching Professor. Health management and policy: management and leadership of health services organizations, urban health, and the history of health care systems.

**Publishing**

**Major: Publishing**

**Degree Awarded: Master of Arts (MA)**

**Calendar Type: Quarter**

**Total Credit Hours: 45.0**

**Classification of Instructional Programs (CIP) code: 09.1001**

**Standard Occupational Classification (SOC) code: 27-3041**

**About the Program**

Students are given a broad scope view of the Publishing Industry via courses taught by publishing professionals and experts in their fields. In addition to the ten required courses, students will take an additional five courses in the aspect of publishing that best suits their interests. Courses will be taught in traditional classrooms, as well as online in both synchronized and asynchronized sessions; special projects can occur in day and evening hours.

The required course list contains seven courses specific to the Publishing program, and three by other disciplines (Law, Business, and Digital Design). The elective list contains three courses specific to the program, and then a wide-range of courses from Communication, Visual Arts and Design, Business, and Law.

Independent Projects are encouraged and are limited only by the student's imagination or area of interest. Opportunities abound at Drexel itself, as well as many other area publishers with whom we've built relationships.

**Degree Requirements**

**Required courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUB 530</td>
<td>The Publishing Environment</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB 631</td>
<td>Publication Design: Print and Digital</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB 635</td>
<td>Periodicals Publishing</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB 730</td>
<td>Book Publishing</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB 504</td>
<td>Drexel Publishing Group Special Projects</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB 750</td>
<td>Small Press Development</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Select five of the following:**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>COM 500</td>
<td>Reading &amp; Res Communication</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 510</td>
<td>Technical Writing</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 520</td>
<td>Science Writing</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 530</td>
<td>Techniques and Science of Photography</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 540</td>
<td>Technical and Science Graphics</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 570</td>
<td>Technical and Science Editing</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 610</td>
<td>Theories of Communication and Persuasion</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 620</td>
<td>Message Design and Evaluation</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 640</td>
<td>Desktop Publishing</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 655</td>
<td>Ethnography of Communication</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 665</td>
<td>Medical Writing</td>
<td>3.0</td>
</tr>
<tr>
<td>COM 675</td>
<td>Grant Writing for the Arts and Humanities</td>
<td>3.0</td>
</tr>
<tr>
<td>COM T680</td>
<td>Special Topics in Communication</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 602S</td>
<td>First Amendment</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 760S</td>
<td>Copyright</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 601</td>
<td>Managing the Total Enterprise</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 630</td>
<td>Global Marketing</td>
<td>3.0</td>
</tr>
<tr>
<td>ORGB 625</td>
<td>Leadership and Professional Development</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB 599</td>
<td>Independent Study in Publishing</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB 701</td>
<td>Independent Project in Publishing</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB T680</td>
<td>Special Topics in Publishing</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits** 45.0

**Sample Plan of Study**

**Term 1**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUB 530</td>
<td>The Publishing Environment</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB 631</td>
<td>Publication Design: Print and Digital</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits** 6.0

**Term 2**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUB 635</td>
<td>Periodicals Publishing</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB 730</td>
<td>Book Publishing</td>
<td>3.0</td>
</tr>
<tr>
<td>MKTG 601</td>
<td>Marketing Strategy Planning</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits** 9.0

**Term 3**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUB 750</td>
<td>Small Press Development</td>
<td>3.0</td>
</tr>
<tr>
<td>PUB T680</td>
<td>Special Topics in Publishing</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits** 6.0

**Term 4**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PUB 504</td>
<td>Drexel Publishing Group Special Projects</td>
<td>3.0</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Term Credits** 6.0

**Term 5**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Elective</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 603S</td>
<td>Media Law</td>
<td>3.0</td>
</tr>
</tbody>
</table>
Foreign Language (TOEFL).

The GRE General Test is required of applicants to full-time MS and PhD level work.

Students must have a minimum 3.0 GPA (on a 4.0 scale) for the last two years of undergraduate studies, as well as for any subsequent graduate-level work.

Appropriate coursework includes experience with all of the following: Software (advanced programming and operating systems); Computer Architecture (digital systems design, computer organization and architecture); Algorithms and Data Structures; Computer Networks. Students must have a minimum 3.0 GPA (on a 4.0 scale) for the last two years of undergraduate studies, as well as for any subsequent graduate-level work.

The GRE General Test is required of applicants to full-time MS and PhD programs. Students whose native language is not English and who do not hold a degree from a US institution must take the Test of English as a Foreign Language (TOEFL).

For additional information on how to apply, visit Drexl’s Admissions page for Computer Engineering (http://www.drexel.edu/grad/programs/coe/computer-engineering).

### Master of Science in Computer Engineering

The Master of Science in Computer Engineering curriculum encompasses 45.0 or 48.0 (with the Graduate Co-op option) approved credit hours, chosen in accordance with the following requirements and a plan of study arranged with the departmental graduate advisor in consultation with the student's research advisor, if applicable. Before the end of the first quarter in the Department of Electrical and Computer Engineering, for a full-time student, or by the end of the first year for a part-time student, said plan of study must be filed and approved with the departmental graduate advisor.

A total of at least 30.0 credit hours must be taken from among the graduate course offerings of the Department of Electrical and Computer Engineering. These credits must be taken at Drexel University. No transfer credit may be used to fulfill these requirements, regardless of content equivalency.

The remaining courses needed to reach the minimum credit hour requirement for the degree program are considered elective courses. Elective courses can be chosen from among the graduate course offerings of the Department of Electrical and Computer Engineering; other departments within the College of Engineering; the School of Biomedical Science, Engineering and Health Systems; the Department of Mathematics; the Department of Physics; the Department of Chemistry and the Department of Biology. In order to have courses outside of these departments and schools count towards degree completion, they must be approved by the departmental graduate advisors prior to registration for said courses.

Please note that ECEC 500 (Fundamentals of Computer Hardware) and ECEC 600 (Fundamentals of Computer Networks) do not count toward the credit requirements to complete the MS in Electrical Engineering degree program.

### Options for Degree Fulfillment

Although not required, students are encouraged to complete a Master's Thesis as part of the MS studies. Those students who choose the thesis option may count up to 9.0 research/thesis credits as part of their required credit hour requirements.

Students may choose to participate in the Graduate Co-op Program, where 6.0 credit hours can be earned for a six month co-operative education experience in industry, working on curriculum related projects. The total number of required credit hours is increased to 48.0 for those students who choose to pursue the Graduate Co-op option. This change represents an increase in non-departmental required credit hours to a total of 18.0 credit hours, 6.0 of which are earned from the cooperative education experience.
For more information on curricular requirements, visit the Department of Electrical and Computer Engineering’ (http://www.ece.drexel.edu)’s web site.

**PhD in Electrical Engineering**

**General Requirements**

The following general requirements must be satisfied in order to complete the PhD in Electrical Engineering:

- 90.0 credit hours total
- candidacy examination
- research proposal
- dissertation defense

Students entering with a master’s degree in electrical or computer engineering or a related field will be considered a post-masters PhD student and will only be required to complete a total of 45.0 credit hours, in accordance with University policy.

**Curriculum**

Appropriate coursework is chosen in consultation with the student’s research advisor. A plan of study must be developed by the student to encompass the total number of required credit hours. Both the departmental graduate advisor and the student’s research advisor must approve this plan.

**Candidacy Examination**

The candidacy examination explores the depth of understanding of the student in his/her specialty area. The student is expected to be familiar with, and be able to use, the contemporary tools and techniques of the field and to demonstrate familiarity with the principal results and key findings.

The student, in consultation with his/her research advisor, will declare a principal technical area for the examination. The examination includes the following three parts:

- A self-study of three papers from the archival literature in the student’s stated technical area, chosen by the committee in consultation with the student.
- A written report (15 pages or less) on the papers, describing their objectives, key questions and hypotheses, methodology, main results and conclusions. Moreover, the student must show in an appendix independent work he/she has done on at least one of the papers—such as providing a full derivation of a result or showing meaningful examples, simulations or applications.
- An oral examination which takes the following format:
  - A short description of the student’s principal area of interest (5 minutes, by student).
  - A review of the self-study papers and report appendix (25-30 minutes, by students).
  - Questions and answers on the report, the appendix and directly related background (40-100 minutes, student and committee).

In most cases, the work produced during the candidacy examination will be a principal reference for the student’s PhD dissertation; however, this is not a requirement.

**Research Proposal**

Each student, after having attained the status of PhD Candidate, must present a research proposal to a committee of faculty and industry members, chosen with his/her research advisor, who are knowledgeable in the specific area of research. This proposal should outline the specific intended subject of study; i.e., it should present a problem statement, pertinent background, methods of study to be employed, expected difficulties and uncertainties and the anticipated form, substance and significance of the results.

The purpose of this presentation is to verify suitability of the dissertation topic and the candidate’s approach, and to obtain the advice and guidance of oversight of mature, experienced investigators. It is not to be construed as an examination, though approval by the committee is required before extensive work is undertaken. The thesis proposal presentation must be open to all; announcements regarding the proposal presentation must be made in advance.

The thesis advisory committee will have the sole responsibility of making any recommendations regarding the research proposal. It is strongly recommended that the proposal presentation be given as soon as possible after the successful completion of the candidacy examination.

**Dissertation Defense**

Dissertation Defense procedures are described in the Office of Graduate Studies policies regarding Doctor of Philosophy Program Requirements (http://www.drexel.edu/provost/graduatesstudies). The student must be a PhD candidate for at least one year before he/she can defend his/her doctoral thesis.

**Dual Degree**

The ECE Department offers outstanding students the opportunity to receive two diplomas (BS and MS) at the same time. The program requires five (5) years to complete. Participants, who are chosen from the best undergraduates students, work with a faculty member on a research project and follow a study plan that includes selected graduate classes. This program prepares individuals for careers in research and development; many of its past graduates continued their studies toward a PhD.

For more information on eligibility, academic requirements, and tuition policy visit the Engineering Combined BS/MS (http://www.ece.drexel.edu/undergrad/bsms.html) page.

**Facilities**

Drexel University and the Electrical and Computer Engineering Department are nationally recognized for a strong history of developing innovative research. Research programs in the ECE Department prepare students for careers in research and development, and aim to endow graduates with the ability to identify, analyze, and address new technical and scientific challenges. The ECE Department is well equipped with state-of-the-art facilities in each of the following ECE Research laboratories:
Research Laboratories at the ECE Department

Adaptive Signal Processing and Information Theory Research Group

The Adaptive Signal Processing and Information Theory Research Group (http://www.ece.drexel.edu/walsh/aspitrg/home.html) conducts research in the area of signal processing and information theory. Our main interests are belief/expectation propagation, turbo decoding and composite adaptive system theory. We are currently doing projects on the following topics:

i) Delay mitigating codes for network coded systems,
ii) Distributed estimation in sensor networks via expectation propagation,
iii) Turbo speaker identification,
iv) Performance and convergence of expectation propagation,
v) Investigating bounds for SINR performance of autocorrelation based channel shorteners.

Applied Networking Research Lab

Applied Networking Research Lab (ANRL) projects focus on modeling and simulation as well as experimentation in wired, wireless and sensor networks. ANRL is the home of MuTANT, a Multi-Protocol Label Switched Traffic Engineering and Analysis Testbed composed of 10 high-end Cisco routers and several PC-routers, also used to study other protocols in data networks as well as automated network configuration and management. The lab also houses a sensor network testbed.

Bioimage Laboratory

Uses computer gaming hardware for enhanced and affordable 3-D visualization, along with techniques from information theory and machine learning to combine the exquisite capabilities of the human visual system with computational sensing techniques for analyzing vast quantities of image sequence data.

Data Fusion Laboratory

The Data Fusion Laboratory investigates problems in multisensory detection and estimation, with applications in robotics, digital communications, radar, and target tracking. Among the projects in progress: computationally efficient parallel distributed detection architectures, data fusion for robot navigation, modulation recognition and RF scene analysis in time-varying environments, pattern recognition in biological data sequences and large arrays, and hardware realizations of data fusion architectures for target detection and target tracking.

Drexel Network Modeling Laboratory

The Drexel Network Modeling Laboratory investigates problems in the mathematical modeling of communication networks, with specific focus on wireless ad hoc networks, wireless sensor networks, and supporting guaranteed delivery service models on best effort and multipath routed networks. Typical methodologies employed in our research include mathematical modeling, computer simulation, and performance optimization, often with the end goal of obtaining meaningful insights into network design principles and fundamental performance tradeoffs.

Drexel Power-Aware Computing Laboratory

The Power-Aware Computing Lab (http://dpac.ece.drexel.edu) investigates methods to increase energy efficiency across the boundaries of circuits, architecture, and systems. Our recent accomplishments include the Sigil profiling tool, scalable modeling infrastructure for accelerator implementations, microarchitecture-aware VDD gating algorithms, an accelerator architecture for ultrasound imaging, evaluation of hardware reference counting, hardware and operating system support for power-agile computing, and memory systems for accelerator-based architectures.

Drexel University Nuclear Engineering Education Laboratory

The field of nuclear engineering encompasses a wide spectrum of occupations, including nuclear reactor design, medical imaging, homeland security, and oil exploration. The Drexel University Nuclear Engineering Education Laboratory (DUNEEL) provides fundamental hands on understanding for power plant design and radiation detection and analysis. Software based study for power plant design, as well as physical laboratory equipment for radiation detection, strengthen the underlying concepts used in nuclear engineering such that the student will comprehend and appreciate the basic concepts and terminology used in various nuclear engineering professions. Additionally, students use the laboratory to develop methods for delivering remote, live time radiation detection and analysis. The goal of DUNEEL is to prepare students for potential employment in the nuclear engineering arena.

Drexel VLSI Laboratory

The Drexel VLSI Laboratory (http://ece.drexel.edu/faculty/taskin/wiki/vlsilab/index.php/Main_Page) investigates problems in the design, analysis, optimization and manufacturing of high performance (low power, high throughput) integrated circuits in contemporary CMOS and emerging technologies. Suited with industrial design tools for integrated circuits, simulation tools and measurement beds, the VLSI group is involved with digital and mixed-signal circuit design to verify the functionality of the discovered novel circuit and physical design principles. The Drexel VLSI laboratory develops design methodologies and automation tools in these areas, particularly in novel clocking techniques, featuring resonant clocking, and interconnects, featuring wireless interconnects.

Drexel Wireless Systems Laboratory

The Drexel Wireless Systems Laboratory (DWSL) contains an extensive suite of equipment for constructing, debugging, and testing prototype wireless communications systems. Major equipment within DWSL includes:

- three software defined radio network testbeds (HYDRA, USRP, and WARP) for rapidly prototyping radio, optical and ultrasonic communications systems,
- a TDK RF anechoic chamber and EMSCAN desktop antenna pattern measurement system,
- a materials printer and printed circuit board milling machine for fabricating conformal antennas and
- wireless protocol conformance testing equipment from Aeroflex.

The lab is also equipped with network analyzers, high speed signal generators, oscilloscopes, and spectrum analyzers as well as several Zigbee development platforms for rapidly prototyping sensor networks.

DWSL personnel also collaborate to create wearable, fabric based transceivers through collaboration with the Shima Seiki Haute Laboratory in the Drexel ExCITE Center. The knitting equipment at Drexel includes sixteen SDS-ONE APEX3 workstations and four state-of-the-art knitting machines. The workstations accurately simulate fabric construction and provide researchers and designers the opportunity to program, create and simulate textile prototypes, import CAD specifications of final products,
and produce made-to-measure or mass-produced pieces on Shima Seiki knitting machines. For testing smart textiles for biomedical, DWSL personnel also have collaborators in the Center for Interdisciplinary Clinical Simulation and Practice (CICSP) in the Drexel College of Medicine which provides access to medical mannequin simulators.

**Ecological and Evolutionary Signal-processing and Informatics Laboratory**

The Ecological and Evolutionary Signal-processing and Informatics Laboratory (EESI) ([http://www.ece.drexel.edu/gair/EESI](http://www.ece.drexel.edu/gair/EESI)) seeks to solve problems in high-throughput genomics and engineer better solutions for biochemical applications. The lab's primary thrust is to enhance the use of high-throughput DNA sequencing technologies with pattern recognition and signal processing techniques. Applications include assessing the organism content of an environmental sample, recognizing/classifying potential and functional genes, inferring environmental factors and inter-species relationships, and inferring microbial evolutionary relationships from short-read DNA/RNA fragments. The lab also investigates higher-level biological systems such as modeling and controlling chemotaxis, the movement of cells.

**Electric Power Engineering Center**

This newly established facility makes possible state-of-the-art research in a wide variety of areas, ranging from detailed theoretical model study to experimental investigation in its high voltage laboratories. The mission is to advance and apply scientific and engineering knowledge associated with the generation, transmission, distribution, use, and conservation of electric power. In pursuing these goals, this center works with electric utilities, state and federal agencies, private industries, nonprofit organizations and other universities on a wide spectrum of projects. Research efforts, both theoretical and experimental, focus on the solution of those problems currently faced by the electric power industry. Advanced concepts for electric power generation are also under investigation to ensure that electric power needs will be met at the present and in the future.

**Electronic Design Automation Facility**

Industrial-grade electronic design automation software suite and intergraded design environment for digital, analog and mixed-signal systems development. Field Programmable Gate Array (FPGA) development hardware. Most up-to-date FPGA/embedded system development hardware kits. Printed circuit board production facility. Also see Drexel VLSI Laboratory.

**Microwave-Photonics Device Laboratories**

The laboratory is equipped with test and measurement equipment for high-speed analog and digital electronics and fiber optic systems. The test equipment includes network analyzers from Agilent (100kHz-1.3 GHz and 45 Mhz-40 GHz), and Anritsu (45 MHz-6 GHz); spectrum analyzers from Tektronix, HP, and Agilent with measurement capability of DC to 40 GHz and up to 90 GHz using external mixers; signal generators and communication channel modulators from HP, Rhode-Schwarz, Systron Donner, and Agilent; microwave power meter and sensor heads, assortment of passive and active microwave components up to 40 GHz; data pattern generator and BER tester up to 3Gb/s; optical spectrum analyzer from Anritsu and power meters from HP; single and multimode fiber optic based optical transmitter and receiver boards covering ITU channels at data rates up to 10Gb/s; passive optical components such as isolator, filter, couplers, optical connectors and fusion splicer; LPKF milling machine for fabrication of printed circuit boards; wire-bonding and Cascade probe stations; Intercontinental test fixtures for testing of MMIC circuits and solid-state transistors; state-of-the-art microwave and electromagnetic CAD packages such as Agilent ADS, ANSYS HFSS, and COMSOL multi-physics module.

**Music and Entertainment Technology Laboratory**

The Music and Entertainment Technology Laboratory (MET-lab) is devoted to research in digital media technologies that will shape the future of entertainment, especially in the areas of sound and music. We employ digital signal processing and machine learning to pursue novel applications in music information retrieval, music production and processing technology, and new music interfaces. The MET-lab is also heavily involved in outreach programs for K-12 students and hosts the Summer Music Technology program, a one-week learning experience for high school students. Lab facilities include a sound isolation booth for audio and music recording, a digital audio workstation running ProTools, two large multi-touch display interfaces of our own design, and a small computing cluster for distributed processing.

**NanoPhotonics+ Lab** ([http://drexelnanophotonics.com](http://drexelnanophotonics.com))

Our research is primarily in the area of nanophotonics with a focus on the nanoscale interaction of light with matter. Interests include: liquid crystal/polymer composites for gratings, lenses and HOEs; liquid crystal interactions with surfaces and in confined nanospaces; alternative energy generation through novel photon interactions; ink-jet printed conducting materials for RF and phononic applications; and the creation and development of smart textiles technologies including soft interconnects, sensors, and wireless implementations.

**Opto-Electro-Mechanical Laboratory**

This lab concentrates on the system integration on optics, electronics, and mechanical components and systems, for applications in imaging, communication, and biomedical research. Research areas include: Programmable Imaging with Optical Micro-electrical-mechanical systems (MEMS), in which microscopic mirrors are used to image light into a single photodetector; Pre-Cancerous Detection using White Light Spectroscopy, which performs a cellular size analysis of nuclei in tissue; Free-space Optical Communication using Space Time Coding, which consists of diffused light for computer-to-computer communications, and also tiny lasers and detectors for chip-to-chip communication; Magnetic Particle Locomotion, which showed that particles could swim in a uniform field; and Transparent Antennas using Polymer, which enables antennas to be printed through an ink-jet printer.

**Plasma and Magnetics Laboratory**

Research is focused on applications of electrical and magnetic technologies to biology and medicine. This includes the subjects of non-thermal atmospheric pressure plasma for medicine, magnetic manipulation of particles for drug delivery and bio-separation, development of miniature NMR sensors for cellular imaging and carbon nanotube cellular probes.

**Power Electronics Research Laboratory**

The Power Electronics Research Laboratory (PERL) is involved in circuit and design simulation, device modeling and simulation, and experimental testing and fabrication of power electronic circuits. The research and development activities include electrical terminations, power quality, solar photovoltaic systems, GTO modeling, protection and relay coordination, and solid-state circuit breakers. The analysis tools include EMPT, SPICE, and others, which have been modified to incorporate models of such controllable solid-state switches as SCRs, GTOs, and MOSFETs. These
programs have a wide variety and range of modeling capabilities used to model electromagnetics and electromechanical transients ranging from microseconds to seconds in duration. The PERL is a fully equipped laboratory with 42 kVA AC and 70 kVA DC power sources and data acquisition systems, which have the ability to display and store data for detailed analysis. Some of the equipment available is a distribution and HV transformer and three phase rectifiers for power sources and digital oscilloscopes for data measuring and experimental analysis. Some of the recent studies performed by the PERL include static VAR compensators, power quality of motor controllers, solid-state circuit breakers, and power device modeling which have been supported by PECO, GE, Gould, and EPRI.

**RE Touch Lab**

The RE Touch Lab is investigating the perceptual and mechanical basis of active touch perception, or haptics, and the development of new technologies for stimulating the sense of touch, allowing people to touch, feel, and interact with digital content as seamlessly as we do with objects in the real world. We study the scientific foundations of haptic perception and action, and the neuroscientific and biomechanical basis of touch, with a long-term goal of uncovering the fundamental perceptual and mechanical computations that enable haptic interaction. We also create new technologies for rendering artificial touch sensations that simulate those that are experienced when interacting with real objects, inspired by new findings on haptic perception.

**Testbed for Power-Performance Management of Enterprise Computing Systems**

This computing testbed is used to validate techniques and algorithms aimed at managing the performance and power consumption of enterprise computing systems. The testbed comprises a rack of Dell 2950 and Dell 1950 PowerEdge servers, as well as assorted desktop machines, networked via a gigabit switch. Virtualization of this cluster is enabled by VMWare’s ESX Server running the Linux RedHat kernel. It also comprises of a rack of ten Apple Xserve machines networked via a gigabit switch. These servers run the OS X Leopard operating systems and have access to a RAID with TBs of total disk capacity.

**Electrical and Computer Engineering Faculty**

Fernand Cohen, PhD (Brown University). Professor. Surface modeling; tissue characterization and modeling; face modeling; recognition and tracking.

Kapil Dandekar, PhD (University of Texas-Austin) Director of the Drexel Wireless Systems Laboratory (DWSL); Associate Dean of Research, College of Engineering. Professor. Cellular/mobile communications and wireless LAN; smart antenna/MIMO for wireless communications; applied computational electromagnetics; microwave antenna and receiver development; free space optical communication; ultrasonic communication; sensor networks for homeland security; ultrawideband communication.

Afshin Daryoush, ScD (Drexel University). Professor. Digital and microwave photonics; nonlinear microwave circuits; RFIC; medical imaging.

Bruce A. Eisenstein, PhD (University of Pennsylvania) Interim Dean, College of Engineering. Professor. Pattern recognition; estimation; decision theory.

Adam K. Fontecchio, PhD (Brown University) Electrical and Computer Engineering. Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Gary Friedman, PhD (University of Maryland-College Park). Professor. Biological and biomedical applications of nanoscale magnetic systems.

Eli Fromm, PhD (Jefferson Medical College) Roy A. Brothers University Professor / Director for Center of Educational Research. Professor. Engineering education; academic research policy; bioinstrumentation; physiologic systems.

Edwin L. Gerber, PhD (University of Pennsylvania) Assistant Department Head for Evening Programs. Professor. Computerized instruments and measurements; undergraduate engineering education.

Allon Guez, PhD (University of Florida). Professor. Intelligent control systems; robotics, biomedical, automation and manufacturing; business systems engineering.

Mark Hempstead, PhD (Harvard University) Junior Colehower Chair. Assistant Professor. Computer engineering; power-aware computing; computer architecture; low power VLSI Design; wireless sensor networks.

Peter R. Herzfeld, PhD (University of Minnesota) Lester A. Kraus Professor/Director, Center for Microwave/Lightwave Engineering. Professor. Lightwave technology; microwaves; millimeter waves; fiber optic and integrated optic devices.

Leonid Hrebin, PhD (Drexel University) Graduate Assistant and Assistant Department Head for Graduate Affairs. Professor. Tissue excitability; acceleration effects on physiology; bioinformatics.

Paul R. Kalata, PhD (Illinois Institute of Technology). Associate Professor. Stochastic and adaptive control theory; identification and decision theory; Kalman filters.

Moshe Kam, PhD (Drexel University) Robert G. Quinn Professor of Electrical and Computer Engineering and Department Head. Professor. Decision fusion and sensor fusion; mobile robots (especially robot navigation); pattern recognition (especially in handwriting applications); optimization and control.

Nagarajan Kandasamy, PhD (University of Michigan). Associate Professor. Embedded systems, self-managing systems, reliable and fault-tolerant computing, distributed systems, computer architecture, and testing and verification of digital systems.

Bruce Katz, PhD (University of Illinois). Adjunct Professor. Speech communication and computer science; artificial intelligence.

Youngmoo Kim, PhD (MIT). Associate Professor. Audio and music signal processing, voice analysis and synthesis, music information retrieval, machine learning.

Timothy P. Kurzweg, PhD (University of Pittsburgh). Associate Professor. Optical MEM modeling and simulation; system-level simulation; computer architecture.

Karen Miu, PhD (Cornell University). Professor. Power systems; distribution networks; distribution automation; optimization; system analysis.

Bahram Nabet, PhD (University of Washington) Associate Dean for Special Projects, College of Engineering; Electrical and Computer
Engineering. Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Prawat Nagvajara, Ph.D. (Boston University). Associate Professor. System on a chip; embedded systems; power grid computation; testing of computer hardware; fault-tolerant computing; VLSI systems; error control coding.

Dagmar Niebur, Ph.D. (Swiss Federal Institute of Technology). Associate Professor. Intelligent systems; dynamical systems; power system monitoring and control.

Chika Nwankpa, PhD (Illinois Institute of Technology). Professor. Power system dynamics; power electronic switching systems; optically controlled high power switches.

Karkal S. Prabhu, PhD (Harvard University). Auxiliary Professor. Computer and software engineering; advanced microprocessors and distributed operating systems.

Gail L. Rosen, PhD (Georgia Institute of Technology). Associate Professor. Signal processing, signal processing for biological analysis and modeling, bio-inspired designs, source localization and tracking.

Kevin J. Scholes, PhD (Dartmouth College) Associate Dean, College of Engineering, Office of Student Services. Associate Professor. Microelectronics; electric vehicles; solar energy; biomedical electronics.

Harish Sethu, PhD (Lehigh University). Associate Professor. Protocols, architectures and algorithms in computer networks; computer security; mobile ad hoc networks; large-scale complex adaptive networks and systems.

P. Mohana Shankar, PhD (Indian Institute of Technology) Allen Rothwarf Professor of Electrical and Computer Engineering. Professor. Wireless communications; biomedical ultrasonics; fiberoptic bio-sensors.

Baris Taskin, PhD (University of Pittsburgh). Associate Professor. Electronic design automation (EDA) of integrated circuits, high-performance VLSI circuits and systems, sequential circuit timing and synchronization, system-on-chip (SOC) design, operational research, VLSI computer-aided design.

Lazar Trachtenberg, DSc (Israel Institute of Technology). Professor. Fault tolerance; multi-level logic synthesis; signal processing; suboptimal filtering.

Oleh Tretiak, ScD (MIT) Robert C. Disque Professor of Electrical and Computer Engineering. Professor. Image processing; tomography; image registration; pattern recognition.

John MacLaren Walsh, PhD (Cornell University). Assistant Professor. Performance and convergence of belief/expectation propagation and turbo decoding/equalization/synchronization, permeation models for ion channels, composite adaptive systems theory.

Steven Weber, PhD (University of Texas-Austin) Assistant Department Head for Graduate Affairs, Electrical and Computer Engineering. Associate Professor. Mathematical modeling of computer and communication networks, specifically streaming multimedia and ad hoc networks.

Jaudelice Cavalcante de Oliveira, PhD (Georgia Institute of Technology). Associate Professor. Next generation Internet; quality of service in computer communication networks; wireless networks.

Interdepartmental Faculty

Dov Jaron, PhD (University of Pennsylvania) Calhoun Distinguished Professor of Engineering in Medicine. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Jeremy R. Johnson, PhD (Ohio State University). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

John Lacontora, PhD (New Jersey Institute of Technology). Associate Research Professor. Service engineering; industrial engineering.

Ryszard Lec, PhD (University of Warsaw Engineering College). Professor. Biomedical applications of visoelastic, acoustoptic and ultrasonic properties of liquid and solid media.

Spiros Mancoridis, PhD (University of Toronto) Interim Department Head, Computer Science. Professor. Software engineering; software security; code analysis; evolutionary computation.

Karen Moxon, PhD (University of Colorado). Associate Professor. Cortico-thalamic interactions; neurobiological perspectives on design of humanoid robots.

Paul Y. Oh, PhD (Columbia University) Associate Department Head for External Affairs, Department of Mechanical Engineering and Mechanics. Professor. Smart sensors servomechanisms; machine vision and embedded microcomputers for robotics and mechatronics.

Banu Onural, Ph.D. (University of Pennsylvania) H.H. Sun Professor / Director, School of Biomedical Engineering Science and Health Systems. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (Rensselaer Polytechnic University). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.

William C. Regli, PhD (University of Maryland-College Park). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Arve Rosen, PhD (Drexel University) Biomedical Engineering and Electrical Engineering. Microwave components and subsystems; utilization of RF/microwaves and lasers in therapeutic medicine.

Jonathan E. Spanier, PhD (Columbia University) Associate Dean, Strategic Planning, College of Engineering. Professor. Electronic, ferroic and plasmonic nanostructures and thin-film materials and interfaces; scanning probe microscopy; laser spectroscopy, including Raman scattering.

Aydin Tozeren, PhD (Columbia University) Distinguished Professor and Director, Center for Integrated Bioinformatics, School of Biomedical Engineering, Science & Health Systems. Professor. Breast cell adhesion and communication, signal transduction networks in cancer and epithelial cells; integrated bioinformatics, molecular profiling, 3D-tumors, bioimaging.

Aspasia Zerva, PhD (University of Illinois). Professor. Earthquake engineering; mechanics; seismicity; probabilistic analysis.
Emeritus Faculty


Vernon L. Newhouse, PhD (University of Leeds) Disque Professor Emeritus. Professor Emeritus. Biomedical and electrophysics: ultrasonic flow measurement, imaging and texture analysis in medicine, ultrasonic nondestructive testing and robot sensing, clinical engineering.

Hun H. Sun, PhD (Cornell University) Ernest O. Lange Professor Emeritus. Professor Emeritus. Systems and signals in biomedical control systems.

Cybersecurity

Major: Cybersecurity
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0 (or 48.0 credits for the 6-month graduate co-op option)
Classification of Instructional Programs (CIP) code: 11.1003
Standard Occupational Classification (SOC) code: 15-1122

About the Program

As a greater percentage of people worldwide use computers, there is a marked increase in cybersecurity concerns. Motivated through discussions with the National Security Agency (NSA), Drexel University's MS in Cybersecurity program prepares students with both academic and practical training to be competitive in today's rapidly changing technical landscape. The program provides deep technical and specialized training and enables graduates to understand, adapt, and develop new techniques to confront emerging threats in cybersecurity.

Administered by the Electrical (http://drexel.edu/engineering/departments/electrical_comp) & Computer Engineering Department (http://drexel.edu/engineering/departments/electrical_comp) in the College of Engineering, this program is interdisciplinary in nature and includes courses from Drexel University's College of Computing & Informatics. Topics covered include computer networking, probability concepts, techniques for analyzing algorithms, dependable software design, reverse software engineering, intrusion detection, ethics, privacy, confidentiality, authenticity, and social networking.

The program offers multidisciplinary "research rotations" as an independent study component of the degree program, and a graduate co-op option for credit.

Additional Information

For additional information about this program, please visit the ECE Department's Cybersecurity degree page (http://drexel.edu/engineering/programs/grad/CyberSecurity).

Degree Requirements

The Master of Science in Cybersecurity program encompasses a minimum of 45.0 or 48.0 (with the 6-month graduate co-op option) approved credit hours, chosen in accordance with the requirements listed below. A plan of study should be arranged with the departmental graduate advisors, and in consultation with the student's research advisor, if applicable.

The required core courses provide students with a theoretical foundation in the field of cybersecurity and a framework to guide the application of knowledge gained in technical electives to the practice of cybersecurity.

### Core Courses

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<thead>
<tr>
<th>Course Code</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>CST 510</td>
<td>Ethics, Privacy and Legal Issues</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 517</td>
<td>Principles of Cybersecurity</td>
<td>3.0</td>
</tr>
<tr>
<td>INFO 725</td>
<td>Information Policy</td>
<td>3.0</td>
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<tr>
<td>Networking Foundation</td>
<td></td>
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<td>CS 544</td>
<td>Computer Networks</td>
<td>3.0</td>
</tr>
<tr>
<td>or ECEC 631</td>
<td>Principles of Computer Networking</td>
<td></td>
</tr>
<tr>
<td>Mathematical Foundations</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>CS 521</td>
<td>Data Structures and Algorithms I</td>
<td>3.0</td>
</tr>
<tr>
<td>or ECES 521</td>
<td>Probability &amp; Random Variables</td>
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</table>

### Cybersecurity Technical Electives

18.0 credits

** General Electives **

12.0 credits

* Cybersecurity technical electives are used to build a deep understanding of one or more areas of technical expertise within the field of cybersecurity. All students are required to take a minimum of 18.0 credits of cybersecurity technical electives from the graduate course offerings of the Department of Computer Science, the Department of Computing and Security Technology, and the Department of Electrical and Computer Engineering.

** General electives are the remaining courses needed to reach the minimum credit hour requirement for the degree program. General electives can be chosen from among the graduate course offerings of the College of Computing & Informatics; the Department of Computer Science; the Department of Computing and Security Technology; the Department of Electrical and Computer Engineering, and the Department of Mathematics. In order to have courses outside of these departments and schools count towards degree completion, they must be approved by the departmental graduate advisors prior to registration for said courses.

Graduate Co-op/Career Opportunities

Graduate Co-Op

Students may choose to participate in the graduate co-op program, working on curriculum related projects. Up to 6.0 credit hours can be earned for a six month full-time cooperative education experience in the industry. There are two options. Students participating in a three month full-time co-op experience earn 3.0 credits, which is the equivalent of one general elective course. Students engaging in a six month full-time co-op experience earn 6.0 credits, of which 3.0 credits is be considered equivalent to a general elective course; the other 3 credits are considered an additional course, increasing the total minimum credit requirement for graduation from the MS program with a six month full-time graduate co-op to 48.0 credits.
Further information on the Graduate Co-Op Program (http://www.drexel.edu/scdc/coop/graduate) is available at the Drexel Steinbright Career Development Center. (http://www.drexel.edu/scdc)

Career Opportunities
The program was deliberately designed to address needs of the Federal Cyber Service, the Department of Defense, and the National Security Agency. The program strengthens ties between these agencies and Drexel University and will provide professional opportunities for students pursuing this degree.

Research
Students in the MS in Cybersecurity program have opportunities to perform research-oriented coursework for academic credit. Research-oriented coursework can be divided into three categories: research rotations, master’s thesis, and independent research.

A total of 9.0 credits of research-oriented coursework may be counted towards the minimum credit hour requirement of the degree program. These credits are considered general electives.

Facilities
Drexel University and the Electrical and Computer Engineering Department are nationally recognized for a strong history of developing innovative research. Research programs in the ECE Department prepare students for careers in research and development, and aim to endow graduates with the ability to identify, analyze, and address new technical and scientific challenges. The ECE Department is well equipped with state-of-the-art facilities in each of the following ECE Research laboratories:

Research Laboratories at the ECE Department

Adaptive Signal Processing and Information Theory Research Group
The Adaptive Signal Processing and Information Theory Research Group (http://www.ece.drexel.edu/walsh/aspitrg/home.html) conducts research in the area of signal processing and information theory. Our main interests are belief/expectation propagation, turbo decoding and composite adaptive system theory. We are currently doing projects on the following topics:

i) Delay mitigating codes for network coded systems,
ii) Distributed estimation in sensor networks via expectation propagation,
iii) Turbo speaker identification,
iv) Performance and convergence of expectation propagation,
v) Investigating bounds for SINR performance of autocorrelation based channel shorteners.

Applied Networking Research Lab
Applied Networking Research Lab (ANRL) projects focus on modeling and simulation as well as experimentation in wired, wireless and sensor networks. ANRL is the home of MuTANT, a Multi-Protocol Label Switched Traffic Engineering and Analysis Testbed composed of 10 high-end Cisco routers and several PC-routers, also used to study other protocols in data networks as well as automated network configuration and management. The lab also houses a sensor network testbed.

Bioimage Laboratory

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sixteen SDS-ONE APEX3 workstations and four state-of-the-art knitting
machines. The workstations accurately simulate fabric construction and
provide researchers and designers the opportunity to program, create and
simulate textile prototypes, import CAD specifications of final products,
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personnel also have collaborators in the Center for Interdisciplinary
Clinical Simulation and Practice (CICSP) in the Drexel College of
Medicine which provides access to medical mannequin simulators.

Ecological and Evolutionary Signal-processing
and Informatics Laboratory
The Ecological and Evolutionary Signal-processing and Informatics
Laboratory (EESI) (http://www.ece.drexel.edu/gailr/EESI) seeks to solve
problems in high-throughput genomics and engineer better solutions for
biochemical applications. The lab’s primary thrust is to enhance the use
of high-throughput DNA sequencing technologies with pattern recognition
and signal processing techniques. Applications include assessing the
organism content of an environmental sample, recognizing/classifying
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Electric Power Engineering Center
This newly established facility makes possible state-of-the-art research
in a wide variety of areas, ranging from detailed theoretical model
study to experimental investigation in its high voltage laboratories. The
mission is to advance and apply scientific and engineering knowledge
associated with the generation, transmission, distribution, use, and
conservation of electric power. In pursuing these goals, this center
works with electric utilities, state and federal agencies, private industries,
nonprofit organizations and other universities on a wide spectrum of
projects. Research efforts, both theoretical and experimental, focus
on the solution of those problems currently faced by the electric power
industry. Advanced concepts for electric power generation are also under
investigation to ensure that electric power needs will be met at the present
and in the future.

Electronic Design Automation Facility
The laboratory is equipped with test and measurement equipment for
high-speed analog and digital electronics and fiber optic systems. The
test equipment includes network analyzers from Agilent (100kHz- 1.3 GHz
and 45 MHz-40 GHz), and Anritsu (45 MHz-6 GHz); spectrum analyzers
from Tektronix, HP, and Agilent with measurement capability of DC
to 40 GHz and up to 90 GHz using external mixers; signal generators
and communication channel modulators from HP, Rhode-Schwarz,
Systron Donner, and Agilent; microwave power meter and sensor heads,
assortment of passive and active microwave components up to 40 GHz ;
data pattern generator and BER test up to 3Gbps; optical spectrum
analyzer from Anritsu and power meters from HP; single and multimode
fiber optic based optical transmitter and receiver boards covering ITU
channels at data rates up to 10gbps; passive optical components such
as isolator, filter, couplers, optical connectors and fusion splicer; LPAF
milling machine for fabrication of printed circuit boards; wire-bonding
and Cascade probe stations; Intercontinental test fixtures for testing of
MMIC circuits and solid-state transistors; state-of-the-art microwave and
electromagnetic CAD packages such as Agilent ADS, ANSYS HFSS, and
COMSOL multi-physics module.

Music and Entertainment Technology Laboratory
The Music and Entertainment Technology Laboratory (MET-lab) is
devoted to research in digital media technologies that will shape the
future of entertainment, especially in the areas of sound and music.
We employ digital signal processing and machine learning to pursue
novel applications in music information retrieval, music production and
processing technology, and new music interfaces. The MET-lab is also
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audio and music recording, a digital audio workstation running ProTools,
two large multi-touch display interfaces of our own design, and a small
computing cluster for distributed processing.

NanoPhotonics+ Lab (http://
drexelnanophotonics.com)
Our research is primarily in the area of nanophotonics with a focus on
the nanoscale interaction of light with matter. Interests include: liquid
crystal/polymer composites for gratings, lenses and HOEs; liquid crystal
interactions with surfaces and in confined nanospaces; alternative energy
generation through novel photon interactions; ink-jet printed conducting
materials for RF and photonic applications; and the creation and
development of smart textiles technologies including soft interconnects,
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Opto-Electro-Mechanical Laboratory

This lab concentrates on the system integration on optics, electronics, and mechanical components and systems, for applications in imaging, communication, and biomedical research. Research areas include: Programmable Imaging with Optical Micro-electrical-mechanical systems (MEMS), in which microscopic mirrors are used to image light into a single photodetector; Pre-Cancerous Detection using White Light Spectroscopy, which performs a cellular size analysis of nuclei in tissue; Free-space Optical Communication using Space Time Coding, which consists of diffused light for computer-to-computer communications, and also tiny lasers and detectors for chip-to-chip communication; Magnetic Particle Locomotion, which showed that particles could swim in a uniform field; and Transparent Antennas using Polymer, which enables antennas to be printed through an ink-jet printer.

Plasma and Magnetics Laboratory

Research is focused on applications of electrical and magnetic technologies to biology and medicine. This includes the subjects of non-thermal atmospheric pressure plasma for medicine, magnetic manipulation of particles for drug delivery and bio-separation, development of miniature NMR sensors for cellular imaging and carbon nanotube cellular probes.

Power Electronics Research Laboratory

The Power Electronics Research Laboratory (PERL) is involved in circuit and design simulation, device modeling and simulation, and experimental testing and fabrication of power electronic circuits. The research and development activities include electrical terminations, power quality, solar photovoltaic systems, GTO modeling, protection and relay coordination, and solid-state circuit breakers. The analysis tools include EMPT, SPICE, and others, which have been modified to incorporate models of such controllable solid-state switches as SCRs, GTOs, and MOSFETs. These programs have a wide variety and range of modeling capabilities used to model electromagnetics and electromechanical transients ranging from microseconds to seconds in duration. The PERL is a fully equipped laboratory with 42 kVA AC and 70 kVA DC power sources and data acquisition systems, which have the ability to display and store data for detailed analysis. Some of the equipment available is a distribution and HV transformer and three phase rectifiers for power sources and digital oscilloscopes for data measuring and experimental analysis. Some of the recent studies performed by the PERL include static VAR compensators, power quality of motor controllers, solid-state circuit breakers, and power device modeling which have been supported by PECO, GE, Gould, and EPRI.

RE Touch Lab

The RE Touch Lab is investigating the perceptual and mechanical basis of active touch perception, or haptics, and the development of new technologies for stimulating the sense of touch, allowing people to touch, feel, and interact with digital content as seamlessly as we do with objects in the real world. We study the scientific foundations of haptic perception and action, and the neuroscientific and biomechanical basis of touch, with a long-term goal of uncovering the fundamental perceptual and mechanical computations that enable haptic interaction. We also create new technologies for rendering artificial touch sensations that simulate those that are experienced when interacting with real objects, inspired by new findings on haptic perception.

Testbed for Power-Performance Management of Enterprise Computing Systems

This computing testbed is used to validate techniques and algorithms aimed at managing the performance and power consumption of enterprise computing systems. The testbed comprises a rack of Dell 2950 and Dell 1950 PowerEdge servers, as well as assorted desktop machines, networked via a gigabit switch. Virtualization of this cluster is enabled by VMWare's ESX Server running the Linux RedHat kernel. It also comprises of a rack of ten Apple Xserve machines networked via a gigabit switch. These servers run the OS X Leopard operating systems and have access to a RAID with TBs of total disk capacity.

Interdepartmental Faculty

Kapil Dandekar, PhD (University of Texas-Austin) Director of the Drexel Wireless Systems Laboratory (DWSL); Associate Dean of Research, College of Engineering. Professor. Cellular/mobile communications and wireless LAN; smart antenna/MIMO for wireless communications; applied computational electromagnetics; microwave antenna and receiver development; free space optical communication; ultrasonic communication; sensor networks for homeland security; ultrawideband communication.

Rachel Greenstadt, PhD (Harvard University). Assistant Professor. Artificial intelligence, privacy, security, multi-agent systems, economics of electronic privacy and information security.

Constantine Katsinis, PhD (University of Rhode Island). Associate Professor. High-performance computer networks, parallel computer architectures with sustained teraflops performance, computer security, image processing.

Steven Weber, PhD (University of Texas-Austin) Assistant Department Head for Graduate Affairs, Electrical and Computer Engineering. Associate Professor. Mathematical modeling of computer and communication networks, specifically streaming multimedia and ad hoc networks.

Christopher C. Yang, PhD (University of Arizona, Tucson). Associate Professor. Web search and mining, security informatics, knowledge management, cross-lingual information retrieval, text summarization, multimedia retrieval, information visualization, information sharing and privacy, digital library, and electronic commerce.

Electrical Engineering

Major: Electrical Engineering
Degree Awarded: Master of Science (MS): or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 - 48.0 (MS) or 90.0 (PhD)
Classification of Instructional Programs (CIP) code: 14.1001
Standard Occupational Classification (SOC) code: 17-2071

About the Program

The program in electrical engineering prepares students for careers in research and development, and aims to endow graduates with the ability to identify, analyze and address new technical and scientific challenges. At present, the department offers graduate coursework in six general areas: (1) computer engineering; (2) control, robotics and intelligent systems; (3) electrophysics; (4) image and signal
processing and interpretation; (5) power engineering and energy; and (6) telecommunications and networking.

The Master of Science in Electrical Engineering degree requires a minimum of 45.0 approved credits chosen in accordance with a plan of study arranged with the permission of a student’s advisor and the departmental graduate advisor. Students who complete a six-month period of internship through Drexel’s Graduate Co-op Program (GCP) (http://www.ece.drexel.edu/grad/cie.html) must complete 48.0 credits including 6.0 GCP credits.

The plan must contain a selection of core courses from the department's offerings and may include appropriate graduate courses from other engineering departments or from physics or mathematics. Further information can be obtained from the department office or from the graduate advisor.

All students also are encouraged to engage in thesis research. The combined thesis and research cannot exceed 9.0 credits. The program is organized so that a student may complete the degree requirements in two years of full-time study or three years of part-time study.

For more information about the programs, including information about teaching and research assistantships, visit the Department's Electrical and Computer Engineering (http://drexel.edu/engineering/departments/electrical_comp) web site.

Admission Requirements

Applicants must satisfy general requirements for graduate admission, including a minimum 3.0 GPA (on a 4.0 scale) for the last two years of undergraduate studies, as well as for any subsequent graduate work, and hold a bachelor’s degree or the equivalent in electrical engineering, computer engineering, or the equivalent from an accredited college or university. A degree in science (physics, mathematics, computer science, etc.) is also acceptable. Applicants with degrees in sciences may be required to take a number of undergraduate engineering courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's.

Applicants for full-time MS and PhD programs must take the GRE general test. Students whose native language is not English and who do not hold a degree from a US institution must take the TOEFL within two years before application.

For additional information on how to apply, visit Drexel's Admissions page for Electrical Engineering (http://www.drexel.edu/grad/programs/coe/electrical-engineering).

Master of Science in Electrical Engineering

The Master of Science in Electrical Engineering curriculum encompasses 45.0 or 48.0 (with the Graduate Co-op option) approved credit hours, chosen in accordance with the following requirements and a plan of study arranged with the departmental graduate advisor in consultation with the student’s research advisor, if applicable. Before the end of the first quarter in the Department of Electrical and Computer Engineering, for a full-time student, or by the end of the first year for a part-time student, said plan of study must be filed and approved with the departmental graduate advisor.

A total of at least 30.0 credit hours must be taken from among the graduate course offerings of the Department of Electrical and Computer Engineering. These credits must be taken at Drexel University. No transfer credit may be used to fulfill these requirements, regardless of content equivalency.

The remaining courses needed to reach the minimum credit hour requirement for the degree program are considered elective courses. Elective courses can be chosen from among the graduate course offerings of the Department of Electrical and Computer Engineering; other departments within the College of Engineering; the School of Biomedical Science, Engineering and Health Systems; the Department of Mathematics; the Department of Physics; the Department of Chemistry and the Department of Biology. In order to have courses outside of these departments and schools count towards degree completion, they must be approved by the departmental graduate advisors prior to registration for said courses.

Please note that ECEC 500 (Fundamentals of Computer Hardware) and ECEC 600 (Fundamentals of Computer Networks) do not count toward the credit requirements to complete the MS in Electrical Engineering degree program.

Customizable Specialization

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Total Credits</th>
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<tbody>
<tr>
<td>Electrical Engineering (ECEE, ECEP, ECES, ECET) Courses</td>
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Electrophysics Specialization

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Controls, Robotics, Intelligent Systems Specialization

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<tr>
<td>ECES 512 Fundamentals of Systems II</td>
<td>3.0</td>
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<tr>
<td>ECES 521 Probability &amp; Random Variables</td>
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<tr>
<td>ECES 522 Random Process &amp; Spectral Analysis</td>
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<tr>
<td>Select three of the following:</td>
<td>9.0</td>
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<td>ECES 604 Optimal Estimation &amp; Stochastic Control</td>
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<tr>
<td>ECES 642 Optimal Control</td>
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<tr>
<td>ECES 644 Computer Control Systems</td>
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<td>ECES 651 Intelligent Control</td>
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<td>ECES 817 Non-Linear Control Systems</td>
<td></td>
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<tr>
<td>ECES 818 Machine Learning &amp; Adaptive Control</td>
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<tr>
<td>General Electrical and Computer Engineering (ECEC, ECEE, ECEP, ECES, ECET) Courses</td>
<td>9.0</td>
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<tr>
<td>Elective Courses</td>
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Power Engineering Specialization

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<th>Required Courses</th>
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<tr>
<td>ECEP 501 Power System Analysis</td>
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ECEP 502 Computer Analysis of Power Systems 3.0
ECEP 503 Synchronous Machine Modeling 3.0
Select one of the following sequences: 6.0

ECES 511 Fundamentals of Systems I
& ECES 512 and Fundamentals of Systems II
ECES 521 Probability & Random Variables
& ECES 522 and Random Process & Spectral Analysis

General Electrical and Computer Engineering (ECEC, ECEE, ECEP, ECES, ECET) Courses
Elective Courses 15.0

Total Credits 45.0

Signal/Image Processing Specialization

Required Courses
ECES 521 Probability & Random Variables 3.0
ECES 522 Random Process & Spectral Analysis 3.0
ECES 523 Detection & Estimation Theory 3.0
ECES 631 Fundamentals of Deterministic Digital Signal Processing 3.0
ECES 682 Fundamentals of Image Processing 3.0
General Electrical and Computer Engineering (ECEC, ECEE, ECEP, ECES, ECET) Courses
Elective Courses 15.0

Total Credits 45.0

Options for Degree Fulfillment

Although not required, students are encouraged to complete a Master’s Thesis as part of the MS studies. Those students who choose the thesis option may count up to 9.0 research/thesis credits as part of their required credit hour requirements.

Students may choose to participate in the Graduate Co-Op Program, where 6.0 credit hours can be earned for a six month cooperative education experience in industry, working on curriculum related projects. The total number of required credit hours is increased to 48.0 for those students who choose to pursue the Graduate Co-op option. This change represents an increase in non-departmental required credit hours to a total of 18.0 credit hours, 6.0 of which are earned from the cooperative education experience.

For more information on curricular requirements, visit the Department of Electrical and Computer Engineering' (http://www.ece.drexel.edu) s web site.

PhD in Electrical Engineering

General Requirements
The following general requirements must be satisfied in order to complete the PhD in Electrical Engineering:

• 90.0 credit hours total
• candidacy examination
• research proposal
• dissertation defense

Students entering with a master’s degree in electrical or computer engineering or a related field will be considered a post-masters PhD student and will only be required to complete a total of 45.0 credit hours, in accordance with University policy.

Curriculum
Appropriate coursework is chosen in consultation with the student’s research advisor. A plan of study must be developed by the student to encompass the total number of required credit hours. Both the departmental graduate advisor and the student’s research advisor must approve this plan.

Candidacy Examination
The candidacy examination explores the depth of understanding of the student in his/her specialty area. The student is expected to be familiar with, and be able to use, the contemporary tools and techniques of the field and to demonstrate familiarity with the principal results and key findings.

The student, in consultation with his/her research advisor, will declare a principal technical area for the examination. The examination includes the following three parts:

• A self-study of three papers from the archival literature in the student’s stated technical area, chosen by the committee in consultation with the student.
• A written report (15 pages or less) on the papers, describing their objectives, key questions and hypotheses, methodology, main results and conclusions. Moreover, the student must show in an appendix independent work he/she has done on at least one of the papers – such as providing a full derivation of a result or showing meaningful examples, simulations or applications.
• An oral examination which takes the following format:
  • A short description of the student’s principal area of interest (5 minutes, by student).
  • A review of the self-study papers and report appendix (25-30 minutes, by student).
  • Questions and answers on the report, the appendix and directly related background (40-100 minutes, student and committee).

In most cases, the work produced during the candidacy examination will be a principal reference for the student’s PhD dissertation; however, this is not a requirement.

Research Proposal
After having attained the status of PhD Candidate, each student must present a research proposal to a committee of faculty and industry members, chosen with his/her research advisor, who are knowledgeable in the specific area of research. This proposal should outline the specific intended subject of study, i.e., it should present a problem statement, pertinent background, methods of study to be employed, expected difficulties and uncertainties and the anticipated form, substance and significance of the results.

The purpose of this presentation is to verify suitability of the dissertation topic and the candidate’s approach, and to obtain the advice and guidance of oversight of mature, experienced investigators. It is not to be construed as an examination, though approval by the committee is required before extensive work is undertaken. The thesis proposal presentation must be open to all; announcements regarding the proposal presentation must be made in advance.

The thesis advisory committee will have the sole responsibility of making any recommendations regarding the research proposal. It is strongly
Dissertation Defense

Dissertation Defense procedures are described in the Graduate College of Drexel University (http://www.drexel.edu/graduatecollege) policies regarding Doctor of Philosophy Program Requirements. The student must be a PhD candidate for at least one year before he/she can defend his/her doctoral thesis.

Dual Degree

The Department of Electrical and Computer Engineering offers outstanding students the opportunity to receive two diplomas (BS and MS) at the same time. The program requires five (5) years to complete. Participants, who are chosen from the best undergraduates students, work with a faculty member on a research project and follow a study plan that includes selected graduate classes. This program prepares individuals for careers in research and development; many of its past graduates continued their studies toward a PhD.

For more information on eligibility, academic requirements, and tuition policy visit the Engineering Combined BS/MS (http://www.ece.drexel.edu/undergrad/bsms.html) page.

Facilities

Drexel University and the Electrical and Computer Engineering Department are nationally recognized for a strong history of developing innovative research. Research programs in the ECE Department prepare students for careers in research and development, and aim to endow graduates with the ability to identify, analyze, and address new technical and scientific challenges. The ECE Department is well equipped with state-of-the-art facilities in each of the following ECE Research laboratories:

Research Laboratories at the ECE Department

Adaptive Signal Processing and Information Theory Research Group

The Adaptive Signal Processing and Information Theory Research Group (http://www.ece.drexel.edu/walsh/aspitrg/home.html) conducts research in the area of signal processing and information theory. Our main interests are belief/expectation propagation, turbo decoding and composite adaptive system theory. We are currently doing projects on the following topics:

i) Delay mitigating codes for network coded systems,
ii) Distributed estimation in sensor networks via expectation propagation,
iii) Turbo speaker identification,
iv) Performance and convergence of expectation propagation,
v) Investigating bounds for SINR performance of autocorrelation based channel shorteners.

Applied Networking Research Lab

Applied Networking Research Lab (ANRL) projects focus on modeling and simulation as well as experimentation in wired, wireless and sensor networks. ANRL is the home of MuTANT, a Multi-Protocol Label Switched Traffic Engineering and Analysis Testbed composed of 10 high-end Cisco routers and several PC-routers, also used to study other protocols in data networks as well as automated network configuration and management. The lab also houses a sensor network testbed.

Biomedical Laboratory

Uses computer gaming hardware for enhanced and affordable 3-D visualization, along with techniques from information theory and machine learning to combine the exquisite capabilities of the human visual system with computational sensing techniques for analyzing vast quantities of image sequence data.

Data Fusion Laboratory

The Data Fusion Laboratory investigates problems in multisensory detection and estimation, with applications in robotics, digital communications, radar, and target tracking. Among the projects in progress: computationally efficient parallel distributed detection architectures, data fusion for robot navigation, modulation recognition and RF scene analysis in time-varying environments, pattern recognition in biological data sequences and large arrays, and hardware realizations of data fusion architectures for target detection and target tracking.

Drexel Network Modeling Laboratory

The Drexel Network Modeling Laboratory investigates problems in the mathematical modeling of communication networks, with specific focus on wireless ad hoc networks, wireless sensor networks, and supporting guaranteed delivery service models on best effort and multipath routed networks. Typical methodologies employed in our research include mathematical modeling, computer simulation, and performance optimization, often with the end goal of obtaining meaningful insights into network design principles and fundamental performance tradeoffs.

Drexel Power-Aware Computing Laboratory

The Power-Aware Computing Lab (http://dpac.ece.drexel.edu) investigates methods to increase energy efficiency across the boundaries of circuits, architecture, and systems. Our recent accomplishments include the Sigil profiling tool, scalable modeling infrastructure for accelerator implementations, microarchitecture-aware VDD gating algorithms, an accelerator architecture for ultrasound imaging, evaluation of hardware reference counting, hardware and operating system support for power-agile computing, and memory systems for accelerator-based architectures.

Drexel University Nuclear Engineering Education Laboratory

The field of nuclear engineering encompasses a wide spectrum of occupations, including nuclear reactor design, medical imaging, homeland security, and oil exploration. The Drexel University Nuclear Engineering Education Laboratory (DUNEEL) provides fundamental hands on understanding for power plant design and radiation detection and analysis. Software based study for power plant design, as well as physical laboratory equipment for radiation detection, strengthen the underlying concepts used in nuclear engineering such that the student will comprehend and appreciate the basic concepts and terminology used in various nuclear engineering professions. Additionally, students use the laboratory to develop methods for delivering remote, live time radiation detection and analysis. The goal of DUNEEL is to prepare students for potential employment in the nuclear engineering arena.
Drexel VLSI Laboratory

The Drexel VLSI Laboratory (http://ece.drexel.edu/faculty/taskin/wiki/vslab/index.php/Main_Page) investigates problems in the design, analysis, optimization and manufacturing of high performance (low power, high throughput) integrated circuits in contemporary CMOS and emerging technologies. Suited with industrial design tools for integrated circuits, simulation tools and measurement beds, the VLSI group is involved with digital and mixed-signal circuit design to verify the functionality of the discovered novel circuit and physical design principles. The Drexel VLSI laboratory develops design methodologies and automation tools in these areas, particularly in novel clocking techniques, featuring resonant clocking, and interconnects, featuring wireless interconnects.

Drexel Wireless Systems Laboratory

The Drexel Wireless Systems Laboratory (DWSL) contains an extensive suite of equipment for constructing, debugging, and testing prototype wireless communications systems. Major equipment within DWSL includes:

- three software defined radio network testbeds (HYDRA, USRP, and WARP) for rapidly prototyping radio, optical and ultrasonic communications systems,
- a TDK RF anechoic chamber and EMSCAN desktop antenna pattern measurement system,
- a materials printer and printed circuit board milling machine for fabricating conformal antennas and wireless protocol conformance testing equipment from Aeroflex.

The lab is also equipped with network analyzers, high speed signal generators, oscilloscopes, and spectrum analyzers as well as several Zigbee development platforms for rapidly prototyping sensor networks.

DWSL personnel also collaborate to create wearable, fabric based transceivers through collaboration with the Shima Seiki Haute Laboratory in the Drexel ExCITe Center. The knitting equipment at Drexel includes sixteen SDS-ONE APEX3 workstations and four state-of-the-art knitting machines. The workstations accurately simulate fabric construction and provide researchers and designers the opportunity to program, create and simulate textile prototypes, import CAD specifications of final products, and produce made-to-measure or mass-produced pieces on Shima Seiki knitting machines. For testing smart textiles for biomedical, DWSL personnel also have collaborators in the Center for Interdisciplinary Clinical Simulation and Practice (CICSP) in the Drexel College of Medicine which provides access to medical mannequin simulators.

Ecological and Evolutionary Signal-processing and Informatics Laboratory

The Ecological and Evolutionary Signal-processing and Informatics Laboratory (EESI) (http://www.ece.drexel.edu/gailr/EESI) seeks to solve problems in high-throughput genomics and engineer better solutions for biochemical applications. The lab's primary thrust is to enhance the use of high-throughput DNA sequencing technologies with pattern recognition and signal processing techniques. Applications include assessing the organism content of an environmental sample, recognizing/classifying potential and functional genes, inferring environmental factors and interspecies relationships, and inferring microbial evolutionary relationships from short-read DNA/RNA fragments. The lab also investigates higher-level biological systems such as modeling and controlling chemotaxis, the movement of cells.

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This newly established facility makes possible state-of-the-art research in a wide variety of areas, ranging from detailed theoretical model study to experimental investigation in its high voltage laboratories. The mission is to advance and apply scientific and engineering knowledge associated with the generation, transmission, distribution, use, and conservation of electric power. In pursuing these goals, this center works with electric utilities, state and federal agencies, private industries, nonprofit organizations and other universities on a wide spectrum of projects. Research efforts, both theoretical and experimental, focus on the solution of those problems currently faced by the electric power industry. Advanced concepts for electric power generation are also under investigation to ensure that electric power needs will be met at the present and in the future.

Electronic Design Automation Facility

Industrial-grade electronic design automation software suite and integrated design environment for digital, analog and mixed-signal systems development. Field Programmable Gate Array (FPGA) development hardware. Most up-to-date FPGA/embedded system development hardware kits. Printed circuit board production facility. Also see Drexel VLSI Laboratory.

Microwave-Photonics Device Laboratories

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Research is focused on applications of electrical and magnetic technologies to biology and medicine. This includes the subjects of non-thermal atmospheric plasma pressure for medicine, magnetic manipulation of particles for drug delivery and bio-separation, development of miniature NMR sensors for cellular imaging and carbon nanotube cellular probes.

**Power Electronics Research Laboratory**

The Power Electronics Research Laboratory (PERL) is involved in circuit and design simulation, device modeling and simulation, and experimental testing and fabrication of power electronic circuits. The research and development activities include electrical terminations, power quality, solar photovoltaic systems, GTO modeling, protection and relay coordination, and solid-state circuit breakers. The analysis tools include EMPT, SPICE, and others, which have been modified to incorporate models of such controllable solid-state switches as SCRs, GTOs, and MOSFETs. These programs have a wide variety and range of modeling capabilities used to model electromagnetics and electromechanical transients ranging from microseconds to seconds in duration. The PERL is a fully equipped laboratory with 42 kVA AC and 70 kVA DC power sources and data acquisition systems, which have the ability to display and store data for detailed analysis. Some of the equipment available is a distribution and HV transformer and three phase rectifiers for power sources and digital oscilloscopes for data measuring and experimental analysis. Some of the recent studies performed by the PERL include static VAR compensators, power quality of motor controllers, solid-state circuit breakers, and power device modeling which have been supported by PECO, GE, Gould, and EPRI.

**RE Touch Lab**

The RE Touch Lab is investigating the perceptual and mechanical basis of active touch perception, or haptics, and the development of new technologies for stimulating the sense of touch, allowing people to touch, feel, and interact with digital content as seamlessly as we do with objects in the real world. We study the scientific foundations of haptic perception and action, and the neuroscientific and biomechanical basis of touch, with a long-term goal of uncovering the fundamental perceptual and mechanical computations that enable haptic interaction. We also create new technologies for rendering artificial touch sensations that simulate those that are experienced when interacting with real objects, inspired by new findings on haptic perception.

**Testbed for Power-Performance Management of Enterprise Computing Systems**

This computing testbed is used to validate techniques and algorithms aimed at managing the performance and power consumption of enterprise computing systems. The testbed comprises a rack of Dell 2950 and Dell 1950 PowerEdge servers, as well as assorted desktop machines, networked via a gigabit switch. Virtualization of this cluster is enabled by VMWare's ESX Server running the Linux RedHat kernel. It also comprises of a rack of ten Apple Xserve machines networked via a gigabit switch. These servers run the OS X Leopard operating systems and have access to a RAID with TBs of total disk capacity.

**Electrical and Computer Engineering Faculty**

Fernand Cohen, PhD (Brown University). Professor. Surface modeling; tissue characterization and modeling; face modeling; recognition and tracking.

Kapil Dandekar, PhD (University of Texas-Austin) Director of the Drexel Wireless Systems Laboratory (DWSL); Associate Dean of Research, College of Engineering. Professor. Cellular/mobile communications and wireless LAN; smart antenna/MIMO for wireless communications; applied computational electromagnetics; microwave antenna and receiver development; free space optical communication; ultrasonic communication; sensor networks for homeland security; ultrawideband communication.

Afsin Daryoush, ScD (Drexel University). Professor. Digital and microwave photonics; nonlinear microwave circuits; RFIC; medical imaging.

Bruce A. Eisenstein, PhD (University of Pennsylvania) Interim Dean, College of Engineering. Professor. Pattern recognition; estimation; decision theory.

Adam K. Fontecchio, PhD (Brown University) Electrical and Computer Engineering. Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Gary Friedman, PhD (University of Maryland-College Park). Professor. Biological and biomedical applications of nanoscale magnetic systems.

Eli Fromm, PhD (Jefferson Medical College) Roy A. Brothers University Professor / Director for Center of Educational Research. Professor.
Engineering education; academic research policy; bioinstrumentation; physiologic systems.

Edward L. Gerber, PhD (University of Pennsylvania) Assistant Department Head for Evening Programs. Professor. Computerized instruments and measurements; undergraduate education.

Allon Guez, PhD (University of Florida). Professor. Intelligent control systems; robotics, biomedical, automation and manufacturing; business systems engineering.

Mark Hempstead, PhD (Harvard University) Junior Colehower Chair. Assistant Professor. Computer engineering; power-aware computing; computer architecture; low power VLSI Design; wireless sensor networks.

Peter R. Herczfeld, PhD (University of Minnesota) Lester A. Kraus Professor/Director, Center for Microwave/Lightwave Engineering. Professor. Lightwave technology; microwaves; millimeter waves; fiberoptic and integrated optic devices.

Leonid Hrebien, PhD (Drexel University) Graduate Advisor and Assistant Department Head for Graduate Affairs. Professor. Tissue excitability; acceleration effects on physiology; bioinformatics.

Paul R. Kalata, PhD (Illinois Institute of Technology). Associate Professor. Stochastic and adaptive control theory; identification and decision theory; Kalman filters.

VLSI computer-aided design.

Moshe Kam, PhD (Drexel University) Robert G. Quinn Professor of Electrical and Computer Engineering and Department Head. Professor. Decision fusion and sensor fusion; mobile robots (especially robot navigation); pattern recognition (especially in handwriting applications); optimization and control.

Nagarajan Kandasamy, PhD (University of Michigan). Associate Professor. Embedded systems, self-managing systems, reliable and fault-tolerant computing, distributed systems, computer architecture, and testing and verification of digital systems.

Bruce Katz, PhD (University of Illinois). Adjunct Professor. Speech communication and computer science; artificial intelligence.

Youngmoo Kim, PhD (MIT). Associate Professor. Audio and music signal processing, voice analysis and synthesis, music information retrieval, machine learning.

Timothy P. Kurzweg, PhD (University of Pittsburgh). Associate Professor. Optical MEM modeling and simulation; system-level simulation; computer architecture.

Karen Miu, PhD (Cornell University). Professor. Power systems; distribution networks; distribution automation; optimization; system analysis.

Bahram Nabet, PhD (University of Washington) Associate Dean for Special Projects, College of Engineering; Electrical and Computer Engineering. Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Prawat Nagavara, Ph.D. (Boston University). Associate Professor. System on a chip; embedded systems; power grid computation; testing of computer hardware; fault-tolerant computing; VLSI systems; error control coding.

Dagmar Niebur, Ph.D. (Swiss Federal Institute of Technology). Associate Professor. Intelligent systems; dynamical systems; power system monitoring and control.

Chika Nwankpa, PhD (Illinois Institute of Technology). Professor. Power system dynamics; power electronic switching systems; optically controlled high power switches.

Karkal S. Prabhu, PhD (Harvard University). Auxiliary Professor. Computer and software engineering; advanced microprocessors and distributed operating systems.

Gail L. Rosen, PhD (Georgia Institute of Technology). Associate Professor. Signal processing, signal processing for biological analysis and modeling, bio-inspired designs, source localization and tracking.

Kevin J. Scales, PhD (Dartmouth College) Associate Dean, College of Engineering, Office of Student Services. Associate Professor. Microelectronics; electric vehicles; solar energy; biomedical electronics.

Harish Sethu, PhD (Lehigh University). Associate Professor. Protocols, architectures and algorithms in computer networks; computer security; mobile ad hoc networks; large-scale complex adaptive networks and systems.

P. Mohana Shankar, PhD (Indian Institute of Technology) Allen Rothwarf Professor of Electrical and Computer Engineering. Professor. Wireless communications; biomedical ultrasonics; fiber optic bio-sensors.

Baris Taskin, PhD (University of Pittsburgh). Associate Professor. Electronic design automation (EDA) of integrated circuits, high-performance VLSI circuits and systems, sequential circuit timing and synchronization, system-on-chip (SOC) design, operational research, VLSI computer-aided design.

Lazar Trachtenberg, DSc (Israel Institute of Technology). Professor. Fault tolerance; multi-level logic synthesis; signal processing; suboptimal filtering.

Oleh Tretiak, ScD (MIT) Robert C. Disque Professor of Electrical and Computer Engineering. Professor. Image processing; tomography; image registration; pattern recognition.

John Maclaren Walsh, PhD (Cornell University). Assistant Professor. Performance and convergence of belief/expectation propagation and turbo decoding/equalization/synchronization, permeation models for ion channels, composite adaptive systems theory.

Steven Weber, PhD (University of Texas-Austin) Assistant Department Head for Graduate Affairs, Electrical and Computer Engineering. Associate Professor. Mathematical modeling of computer and communication networks, specifically streaming multimedia and ad hoc networks.

Jaudelice Cavalcante de Oliveira, PhD (Georgia Institute of Technology). Associate Professor. Next generation Internet; quality of service in computer communication networks; wireless networks.

Interdepartmental Faculty

Dov Jaron, PhD (University of Pennsylvania) Calhoun Distinguished Professor of Engineering in Medicine. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.
Jeremy R. Johnson, PhD (Ohio State University). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

John Lacontora, PhD (New Jersey Institute of Technology). Associate Research Professor. Service engineering; industrial engineering.

Ryszard Lec, PhD (University of Warsaw Engineering College). Professor. Biomedical applications of viscoelastic, acoustoptic and ultrasonic properties of liquid and solid media.

Spiros Mancoridis, PhD (University of Toronto) Interim Department Head, Computer Science. Professor. Software engineering; software security; code analysis; evolutionary computation.

Karen Moxon, PhD (University of Colorado). Associate Professor. Corticothalamic interactions; neurobiological perspectives on design of humanoid robots.

Paul Y. Oh, PhD (Columbia University) Associate Department Head for External Affairs, Department of Mechanical Engineering and Mechanics. Professor. Smart sensors servomechanisms; machine vision and embedded microcomputers for robotics and mechatronics.

Banan Onaral, Ph.D. (University of Pennsylvania) H.H. Sun Professor / Director, School of Biomedical Engineering Science and Health Systems. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (Rensselaer Polytechnic University). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.

William C. Regli, PhD (University of Maryland-College Park). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Arye Rosen, PhD (Drexel University) Biomedical Engineering and Electrical Engineering. Microwave components and subsystems; utilization of RF/microwaves and lasers in therapeutic medicine.

Jonathan E. Spanier, PhD (Columbia University) Associate Dean, Strategic Planning, College of Engineering. Professor. Electronic, ferroic and plasmonic nanostructures and thin-film materials and interfaces; scanning probe microscopy; laser spectroscopy, including Raman scattering.

Aydin Tozeren, PhD (Columbia University) Distinguished Professor and Director, Center for Integrated Bioinformatics, School of Biomedical Engineering, Science & Health Systems. Professor. Breast cell adhesion and communication, signal transduction networks in cancer and epithelial cells; integrated bioinformatics, molecular profiling, 3D-tumors, bioimaging.

Aspasia Zerva, PhD (University of Illinois). Professor. Earthquake engineering; mechanics; seismicity; probabilistic analysis.

Emeritus Faculty


Vernon L. Newhouse, PhD (University of Leeds) Disque Professor Emeritus. Professor Emeritus. Biomedical and electrophysics: ultrasonic flow measurement, imaging and texture analysis in medicine, ultrasonic nondestructive testing and robot sensing, clinical engineering.

Hun H. Sun, PhD (Cornell University) Ernest O. Lange Professor Emeritus. Professor Emeritus. Systems and signals in biomedical control systems.

Electrical Engineering/Telecommunications Engineering

Major: Electrical/Telecommunications Engineering

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 - 48.0 (MS) or 90.0 (PhD)

Classification of Instructional Programs (CIP) code: 14.1001; 14.1004

Standard Occupational Classification (SOC) code: 15-1143; 17-2071

About the Program

Fueled by the rapid spread of technologies such as electronic mail, cellular and mobile phone systems, interactive cable television, and the information superhighway, Drexel's program in Telecommunications Engineering responds to the growing demand for engineers with telecommunications expertise. The program combines a strong foundation in telecommunications engineering with training in other important issues such as global concerns, business, and information transfer and processing.

Drexel University's program in Telecommunications Engineering combines the expertise of its faculty in electrical and computer engineering, business, information systems, and humanities. Through its interdisciplinary approach, Drexel's Telecommunications Engineering program trains and nurtures the complete telecommunications engineer.

The MS in Electrical Engineering/Telecommunications Engineering degree is awarded to students who demonstrate in-depth knowledge of the field. The average time required to complete the master's degree is two years of full-time or three years of part-time study.

For more information, visit the Department of Electrical and Computer Engineering (http://www.ece.drexel.edu)’s web site.

Admission Requirements

Applicants must meet the general requirements for graduate admission, which include at least a 3.0 GPA for the last two years of undergraduate study and for any graduate level study undertaken, and are required to hold a bachelor of science degree in electrical engineering or a related field. Applicants whose undergraduate degrees are not in the field of electrical engineering may be required to take a number of undergraduate courses. The GRE General Test is required of applicants for full-time MS and PhD programs. Applicants whose native language is not English and who do not have a previous degree from a US institution are required to take the Test of English as a Foreign Language (TOEFL).

For additional information on how to apply, visit Drexel's Admissions page for Electrical-Telecommunications Engineering (http://www.drexel.edu/grad/programs/coe/electrical-telecommunications).
MS in Electrical and Telecommunications Engineering

The Master of Science in Electrical and Telecommunications Engineering curriculum encompasses 45.0 or 48.0 (with the Graduate Co-Op) approved credit hours, in accordance with the following requirements and a plan of study arranged with the departmental graduate advisor in consultation with the student's research advisor (if applicable). This plan of study must be filed in the Department of Electrical and Computer Engineering and approved with the departmental graduate advisor before the end of the first quarter for a full-time student, or by the end of the first year for a part-time student.

Degree Requirements

A total of at least 30.0 credit hours must be taken from among the graduate course offerings of the Department of Electrical and Computer Engineering. These credits must be taken at Drexel University. No transfer credit may be used to fulfill these requirements, regardless of content equivalency.

<table>
<thead>
<tr>
<th>Course Type</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>Telecommunications Engineering (ECET) Courses</td>
<td>6.0</td>
</tr>
<tr>
<td>Telecommunications Engineering Elective (ECEC, ECEE, ECES, ECET) Courses</td>
<td>15.0</td>
</tr>
<tr>
<td>General Electrical and Computer Engineering (ECEC, ECEE, ECEP, ECES, ECET) Courses</td>
<td>9.0</td>
</tr>
<tr>
<td>Elective Courses</td>
<td>15.0</td>
</tr>
<tr>
<td>Total Credits</td>
<td>45.0</td>
</tr>
</tbody>
</table>

With the remaining required 15.0 credit hours, students may take graduate coursework, subject to the approval of the departmental graduate advisor, in electrical and computer engineering, mathematics, physics or other engineering disciplines.

In addition, students pursuing an MS in Electrical and Telecommunications Engineering are allowed and strongly encouraged to take the following course as part of their required 15.0 credit hours:

- COM 650 Telecommunications Policy in the Information Age

Although not required, students are encouraged to complete a master's thesis as part of the MS studies. Those students who choose the thesis option may count up to 9.0 research/thesis credits as part of their required credit hour requirements.

Graduate Co-Op Program

Students may choose to participate in the Graduate Co-Op Program, where 6.0 credit hours can be earned for a six month cooperative education experience in industry, working on curriculum related projects. The total number of required credit hours is increased to 48 for those students who choose to pursue the Graduate Co-Op option. This change represents an increase in non-departmental required credit hours to a total of 18.0 credit hours, 6.0 of which are earned from the cooperative education experience.

Please note that ECEC 500 (Fundamentals of Computer Hardware) and ECEC 600 (Fundamentals of Computer Networks) do not count toward the credit requirements to complete the MS in Electrical Engineering degree program.

For more information on curricular requirements, visit the Department of Electrical and Computer Engineering (http://www.ece.drexel.edu)'s web site.

PhD in Electrical Engineering

General Requirements

The following general requirements must be satisfied in order to complete the PhD in Electrical Engineering:

- 90.0 credit hours total
- candidacy examination
- research proposal
- dissertation defense

Students entering with a master's degree in electrical or computer engineering or a related field will be considered a post-masters PhD student and will only be required to complete a total of 45.0 credit hours, in accordance with University policy.

Curriculum

Appropriate coursework is chosen in consultation with the student's research advisor. A plan of study must be developed by the student to encompass the total number of required credit hours. Both the departmental graduate advisor and the student's research advisor must approve this plan.

Candidacy Examination

The candidacy examination explores the depth of understanding of the student in his/her specialty area. The student is expected to be familiar with, and be able to use, the contemporary tools and techniques of the field and to demonstrate familiarity with the principal results and key findings.

The student, in consultation with his/her research advisor, will declare a principal technical area for the examination. The examination includes the following three parts:

- A self-study of three papers from the archival literature in the student's stated technical area, chosen by the committee in consultation with the student.
- A written report (15 pages or less) on the papers, describing their objectives, key questions and hypotheses, methodology, main results and conclusions. Moreover, the student must show in an appendix independent work he/she has done on at least one of the papers – such as providing a full derivation of a result or showing meaningful examples, simulations or applications.
- An oral examination which takes the following format:
  - A short description of the student's principal area of interest (5 minutes, by student).
  - A review of the self-study papers and report appendix (25-30 minutes, by student).
  - Questions and answers on the report, the appendix and directly related background (40-100 minutes, student and committee).

In most cases, the work produced during the candidacy examination will be a principal reference for the student's PhD dissertation; however, this is not a requirement.

Research Proposal

After having attained the status of PhD Candidate, each student must present a research proposal to a committee of faculty and industry members, chosen with his/her research advisor, who are knowledgeable in the specific area of research. This proposal should outline the specific intended subject of study, i.e., it should present a problem statement, pertinent background, methods of study to be employed, expected
difficulties and uncertainties and the anticipated form, substance and significance of the results.

The purpose of this presentation is to verify suitability of the dissertation topic and the candidate's approach, and to obtain the advice and guidance of oversight of mature, experienced investigators. It is not to be construed as an examination, though approval by the committee is required before extensive work is undertaken. The thesis proposal presentation must be open to all; announcements regarding the proposal presentation must be made in advance.

The thesis advisory committee will have the sole responsibility of making any recommendations regarding the research proposal. It is strongly recommended that the proposal presentation be given as soon as possible after the successful completion of the candidacy examination. The student must be a PhD candidate for at least one year before he/she can defend his/her doctoral thesis.

**Dissertation Defense**

Dissertation Defense procedures are described in the Graduate College of Drexel University (http://www.drexel.edu/graduatecollege) policies regarding Doctor of Philosophy Program Requirements. The student must be a PhD candidate for at least one year before he/she can defend his/her doctoral thesis.

**Dual Degree**

The ECE Department offers outstanding students the opportunity to receive two diplomas (BS and MS) at the same time. The program requires five (5) years to complete. Participants, who are chosen from the best undergraduates students, work with a faculty member on a research project and follow a study plan that includes selected graduate classes. This program prepares individuals for careers in research and development; many of its past graduates continued their studies toward a PhD.

For more information on eligibility, academic requirements, and tuition policy visit the Engineering Combined BS/MS (http://www.ece.drexel.edu/undergrad/bsms.html) page.

**Facilities**

Drexel University and the Electrical and Computer Engineering Department are nationally recognized for a strong history of developing innovative research. Research programs in the ECE Department prepare students for careers in research and development, and aim to endow graduates with the ability to identify, analyze, and address new technical and scientific challenges. The ECE Department is well equipped with state-of-the-art facilities in each of the following ECE Research laboratories:

**Research Laboratories at the ECE Department**

**Adaptive Signal Processing and Information Theory Research Group**

The Adaptive Signal Processing and Information Theory Research Group (http://www.ece.drexel.edu/walsh/asplitg/home.html) conducts research in the area of signal processing and information theory. Our main interests are belief/expectation propagation, turbo decoding and composite adaptive system theory. We are currently doing projects on the following topics:

i) Delay mitigating codes for network coded systems,

ii) Distributed estimation in sensor networks via expectation propagation,

iii) Turbo speaker identification,

iv) Performance and convergence of expectation propagation,

v) Investigating bounds for SINR performance of autocorrelation based channel shorteners.

**Applied Networking Research Lab**

Applied Networking Research Lab (ANRL) projects focus on modeling and simulation as well as experimentation in wired, wireless and sensor networks. ANRL is the home of MuTANT, a Multi-Protocol Label Switched Traffic Engineering and Analysis Testbed composed of 10 high-end Cisco routers and several PC-routers, also used to study other protocols in data networks as well as automated network configuration and management. The lab also houses a sensor network testbed.

**Bioimage Laboratory**

Uses computer gaming hardware for enhanced and affordable 3-D visualization, along with techniques from information theory and machine learning to combine the exquisite capabilities of the human visual system with computational sensing techniques for analyzing vast quantities of image sequence data.

**Data Fusion Laboratory**

The Data Fusion Laboratory investigates problems in multisensory detection and estimation, with applications in robotics, digital communications, radar, and target tracking. Among the projects in progress: computationally efficient parallel distributed detection architectures, data fusion for robot navigation, modulation recognition and RF scene analysis in time-varying environments, pattern recognition in biological data sequences and large arrays, and hardware realizations of data fusion architectures for target detection and target tracking.

**Drexel Network Modeling Laboratory**

The Drexel Network Modeling Laboratory investigates problems in the mathematical modeling of communication networks, with specific focus on wireless ad hoc networks, wireless sensor networks, and supporting guaranteed delivery service models on best effort and multipath routed networks. Typical methodologies employed in our research include mathematical modeling, computer simulation, and performance optimization, often with the end goal of obtaining meaningful insights into network design principles and fundamental performance tradeoffs.

**Drexel Power-Aware Computing Laboratory**

The Power-Aware Computing Lab (http://dpac.ece.drexel.edu) investigates methods to increase energy efficiency across the boundaries of circuits, architecture, and systems. Our recent accomplishments include the Sigil profiling tool, scalable modeling infrastructure for accelerator implementations, microarchitecture-aware VDD gating algorithms, an accelerator architecture for ultrasound imaging, evaluation of hardware reference counting, hardware and operating system support for power-agile computing, and memory systems for accelerator-based architectures.

**Drexel University Nuclear Engineering Education Laboratory**

The field of nuclear engineering encompasses a wide spectrum of occupations, including nuclear reactor design, medical imaging, homeland security, and oil exploration. The Drexel University Nuclear Engineering Education Laboratory (DUNEEL) provides fundamental hands on understanding for power plant design and radiation detection and analysis. Software based study for power plant design, as well as physical laboratory equipment for radiation detection, strengthen the
underlying concepts used in nuclear engineering such that the student will comprehend and appreciate the basic concepts and terminology used in various nuclear engineering professions. Additionally, students use the laboratory to develop methods for delivering remote, live time radiation detection and analysis. The goal of DUNEEL is to prepare students for potential employment in the nuclear engineering arena.

**Drexel VLSI Laboratory**

The Drexel VLSI Laboratory (http://ece.drexel.edu/faculty/taskin/wiki/vslab/index.php/Main_Page) investigates problems in the design, analysis, optimization and manufacturing of high performance (low power, high throughput) integrated circuits in contemporary CMOS and emerging technologies. Suited with industrial design tools for integrated circuits, simulation tools and measurement beds, the VLSI group is involved with digital and mixed-signal circuit design to verify the functionality of the discovered novel circuit and physical design principles. The Drexel VLSI laboratory develops design methodologies and automation tools in these areas, particularly in novel clocking techniques, featuring resonant clocking, and interconnects, featuring wireless interconnects.

**Drexel Wireless Systems Laboratory**

The Drexel Wireless Systems Laboratory (DWSL) contains an extensive suite of equipment for constructing, debugging, and testing prototype wireless communications systems. Major equipment within DWSL includes:

- three software defined radio network testbeds (HYDRA, USRP, and WARP) for rapidly prototyping radio, optical and ultrasonic communications systems,
- a TDK RF anechoic chamber and EMSCAN desktop antenna pattern measurement system,
- a materials printer and printed circuit board milling machine for fabricating conformal antennas and
- wireless protocol conformance testing equipment from Aeroflex.

The lab is also equipped with network analyzers, high speed signal generators, oscilloscopes, and spectrum analyzers as well as several Zigbee development platforms for rapidly prototyping sensor networks.

DWSL personnel also collaborate to create wearable, fabric based transceivers through collaboration with the Shima Seiki Haute Laboratory in the Drexel ExCITe Center. The knitting equipment at Drexel includes sixteen SDS-ONE APEX3 workstations and four state-of-the-art knitting machines. The workstations accurately simulate fabric construction and provide researchers and designers the opportunity to program, create and simulate textile prototypes, import CAD specifications of final products, and produce made-to-measure or mass-produced pieces on Shima Seiki knitting machines. For testing smart textiles for biomedical, DWSL personnel also have collaborators in the Center for Interdisciplinary Clinical Simulation and Practice (CICSP) in the Drexel College of Medicine which provides access to medical mannequin simulators.

**Ecological and Evolutionary Signal-processing and Informatics Laboratory**

The Ecological and Evolutionary Signal-processing and Informatics Laboratory (EESI) (http://www.ece.drexel.edu/galir/EESI) seeks to solve problems in high-throughput genomics and engineer better solutions for biochemical applications. The lab's primary thrust is to enhance the use of high-throughput DNA sequencing technologies with pattern recognition and signal processing techniques. Applications include assessing the organism content of an environmental sample, recognizing/classifying potential and functional genes, inferring environmental factors and interspecies relationships, and inferring microbial evolutionary relationships from short-read DNA/RNA fragments. The lab also investigates higher-level biological systems such as modeling and controlling chemotaxis, the movement of cells.

**Electric Power Engineering Center**

This newly established facility makes possible state-of-the-art research in a wide variety of areas, ranging from detailed theoretical model study to experimental investigation in its high voltage laboratories. The mission is to advance and apply scientific and engineering knowledge associated with the generation, transmission, distribution, use, and conservation of electric power. In pursuing these goals, this center works with electric utilities, state and federal agencies, private industries, nonprofit organizations and other universities on a wide spectrum of projects. Research efforts, both theoretical and experimental, focus on the solution of those problems currently faced by the electric power industry. Advanced concepts for electric power generation are also under investigation to ensure that electric power needs will be met at the present and in the future.

**Electronic Design Automation Facility**

Industrial-grade electronic design automation software suite and integrated design environment for digital, analog and mixed-signal systems development. Field Programmable Gate Array (FPGA) development hardware. Most up-to-date FPGA/embedded system development hardware kits. Printed circuit board production facility. Also see Drexel VLSI Laboratory.

**Microwave-Photonics Device Laboratories**

The laboratory is equipped with test and measurement equipment for high-speed analog and digital electronics and fiber optic systems. The test equipment includes network analyzers from Agilent (100kHz-1.3 GHz and 45 MHz-40 GHz), and Anritsu (45 MHz-6 GHz); spectrum analyzers from Tektronix, HP, and Agilent with measurement capability of DC to 40 GHz and up to 90 GHz using external mixers; signal generators and communication channel modulators from HP, Rhode-Schwarz, Systron Donner, and Agilent; microwave power meter and sensor heads, assortment of passive and active microwave components up to 40 GHz; data pattern generator and BER tester up to 3Gb/s; optical spectrum analyzer from Anritsu and power meters from HP: single and multimode fiber optic based optical transmitter and receiver boards covering ITU channels at data rates up to 10Gb/s; passive optical components such as isolator, filter, couplers, optical connectors and fusion splicer; LPKF milling machine for fabrication of printed circuit boards; wire-bonding and Cascade probe stations; Intercontinental test fixtures for testing of MMIC circuits and solid-state transistors; state-of-the-art microwave and electromagnetic CAD packages such as Agilent ADS, ANSYS HFSS, and COMSOL multi-physics module.

**Music and Entertainment Technology Laboratory**

The Music and Entertainment Technology Laboratory (MET-lab) is devoted to research in digital media technologies that will shape the future of entertainment, especially in the areas of sound and music. We employ digital signal processing and machine learning to pursue novel applications in music information retrieval, music production and processing technology, and new music interfaces. The MET-lab is also heavily involved in outreach programs for K-12 students and hosts the Summer Music Technology program, a one-week learning experience for high school students. Lab facilities include a sound isolation booth for audio and music recording, a digital audio workstation running ProTools,
two large multi-touch display interfaces of our own design, and a small computing cluster for distributed processing.

**NanoPhotonics+ Lab** ([http://drexelnanophotonics.com](http://drexelnanophotonics.com))

Our research is primarily in the area of nanophotonics with a focus on the nanoscale interaction of light with matter. Interests include: liquid crystal/polymer composites for gratings, lenses and HOEs; liquid crystal interactions with surfaces and in confined nanospaces; alternative energy generation through novel photon interactions; ink-jet printed conducting materials for RF and photonic applications; and the creation and development of smart textiles technologies including soft interconnects, sensors, and wireless implementations.

**Opto-Electro-Mechanical Laboratory**

This lab concentrates on the system integration on optics, electronics, and mechanical components and systems, for applications in imaging, communication, and biomedical research. Research areas include: Programmable Imaging with Optical Micro-electrical-mechanical systems (MEMS), in which microscopic mirrors are used to image light into a single photodetector; Pre-Cancerous Detection using White Light Spectroscopy, which performs a cellular size analysis of nuclei in tissue; Free-space Optical Communication using Space Time Coding, which consists of diffused light for computer-to-computer communications, and also tiny lasers and detectors for chip-to-chip communication; Magnetic Particle Locomotion, which showed that particles could swim in a uniform field; and Transparent Antennas using Polymer, which enables antennas to be printed through an ink-jet printer.

**Plasma and Magnetics Laboratory**

Research is focused on applications of electrical and magnetic technologies to biology and medicine. This includes the subjects of non-thermal atmospheric pressure plasma for medicine, magnetic manipulation of particles for drug delivery and bio-separation, development of miniature NMR sensors for cellular imaging and carbon nanotube cellular probes.

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The RE Touch Lab is investigating the perceptual and mechanical basis of active touch perception, or haptics, and the development of new technologies for stimulating the sense of touch, allowing people to touch, feel, and interact with digital content as seamlessly as we do with objects in the real world. We study the scientific foundations of haptic perception and action, and the neuroscientific and biomechanical basis of touch, with a long-term goal of uncovering the fundamental perceptual and mechanical computations that enable haptic interaction. We also create new technologies for rendering artificial touch sensations that simulate those that are experienced when interacting with real objects, inspired by new findings on haptic perception.

**Testbed for Power-Performance Management of Enterprise Computing Systems**

This computing testbed is used to validate techniques and algorithms aimed at managing the performance and power consumption of enterprise computing systems. The testbed comprises a rack of Dell 2950 and Dell 1950 PowerEdge servers, as well as assorted desktop machines, networked via a gigabit switch. Virtualization of this cluster is enabled by VMWare’s ESX Server running the Linux RedHat kernel. It also comprises of a rack of ten Apple Xserve machines networked via a gigabit switch. These servers run the OS X Leopard operating systems and have access to a RAID with TBs of total disk capacity.

**Electrical and Computer Engineering Faculty**

Fernand Cohen, PhD (Brown University). Professor. Surface modeling; tissue characterization and modeling; face modeling; recognition and tracking.

Kapil Dandekar, PhD (University of Texas-Austin) Director of the Drexel Wireless Systems Laboratory (DWSL); Associate Dean of Research, College of Engineering. Professor. Cellular/mobile communications and wireless LAN; smart antenna/MIMO for wireless communications; applied computational electromagnetics; microwave antenna and receiver development; free space optical communication; ultrasonic communication; sensor networks for homeland security; ultrawideband communication.

Afshin Daryoush, ScD (Drexel University). Professor. Digital and microwave photonics; nonlinear microwave circuits; RFIC; medical imaging.

Bruce A. Eisenstein, PhD (University of Pennsylvania) Interim Dean, College of Engineering. Professor. Pattern recognition; estimation; decision theory.

Adam K. Fontecchio, PhD (Brown University) Electrical and Computer Engineering. Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Gary Friedman, PhD (University of Maryland-College Park). Professor. Biological and biomedical applications of nanoscale magnetic systems.

Eli Fromm, PhD (Jefferson Medical College) Roy A. Brothers University Professor / Director of Center for Educational Research. Professor. Engineering education; academic research policy; bioinstrumentation; physiologic systems.
Edwin L. Gerber, PhD (University of Pennsylvania) Assistant Department Head for Evening Programs. Professor. Computerized instruments and measurements; undergraduate engineering education.

Allon Guez, PhD (University of Florida). Professor. Intelligent control systems; robotics, biomedial, automation and manufacturing; business systems engineering.

Mark Hemphstead, PhD (Harvard University) Junior Colehower Chair, Assistant Professor. Computer engineering; power-aware computing; computer architecture; low power VLSI Design; wireless sensor networks.

Peter R. Herczfeld, PhD (University of Minnesota) Lester A. Kraus Professor/Director, Center for Microwave/Lightwave Engineering. Professor. Lightwave technology; microwaves; millimeter waves; fiberoptic and integrated optic devices.

Leonid Hrebien, PhD (Drexel University) Graduate Advisor and Assistant Department Head for Graduate Affairs. Professor. Tissue excitability; acceleration effects on physiology; bioinformatics.

Paul R. Kalata, PhD (Illinois Institute of Technology). Associate Professor. Stochastic and adaptive control theory; identification and decision theory; Kalman filters.

Moshe Kam, PhD (Drexel University) Robert G. Quinn Professor of Electrical and Computer Engineering and Department Head. Professor. Decision fusion and sensor fusion; mobile robots (especially robot navigation); pattern recognition (especially in handwriting applications); optimization and control.

Nagarajan Kandasamy, PhD (University of Michigan). Associate Professor. Embedded systems, self-managing systems, reliable and fault-tolerant computing, distributed systems, computer architecture, and testing and verification of digital systems.

Bruce Katz, PhD (University of Illinois). Adjunct Professor. Speech communication and computer science; artificial intelligence.

Youngmoo Kim, PhD (MIT). Associate Professor. Audio and music signal processing, voice analysis and synthesis, music information retrieval, machine learning.

Timothy P. Kurzweg, PhD (University of Pittsburgh). Associate Professor. Optical MEM modeling and simulation; system-level simulation; computer architecture.

Karen Miu, PhD (Cornell University). Professor. Power systems; distribution networks; distribution automation; optimization; system analysis.

Bahram Nabet, PhD (University of Washington) Associate Dean for Special Projects, College of Engineering; Electrical and Computer Engineering. Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Prawat Nagvajara, Ph.D. (Boston University). Associate Professor. System on a chip; embedded systems; power grid computation; testing of computer hardware; fault-tolerant computing; VLSI systems; error control coding.

Dagmar Niebur, Ph.D. (Swiss Federal Institute of Technology). Associate Professor. Intelligent systems; dynamical systems; power system monitoring and control.

Chika Nwankpa, PhD (Illinois Institute of Technology). Professor. Power system dynamics; power electronic switching systems; optically controlled high power switches.

Karkal S. Prahbu, PhD (Harvard University). Auxiliary Professor. Computer and software engineering; advanced microprocessors and distributed operating systems.

Gail L. Rosen, PhD (Georgia Institute of Technology). Associate Professor. Signal processing, signal processing for biological analysis and modeling, bio-inspired designs, source localization and tracking.

Kevin J. Scoles, PhD (Dartmouth College) Associate Dean, College of Engineering, Office of Student Services. Associate Professor. Microelectronics; electric vehicles; solar energy; biomedical electronics.

Harish Sethu, PhD (Lehigh University). Associate Professor. Protocols, architectures and algorithms in computer networks; computer security; mobile ad hoc networks; large-scale complex adaptive networks and systems.

P. Mohana Shankar, PhD (Indian Institute of Technology) Allen Rothwarf Professor of Electrical and Computer Engineering. Professor. Wireless communications; biomedical ultrasonics; fiberoptic bio-sensors.

Baris Taskin, PhD (University of Pittsburgh). Associate Professor. Electronic design automation (EDA) of integrated circuits, high-performance VLSI circuits and systems, sequential circuit timing and synchronization, system-on-chip (SOC) design, operational research, VLSI computer-aided design.

Lazar Trachtenberg, DSc (Israel Institute of Technology). Professor. Fault tolerance; multi-level logic synthesis; signal processing; suboptimal filtering.

Oleh Tretiak, ScD (MIT) Robert C. Disque Professor of Electrical and Computer Engineering. Professor. Image processing; tomography; image registration; pattern recognition.

John MacLaren Walsh, PhD (Cornell University). Assistant Professor. Performance and convergence of belief/expectation propagation and turbo decoding/equalization/synchronization, permeation models for ion channels, composite adaptive systems theory.

Steven Weber, PhD (University of Texas-Austin) Assistant Department Head for Graduate Affairs, Electrical and Computer Engineering. Associate Professor. Mathematical modeling of computer and communication networks, specifically streaming multimedia and ad hoc networks.

Jaudelice Cavalcante de Oliveira, PhD (Georgia Institute of Technology). Associate Professor. Next generation Internet; quality of service in computer communication networks; wireless networks.

Interdepartmental Faculty

Dov Jaron, PhD (University of Pennsylvania) Calhoun Distinguished Professor of Engineering in Medicine. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Jeremy R. Johnson, PhD (Ohio State University). Professor. Computer algebra; parallel computations; algebraic algorithms; scientific computing.

John Laccontora, PhD (New Jersey Institute of Technology). Associate Research Professor. Service engineering; industrial engineering.
Ryszard Lec, PhD (University of Warsaw Engineering College). Professor. Biomedical applications of viscoelastic, acoustoptic and ultrasonic properties of liquid and solid media.

Spiros Mancoridis, PhD (University of Toronto) Interim Department Head, Computer Science. Professor. Software engineering; software security; code analysis; evolutionary computation.

Karen Moxon, PhD (University of Colorado). Associate Professor. Corticothalamic interactions; neurobiological perspectives on design of humanoid robots.

Paul Y. Oh, PhD (Columbia University) Associate Department Head for External Affairs, Department of Mechanical Engineering and Mechanics. Professor. Smart sensors servomechanisms; machine vision and embedded microcomputers for robotics and mechatronics.

Banan Onaral, Ph.D. (University of Pennsylvania) H.H. Sun Professor / Director, School of Biomedical Engineering Science and Health Systems. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (Rensselaer Polytechnic University). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.

William C. Regli, PhD (University of Maryland-College Park). Professor. Artificial intelligence; computer graphics; engineering design and Internet computing.

Arye Rosen, PhD (Drexel University) Biomedical Engineering and Electrical Engineering. Microwave components and subsystems; utilization of RF/microwaves and lasers in therapeutic medicine.

Jonathan E. Spanier, PhD (Columbia University) Associate Dean, Strategic Planning, College of Engineering. Professor. Electronic, ferroic and plasmonic nanostructures and thin-film materials and interfaces; scanning probe microscopy; laser spectroscopy, including Raman scattering.

Aydin Tozeren, PhD (Columbia University) Distinguished Professor and Director, Center for Integrated Bioinformatics, School of Biomedical Engineering, Science & Health Systems. Professor. Breast cell adhesion and communication, signal transduction networks in cancer and epithelial cells; integrated bioinformatics, molecular profiling, 3D-tumors, bioimaging.

Aspasia Zerva, PhD (University of Illinois). Professor. Earthquake engineering; mechanics; seismicity; probabilistic analysis.

Emeritus Faculty


Vernon L. Newhouse, PhD (University of Leeds) Disque Professor Emeritus. Professor Emeritus. Biomedical and electrophysics: ultrasonic flow measurement, imaging and texture analysis in medicine, ultrasonic nondestructive testing and robot sensing, clinical engineering.

Hun H. Sun, PhD (Cornell University) Ernest O. Lange Professor Emeritus. Professor Emeritus. Systems and signals in biomedical control systems.

Engineering Management

Major: Engineering Management
Degree Awarded: Master of Science
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 15.1501
Standard Occupational Classification (SOC) code: 11-9041

About the Program

The Engineering Management Program (http://www.drexel.edu/egmt) is designed to provide the background in management science necessary to advance from purely technical positions to supervisory responsibilities in such areas as research and development, production, engineering, design, and technical marketing. Study can be on a part-time or full-time basis, and all courses are offered online.

In our increasingly complex, technically-oriented economy, demand has risen for professionals with the expertise to manage both human and technological resources — a combination of talents crucial to organizations competing in the global marketplace. Students graduating with the master's in engineering management are significantly better positioned to meet the challenge.

Engineering management is a multidisciplinary program offering a core curriculum and specialization in a selected area of technology or management. Majors in engineering management must hold a bachelor's degree in engineering, basic science, or a related field. The program is open to those professionals who aspire to be engineering or technically based managers.

Dual-Degree Requirements

Students may simultaneously pursue the master's in engineering management and another master's degree. Students must satisfy program requirements for each degree, with a maximum of 15.0 credits transferred from one program to the other. (The master's in engineering management requires 45.0 credits; if the other degree requires 45.0 credits, then 60.0 credits are required under the dual degree program.) Approval for the dual degree program must be obtained from the program advisor in each department or program.

Graduate Co-op Program (GCP)

The Graduate Co-op Program (graduate intern or co-op program) is available to master's-level engineering management students. The opportunity to spend six months in industry provides a significant opportunity for the engineer in transition to management. Through Drexel's Steinbright Career Development Center (http://www.drexel.edu/sccd/coop/graduate), students can explore new career directions. This program requires 6.0 additional credits, 3.0 for each term in industry.

Certificate Opportunity

The Engineering Management Program also offers a four-course Graduate Certificate in Engineering Management.

Students can apply to pursue the Graduate Certificate in Engineering Management, earn the credential, and subsequently apply those credits toward completion of a master's in engineering management. However,
current students in pursuit of the master’s in engineering management may not simultaneously pursue the graduate certificate.

Non-engineering management graduate students in the College of Engineering (including those in the accelerated bachelor’s/master’s program) are welcome to apply for the certificate, with advisor approval, and they can do so while simultaneously pursuing their primary degree.

Additional Information

For more information about the program, visit the Drexel Online Engineering Management (http://www.drexel.com/online-degrees/engineering-degrees/ms-egmt) program page.

Admission Requirements

Admission to this program requires:

- A four-year bachelor of science degree in engineering from an ABET-accredited institution in the United States or an equivalent international institution. Bachelor’s degrees in math or the physical sciences may also be considered for provisional admission.
- Minimum cumulative undergraduate GPA of 3.0. If any other graduate work has been completed, the average GPA must be at least 3.0.
- Complete graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation, professional or academic (professional preferred).
- Resume
- A 750-word essay on one of two prompts: technical analysis problem or human resource problem (details of each problem are included in the essay tab of the online application).
- International students must submit an Internet-based TOEFL (IBT = score of 100 or higher).

At least five years of relevant professional work experience are recommended, but not required.

Interested students should complete the Drexel University Online admission application (http://www.drexel.com/online-degrees/engineering-degrees/ms-egmt/admissions.aspx) for admission into this online program.

Degree Requirements

The master’s in engineering management degree requires 45.0 credits, including 30.0 credits in required core courses and 15.0 graduate elective credits. These electives may be taken in other colleges at Drexel consistent with the plan of study and any required prerequisites.

Students may take their required elective credits from any graduate-level course(s) in engineering, business, or another college for which they have adequate preparation and can obtain approvals from the college and the engineering management program.

All candidates are encouraged to discuss areas of interest with the program advisor and to develop a proposed plan of study during the early stages of the program.

Note: Specific course requirements will be waived for students who have taken equivalent courses elsewhere.

### Engineering Management

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EGMT 501</td>
<td>Engineering Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 502</td>
<td>Advanced Engineering Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 504</td>
<td>Engineering Management Communications</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 581</td>
<td>Human Relations and Organizational Behavior</td>
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</table>

### Quantitative Analysis

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<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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<tbody>
<tr>
<td>EGMT 571</td>
<td>Managerial Statistics</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 572</td>
<td>Statistical Data Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 573</td>
<td>Operations Research</td>
<td>3.0</td>
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### Economics and Financial Management

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EGMT 531</td>
<td>Engineering Economic Evaluation &amp; Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 535</td>
<td>Financial Management</td>
<td>3.0</td>
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</table>

### Engineering Management Capstone

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EGMT 692</td>
<td>Engineering Management Capstone</td>
<td>3.0</td>
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</table>

### Electives

Select five of the following electives: 15.0

- EGMT 536 Advanced Financial Management for Engineers
- EGMT 650 Engineering Leadership

### Marketing & Business Development

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGMT 614</td>
<td>Marketing: Identifying Customer Needs</td>
<td></td>
</tr>
<tr>
<td>EGMT 615</td>
<td>Product Conceptualization and Development</td>
<td></td>
</tr>
<tr>
<td>EGMT 616</td>
<td>Technology Conceptualization and Development</td>
<td></td>
</tr>
<tr>
<td>EGMT 660</td>
<td>Sustainable Business Practices for Engineers</td>
<td></td>
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</table>

### Project Management

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EGMT 620</td>
<td>Engineering Project Management</td>
<td></td>
</tr>
<tr>
<td>EGMT 625</td>
<td>Project Planning, Scheduling and Control</td>
<td></td>
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<tr>
<td>EGMT 630</td>
<td>Global Engineering Project Management</td>
<td></td>
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</tbody>
</table>

### Systems Engineering & Systems Thinking

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EGMT 635</td>
<td>Visual System Mapping</td>
<td></td>
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<tr>
<td>EGMT 685</td>
<td>Systems Engineering Management</td>
<td></td>
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<tr>
<td>EGMT 688</td>
<td>Systems Engineering Analysis I</td>
<td></td>
</tr>
<tr>
<td>EGMT 690</td>
<td>Systems Engineering Analysis II</td>
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</table>

### Engineering Law & Ethics

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EGMT 610</td>
<td>Ethics &amp; Business Practices for Engineers</td>
<td></td>
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<tr>
<td>EGMT 652</td>
<td>Engineering Law</td>
<td></td>
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</table>

### Other Approved Electives

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGMT 680</td>
<td>Course EGMT 680 Not Found</td>
<td></td>
</tr>
<tr>
<td>SYSE 510</td>
<td>Systems Engineering Process</td>
<td></td>
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<tr>
<td>SYSE 511</td>
<td>Systems Engineering Tools</td>
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<tr>
<td>SYSE 520</td>
<td>Sustainment and Integrated Logistics</td>
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<tr>
<td>SYSE 521</td>
<td>Integrated Risk Management</td>
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<tr>
<td>SYSE 522</td>
<td>Supply Chain Systems Engineering</td>
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<tr>
<td>SYSE 523</td>
<td>Systems Reliability Engineering</td>
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<tr>
<td>SYSE 524</td>
<td>Systems Reliability, Availability &amp; Maintainability Analysis</td>
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<tr>
<td>SYSE 525</td>
<td>Statistical Modeling &amp; Experimental Design</td>
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<tr>
<td>SYSE 530</td>
<td>Systems Engineering Design</td>
<td></td>
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<tr>
<td>SYSE 531</td>
<td>Systems Architecture Development</td>
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<tr>
<td>SYSE 532</td>
<td>Software Systems Engineering</td>
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<tr>
<td>SYSE 533</td>
<td>Systems Integration and Test</td>
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</tbody>
</table>

**Total Credits 45.0**
EGMT 572 Statistical Data Analysis requires as a prerequisite EGMT 571 Managerial Statistics or approval from the program administration to complete a waiver and request to take then pass the STAT Placement Exam in place of EGMT 571. If approved for the waiver of EGMT 571, students will be eligible to complete an upper level course substitution to satisfy the degree requirements. More information on this option is available on the Engineering Management website (http://www.drexel.edu/egmt/programs/onlinemasters/EGMT%20571).

** Students may select electives from other disciplines outside of Engineering Management with prior approval from their advisor.

### Certificate in Engineering Management

**Certificate Level:** Graduate

**Admissions Requirements:** Undergraduate degree in engineering

**Certificate Type:** Graduate Certificate

**Number of Credits to Completion:** 12.0

**Instructional Delivery:** Online

**Calendar Type:** Quarter

**Expected Time to Completion:** 1 year

**Financial Aid Eligibility:** Aid eligible

**Classification of Instructional Program (CIP) Code:** 15.1501

**Standard Occupational Classification (SOC) Code:** 11-9040

**Gainful Employment Statistics** (http://deptapp08.drexel.edu/gainfulemployment/Engineering_management/gedt.html)

This program is a superb training ground for engineers and scientists who want to obtain a solid foundation in critical areas in management, communications, economics and finance without having to commit to the entire graduate program. After completing the program, students have the option of applying the earned credits toward a master’s degree in engineering management.

Admission to this program requires:

- A four-year bachelor of science degree in engineering from an ABET-accredited institution in the United States or an equivalent international institution. Bachelor’s degrees in math or the physical sciences may also be considered for provisional admission.
- Minimum cumulative undergraduate GPA of 3.0. If any other graduate work has been completed, the average GPA must be at least 3.0.
- Complete graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation, professional or academic (professional preferred).
- Resume
- A 750-word essay on one of two prompts: technical analysis problem or human resource problem (details of each problem are included in the essay tab of the online application).
- International students must submit an Internet-based TOEFL (IBT = score of 100 or higher).

At least five years of relevant professional work experience are recommended, but not required.

Continuing master’s students pursuing other technical disciplines may also complete the certificate courses as electives with approval from their advisor (e.g., electrical engineering master’s students may complete these four courses to satisfy four of their five elective requirements).

This certificate is awarded to students who successfully complete the following four graduate-level courses from the master’s in engineering management (p. 314) curriculum:

<table>
<thead>
<tr>
<th>Requirements</th>
<th>EGMT 501 Engineering Management</th>
<th>3.0</th>
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<tbody>
<tr>
<td></td>
<td>EGMT 504 Engineering Management Communications</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>EGMT 531 Engineering Economic Evaluation &amp; Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td></td>
<td>EGMT 535 Financial Management</td>
<td>3.0</td>
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</tbody>
</table>

**Total Credits** 12.0

The program is administered through Drexel Online. Applications to the certificate program are managed by Drexel Online. For the most current admission information, please visit www.drexel.com (http://www.drexel.com/online-degrees/engineering-degrees/cert-egmt).

### Engineering Management Faculty

James Breen, MBA, PE (Drexel University). Adjunct Instructor. Vice President of Manufacturing Network Strategy at Johnson & Johnson.

James C. Deiner, MBA (Cornell University). Adjunct Instructor. IT projects in the pharmaceutical, logistics and financial services industries.

James Lill, MS, PE (Drexel University). Adjunct Instructor. Director of Facilities, Planning and Management for the Downingtown Area School District.

Carol Mablekos, PhD (Purdue University). Adjunct Instructor. Managerial communications.

Milena McCall, PhD (New York University). Adjunct Instructor. Managerial communications.

Miray Pereira, MBA (Rutgers University). Adjunct Instructor. Manages a team of consultants responsible for development, facilitation and implementation of fundamental demand management systems and capabilities for DuPont, most recently with the DuPont Safety & Protection Platform in strategic planning, mergers & acquisitions.

Fredric Plotnick, PhD, JD, PE (Drexel University; Widener University). Adjunct Professor. CEO and principal consultant of Engineering & Property Management Consultants, Inc.

Dave Reischneider, BS (University of Delaware) Assistant Director, Enrollment Management, College of Engineering. Adjunct Instructor. Creating strategic customer relationships and commercializing new products.

Stephen Smith, PhD (Drexel University). Associate Teaching Professor. Development of online learning and distance teaching/learning techniques for engineering.

Fernando Tovia, PhD (University of Arkansas). Adjunct Instructor. Core quantitative analysis, strategic planning, supply chain management and manufacturing systems.

John Via, EngD (Southern Methodist University) Director of Engineering Management and the Associate Dean of Engineering for Online Programs at Drexel University. Teaching Professor.
**About the Program**

Programs in environmental engineering are available with specializations in air pollution, hazardous and solid waste, subsurface contaminant hydrology, water resources, water and wastewater, and sustainability treatment.

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 and sustainable 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 public health. 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.

For more information about this program, visit the MS in Environmental Engineering (http://www.drexel.edu/cae/academics/grad-doctoral-programs) web page.

**Admission Requirements**

In addition to the general entrance requirements for all environmental engineering applicants, entrance to the MS in Environmental Engineering program requires an undergraduate engineering degree from an ABET-approved institution. Students lacking this credential will be required to complete additional undergraduate courses to incorporate related elements of the functional equivalent of the ABET engineering BS degree. Typically, courses must be taken in computer programming, differential equations, linear algebra and fluid mechanics.

For additional information on how to apply, visit Drexel's Admissions page for Environmental Engineering (http://www.drexel.edu/grad/programs/coe/environmental-engineering).

**Degree Requirements**

The MS in Environmental Engineering program requires 45.0 credits of coursework. Both a theses and a non-thesis option are available. It is possible to finish the MS degree on either a part-time or full-basis. The degree consists of a set of core courses, a sequence in one of several areas of emphasis (treatment process, human risks, water resources, environmental modeling, and air quality) and completion of cognate and elective sequences. After the first term of study, a detailed plan of study is developed with the student's graduate advisor.

### Core Courses

- ENVE 660 Chemical Kinetics in Environmental Engineering 3.0
- ENVS 501 Chemistry of the Environment 3.0
- ENVS 516 Sanitary Microbiology 3.0
- Statistics Course (for example, ENVS 506 Biostatistics) 3.0
- Environmental Policy Course 3.0

### Additional Sequence Courses, Electives, and/or Thesis course 30.0

### Total Credits 45.0

**Degree Requirements**

Applicants to the doctoral program are judged on the basis of academic excellence and the alignment of their research interests with those of the faculty in the School. To be awarded the PhD, students must complete a major research project publishable in peer-reviewed journals. The degree requires a total of 90.0 credits; credits earned toward a master's degree may apply toward the 90.0 credits. There is no prescribed coursework—students must take courses needed to complete their research under guidance of an academic advisor. There is a one-year residency requirement. Students must successfully pass the candidacy examination, the proposal defense, and a PhD dissertation and oral defense.

Prospective PhD student are welcome to contact the Department (http://www.drexel.edu/cae) to discuss their research interests.

**Dual Degree**

**Dual MS Degree**

The university encourages students with broad interest to consider a dual-master's option. Students can simultaneously work on two master's degrees, applying to both programs a limited number of credits (a maximum of 15.0 to each). Applicants interested in a dual degree should apply for just one program; once enrolled at Drexel, the student may then request admission to the second program. The graduate advisors from both degree programs must approve the student's enrollment, and they must approve the transfer of credits from one program to another. Applicants considering two degrees are encouraged to contact the appropriate academic departments.

**Bachelor's/Master's Dual Degree Program**

The BS/MS dual degree is an accelerated program providing the academically qualified student an opportunity to simultaneously earn both BS and MS degrees (two diplomas are awarded) in program areas of his/her choice in five years, the time normally required to finish a bachelor's degree alone. Because both degrees are completed in the time usually required for the bachelor's degree, both degrees may be completed at the undergraduate tuition rate.

The five-year completion period is possible because fewer undergraduate credits are required for the combined degrees (180.0 credits instead of 192.0 credits). Also, co-op experience may be adjusted (two co-op periods instead of three) giving the BS/MS student two additional quarters to take courses. If needed, students may also take evening courses while on co-op.

The program combines the practical work experience of Drexel undergraduate cooperative education with the graduate credentials of an advanced degree. Students may earn both degrees in the same major,
or may complete their master’s degree in a different field. With both an undergraduate and graduate degree and practical work experience, BS/MS graduates enter the work force with specialized knowledge and training.

Students interested in the Environmental Engineering BS/MS program, may contact Dr. Charles N. Haas at haas@drexel.edu for more information.

Facilities
The Department of Civil, Architectural, and Environmental Engineering is well equipped with state-of-the-art facilities:

- Analytical instrumentation for measuring biological and chemical contaminants in air, water and land
- Field sampling equipment for water and air measurements
- Molecular biology capability
- Computational facilities including access to multi-processor clusters, and advanced simulation and data analysis software

Civil, Architectural and Environmental Engineering Faculty

Emin A. Aktan, PhD (University of Illinois at Urbana-Champaign) John Roebling Professor of Infrastructure Studies. Professor. Structural engineering; infrastructure; evaluation; intelligent systems.

Ivan Bartoli, PhD (University of California, San Diego). Assistant Professor. Non-destructive evaluation and structural health monitoring; dynamic identification, stress wave propagation modeling.

Robert Brehm, PhD (Drexel University). Associate Teaching Professor. International infrastructure delivery; response to natural catastrophes; risk assessment and mitigation strategies; project management techniques.

S.C. Jonathan Cheng, PhD (West Virginia University). Associate Professor. Soil mechanics; geosynthetics; probabilistic design; landfill containments.

Louis DaSaro, MS (University of Delaware). Associate Teaching Professor. Failure analysis and restoration of existing structures, blast resistant structures, green structures, engineering education.

Patricia Gallagher, PhD (Virginia Polytechnic Institute). Associate Professor. Soil mechanics; geoenvironmental; ground improvement; sustainability.


Charles N. Haas, PhD (University of Illinois-Urbana) L. D. Betz Professor and Department Head, Civil, Architectural and Environmental Engineering. Professor. Control of human exposures to and risk assessment of pathogenic organisms; water and waste treatment; homeland security.

Ahmad Hamid, PhD (McMaster University). Professor. Engineered masonry; building; cladding; prestressed concrete.

Y. Grace Hsuan, PhD (Imperial College). Professor. Polymeric and cementitious materials; geosynthetic reliability and durability.

Joseph B. Hughes, PhD (University of Iowa) Dean of the College of Engineering and Distinguished Professor. Biological processes and applications of nanotechnology in environmental systems.

Joseph P. Martin, PhD (Colorado State University). Professor. Geoenvironmental engineering; urban environmental hydrology; transportation.

James E. Mitchell, MArch (University of Pennsylvania). Associate Professor. Architectural engineering design; building systems.

Franco Montalto, PhD (Cornell University). Associate Professor. Effects of built infrastructure on societal water needs, ecohydrologic patterns and processes, ecological restoration, green design, water interventions.

Franklin Moon, PhD (Georgia Institute of Technology). Associate Professor. Full-scale structural testing, structural dynamics, evaluation and rehabilitation of existing structures.

Joseph V. Mullin, PhD (Pennsylvania State University). Senior Lecturer. Structural material behavior, engineering economy and design.

Mira S. Olson, PhD (University of Virginia). Associate Professor. Groundwater; environmental fluid mechanics; hydrology.

Anu Pradhan, PhD (Carnegie Mellon University). Assistant Professor. Infrastructure management, construction engineering, transportation engineering, sensing system, geographic information system, statistical machine learning.

Yared Shifferaw, PhD (Johns Hopkins University). Assistant Professor. Computational and experimental mechanics, structural stability, optimization, health monitoring and hazard mitigation, sustainable structures, emerging materials, thin-walled structures and metallic structures.

Kurt Sjoblom, PhD (Massachusetts Institute of Technology). Assistant Professor. Laboratory testing of geomaterials, geotechnical engineering, foundation engineering.

Sabrina Spatari, PhD (University of Toronto). Assistant Professor. Research in industrial ecology; development and application of life cycle assessment (LCA) and material flow analysis (MFA) methods for guiding engineering and policy decisions; specific interest in biomass and bioenergy, biofuels, and urban infrastructure.

Michael Waring, PhD (University of Texas-Austin). Assistant Professor. Indoor air quality and building sustainability; indoor particulate matter fate and transport; indoor chemistry and particle formation; secondary impacts of control technologies and strategies.

Jin Wen, PhD (University of Iowa). Associate Professor. Architectural engineering, building control systems, indoor air quality.

Aspasia Zerva, PhD (University of Illinois). Professor. Earthquake engineering; mechanics; seismicity; probabilistic analysis.

Interdepartmental Faculty

Eugenia Ellis, PhD (Virginia Polytechnic State University). Associate Professor. Registered architect; interior design, extended-care facilities design, research on spatial visualization, perception and imagination.
Bakhtier Farouk, PhD (University of Delaware) Billings Professor of Mechanical Engineering. Professor. Heat transfer; combustion; numerical methods; turbulence modeling; materials processing.

Emeritus Faculty

Harry G. Harris, PhD (Cornell University). Professor Emeritus. Structural models, dynamics of structures, plates and shells, industrialized building construction.

Robert M. Koerner, PhD (Duke University). Harry Bownam Professor Emeritus. Geosynthetic engineering; soil mechanics; water resources.

Richard Weggel, PhD (University of Illinois) Samuel S. Baxter Professor Emeritus; Civil and Environmental Engineering. Professor Emeritus. Coastal engineering; hydraulics engineering; hydrology.


Master of Engineering

Major: Engineering
Degree Awarded: Master of Engineering (ME)
Calendar Type: Quarter
Total Credit Hours: 48.0
Classification of Instructional Programs (CIP) code: 14.0101
Standard Occupational Classification (SOC) code: 17.2199

About the Program

This ME program is a highly customizable program primarily used for International and visiting students studying engineering at Drexel. This career-focused program is designed for working professionals and those seeking employment in a manufacturing-related industry, and may not be the best choice for those who wish to earn a PhD in engineering. The ME program offers wide flexibility for those students who wish to combine technical and nontechnical study with hands-on experience in industry and laboratory research.

Admission Requirements

In addition to meeting requirements for graduate admission, which include at least a 3.0 GPA for the last two years of undergraduate study and for any graduate study, applicants must hold a bachelor's degree in engineering from an accredited institution or an equivalent. Students whose background is in science or mathematics may be accepted to the program, but they will be required to take undergraduate engineering courses. Although the Graduate Record Examination (GRE) is not required for admission, it may be required of students interested in a teaching or research assistantship. Applicants whose native language is not English and who do not have previous degrees from a U.S. institution are required to submit scores of at least 550 on the Test of English as a Foreign Language (TOEFL).

Degree Requirements

Students take a series of core and elective courses. Students work closely with and advisor to develop an individualized plan of study. A six-month period of career-related employment through Drexel’s Graduate Co-op program is a requirement for full-time students. Students who are already employed as practicing engineers may apply to pursue the program on a part-time basis. A thesis is not required. The average time required to complete the master’s degree is two years of full-time study or three years of part-time study.

Degree Requirements

The degree requires a total of 48.0 credits, including at least 18.0 credits from an engineering discipline core. This core may be from any engineering department: Civil and Architectural, Chemical, Electrical and Computer, Materials, or Mechanical Engineering and Mechanics. (Please refer to the appropriate departmental description in this catalog for more information about each department.) Students also complete 15.0 credits from the manufacturing core, which includes 6.0 credits in manufacturing and 9.0 credits of departmental manufacturing electives. Three credits of either engineering analysis or probability and statistics, 6.0 credits from either engineering management or the Bennett S. LeBow College of Business, and 6.0 credits of GCP round out the program.

Curriculum

Manufacturing Core Courses
MEM 687 Manufacturing Processes I 3.0
MEM 689 Computer-Aided Manufacturing 3.0
Departmental Manufacturing Electives (see below) 9.0
Departmental Engineering Core 18.0
Engineering Management/Business Requirements (see below) 6.0
Engineering Analysis/Probability and Statistics Requirement 3.0
Graduate Co-Op Program 6.0

Departmental Manufacturing Elective Courses
Select three of the following:

Chemical Engineering
CHE 525 Transport Phenomena I
CHE 554 Process Systems Engineering
CHE 560 Transport Phenomena in Biological Systems
CHE 562 Bioreactor Engineering
CHE 564 Unit Operations in Bioprocess Systems

Electrical and Computer Engineering
ECEC 541 Robotic Computer Interface Controls I
ECEC 542 Robotic Computer Interface Controls II

Materials Science and Engineering
MATE 570 Materials Processing I
MATE 651 Advanced Polymer Processing

Mechanical Engineering and Mechanics
MEM 688 Manufacturing Processes II
MEM 717 Heat Transfer in Manufacturing
MEM 727 Fluid Dynamics in Manufacturing Processes
MEM 800 Course MEM 800 Not Found

Business Core
Select two of the following courses:

LeBow College of Business
POM 620 Management of Manufacturing Firms
POM 624 Management of Service Firms

Engineering Management
EGMT 531 Engineering Economic Evaluation & Analysis
EGMT 607 Marketing: Identifying Customer Needs
EGMT 652 Engineering Law
Sustainability and Green Construction

Architecture.

Law, environmental remediation, public policy, market analysis, and estate as investments, design and construction, operations, development to create, maintain, and build environments for living, working and

In this concentration students explore the knowledge and skills required to successfully manage complex construction projects. The program focuses on training professionals to meet the challenge of increasing owner demands, tighter project delivery times and increasing regulation. The program provides the leadership skills professionals need to navigate the many daily challenges construction organizations face in successfully managing construction operations.

Three concentrations are available: construction project management, real estate, and sustainability and green construction.

Program Goals

The program is designed to increase the students' breadth and depth of knowledge in the principles and practices of construction management. The program serves as an excellent platform to develop senior management for the region's construction industry.

Graduates of the Master of Science in Construction Management program will:

• exhibit strong technical and managerial skills
• apply scientific methodologies to problem solving
• think critically
• exercise creativity and inject innovation into the process
• operate at the highest level of ethical practice
• employ principles of transformational leadership

Concentrations

Three concentrations are available:

Construction Project Management

This concentration provides the knowledge and skills required to successfully manage complex construction projects. Topics include hard skills of project management, such as estimating and budgeting, time management, and planning. Other topics include managerial and legal aspects of construction contract administration, international construction practices, strategic planning, quality management, and productivity analysis.

Real Estate

In this concentration students explore the knowledge and skills required to create, maintain, and build environments for living, working and entertainment purposes. Relevant issues include project finance, real estate as investments, design and construction, operations, development law, environmental remediation, public policy, market analysis, and architecture.

Sustainability and Green Construction

Sustainable development means integrating the decision-making process across the project team, so that every decision is made with an eye to the greatest long-term benefits. Currently, in the Leadership in Energy and Environmental Design (LEED) green building rating system, the construction process represents a significant portion of the effort required to achieve high performance building programs. This concentration is intended to explore these concepts in detail.

For additional information, view the College of Engineering's Construction Management (http://drexel.edu/engineering/programs/undergrad/Construction%20Management) web page.

Admissions Requirements

Admission to the program requires:

• A bachelor's degree in construction management or engineering, or a baccalaureate business or non-technical degree.
• A completed application
• Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Potential students must supply transcripts regardless of the number of credits earned or the type of school attended. If a potential student does not list all post-secondary institutions on his or her application, and these are listed on transcripts received from other institutions, processing of the application will be delayed until the remaining transcripts have been submitted.
• GPA of 3.0 or higher
• Two letters of recommendation (professional or academic)
• Up-to-date resume
• 500 word essay on why the applicant wishes to pursue graduate studies in this program
• International Students must submit a TOEFL score indicating a minimum of 600 (paper exam) or 250 (CBT exam). For more information regarding international applicant requirements, view the International Students Admissions Information (http://drexel.edu/grad/resources/international) page.

Visit the Graduate Admissions (http://www.drexel.edu/grad/programs/coe/construction-management) website for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements

The Master of Science in Construction Management curriculum includes a core of 5 required courses (15.0 credits), a concentration, and 6.0 credits of culminating experience. The culminating experience includes a capstone project in construction management.

Core Foundation Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMGT 501</td>
<td>Leadership in Construction</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 505</td>
<td>Construction Accounting and Financial Management</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 510</td>
<td>Construction Control Techniques</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 512</td>
<td>Cost Estimating and Bidding Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 515</td>
<td>Risk Management in Construction</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Concentrations

15.0-24.0

Students pursue a concentration in one of the following areas:

Construction Management Project Management Concentration

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMGT 525</td>
<td>Applied Construction Project Management</td>
</tr>
</tbody>
</table>
The certificate in construction management has been designed for professionals to develop the multidisciplinary skills required of effective construction managers. Students have the option of completing this 18.0 credit certificate in construction management as a stand-alone professional development credential, or as a step toward the MS in Construction Management program.

The admissions process for this program is the same as for the MS in Construction Management. (p. 320)

This graduate certificate seeks to produce professionals with the knowledge, skills, and perspective required to be successful in the real estate development process and the industry as a whole. Students explore the knowledge and skills required to create, maintain, and build environments for living, working and entertainment purposes.

Relevant issues include project finance, real estate as investments, design and construction, operations, development law, environmental remediation, public policy, market analysis, and architecture.

Students wishing to complete this certificate in the context of a master’s degree should consider the MS in Construction Management (p. 320) with a concentration in Real Estate.

### Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CMGT 510</td>
<td>Construction Control Techniques</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 512</td>
<td>Cost Estimating and Bidding Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 515</td>
<td>Risk Management in Construction</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 525</td>
<td>Applied Construction Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 528</td>
<td>Construction Contract Administration</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 538</td>
<td>Strategic Management in Construction</td>
<td>3.0</td>
</tr>
</tbody>
</table>

### Total Credits: 18.0

The architectural, engineering, and construction community faces the daunting task of providing a built environment which is in harmony with the natural environment—meeting the current needs of society without jeopardizing the ability of future generations to meet their needs. Sustainable development means integrating the decision-making process across the project team, so that every decision is made with an eye to the greatest long-term benefits.

The certificate in Sustainability and Green Construction is a flexible, part-time post-baccalaureate program, focused on the sustainable aspects of the construction process. Students have the opportunity to complete all requirements within one and a half years.

Currently, in the Leadership in Energy and Environmental Design (LEED) green building rating system, the construction process represents a significant portion of the effort required to achieve high performance building programs. This certificate program is intended to explore these concepts in detail. Credits from this certificate will transfer toward a Masters of Science in Construction Management (p. 320).

### Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>CMGT 501</td>
<td>Leadership in Construction</td>
<td>3.0</td>
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<tr>
<td>CMGT 512</td>
<td>Cost Estimating and Bidding Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 515</td>
<td>Risk Management in Construction</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 538</td>
<td>Strategic Management in Construction</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 545</td>
<td>Sustainable Principles &amp; Practices</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 546</td>
<td>Sustainable Technologies</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 547</td>
<td>LEED Concepts</td>
<td>3.0</td>
</tr>
<tr>
<td>CMGT 558</td>
<td>Community Sustainability</td>
<td>3.0</td>
</tr>
</tbody>
</table>

### Total Credits: 27.0

### Construction Management Faculty

Charles Cook, PhD (New York University). Assistant Clinical Professor. Construction management; project management; leadership and teambuilding; oral and written communication.

Robert Muir Jr., PhD (Drexel University). Assistant Clinical Professor. Construction management; value engineering; management of field...
operations; planning and scheduling; project management; heavy and industrial construction.

Richard Sievert, PhD (Northwestern University). Associate Clinical Professor. Project management and construction management; value engineering; cost reduction and waste minimization; facilities planning and management; marketing and selling professional services; quality management, engineering and construction business administration.

Engineering Technology

Major: Engineering Technology
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 15.0000
Standard Occupational Classification (SOC) code: 17-3029

About the Program

The Master of Science in Engineering Technology offers courses focused on the technologies used in today’s modern emerging industries. The program is designed to provide specialized engineering technology education to those who currently hold an accredited baccalaureate degree in engineering technology or a related field. The flexibility of the program permits students to select a combination of courses relevant to their individual career goals or to provide the foundation for further advanced study. Courses will be delivered in several modes; face-to-face, on-line, or real-time videoconferencing.

The primary goal of the Master of Science in Engineering Technology is to develop advanced-level practitioners in resolving technical problems through the application of engineering principles and technology.

The program can be pursued on a part-time basis and permits students to select a combination of courses relevant to their individual career goals. The program is also designed to provide the foundation for further advanced study and allows practicing professionals the opportunity to update knowledge and skills based on the latest technological developments in the industrial environment and therefore advance in their chosen careers.

Program Goals

Graduates of the Master of Science in Engineering Technology will be expected to:

- Apply scientific and technological concepts to solving technological problems.
- Apply concepts and skills developed in a variety of technical and professional disciplines including computer applications and networking, materials properties and production processes, and quality control to improve production processes and techniques.
- Plan, facilitate, and integrate technology and problem solving techniques in the leadership functions of the industrial enterprise system.
- Engage in applied technical research in order to add to the knowledge of the discipline and to solve problems in an industrial environment.
- Apply theories, concepts, and principles of related disciplines to develop the communication skills required for technical-managers.

For additional information, view the College of Engineering’s Engineering Technology program (http://drexel.edu/engtech) web page.

Admission Requirements

Applicants must have a 3.0 grade point average in their undergraduate or upper division (junior and senior year) coursework.

International students who have their undergraduate degree from a country whose language is not English can be admitted with a Test of English as a Foreign Language (TOEFL) test score of 550 or better. For more information regarding international applicant requirements, view the International Students Admissions Information (http://drexel.edu/isss/NewStudent.html) page.

Prerequisite courses

The following prerequisite courses must be completed at the undergraduate level with a minimum grade of C:

- Calculus I
- Calculus II
- Physics I (can be algebra-based)
- Physics II (can be algebra-based)
- DC/AC Circuit Analysis
- Digital Electronics
- Chemistry I or Industrial Materials
- Statistics

Visit the Graduate Admissions (http://www.drexel.edu/grad/programs/coe/engineering-technology) website for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements

Candidates for the MS in Engineering Technology must complete a minimum of 45.0 quarter credits. A minimum grade of B is required in all core courses and no more than two C grades in electives.

Of the 45.0 quarter credits required for the degree, 30.0 must be earned at Drexel University, including 24.0 credits of Engineering Technology (ET) courses. A maximum of 15.0 transfer credits may be allowed for graduate courses taken at other institutions, if they are appropriate to the student’s plan of study.

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET 605</td>
<td>Materials for Emerging Technologies</td>
<td>3.0</td>
</tr>
<tr>
<td>ET 610</td>
<td>Networks for Industrial Environments</td>
<td>3.0</td>
</tr>
<tr>
<td>ET 615</td>
<td>Rapid Prototyping and Product Design</td>
<td>3.0</td>
</tr>
<tr>
<td>ET 619</td>
<td>Programmable Devices and Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>ET 620</td>
<td>Microsystems and Microfabrication</td>
<td>3.0</td>
</tr>
<tr>
<td>ET 725</td>
<td>Sensors and Measurement Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>ET 732</td>
<td>Modern Energy Conversion Technologies</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 571</td>
<td>Managerial Statistics</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 610</td>
<td>Ethics &amp; Business Practices for Engineers</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Electives

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>ET 635</td>
<td>Engineering Quality Methods</td>
</tr>
<tr>
<td>ET 675</td>
<td>Reliability Engineering</td>
</tr>
<tr>
<td>ET 730</td>
<td>Lean Manufacturing Principles</td>
</tr>
<tr>
<td>ET 755</td>
<td>Sustainable and Green Manufacturing</td>
</tr>
<tr>
<td>PROJ 501</td>
<td>Introduction to Project Management</td>
</tr>
<tr>
<td>EGMT 572</td>
<td>Statistical Data Analysis</td>
</tr>
</tbody>
</table>

Degree Requirements
About the Program

Modern project management is a field that began in the 1950s in the defense industry. In the 1980s, the field gained critical mass in a broad range of industries, including, but not limited to building/construction, IT/ systems development, defense, engineering, film and video, financial services, healthcare, and government contracting. Organizations are using project management concepts, tools, and techniques to achieve their objectives and gain a competitive advantage.

The Master of Science in Project Management, a part-time online program, is designed to equip professionals with the knowledge and skills expected of project managers in any field. The course content is mapped to the internationally-recognized Project Management Institute’s (PMI®) A Guide to the Project Management Body of Knowledge (PMBOK® Guide).

For additional information, visit the Master of Science in Project Management (http://drexel.edu/projmgt) page.

Admission Requirements

Recommended Prerequisites

The following undergraduate courses or their equivalent are recommended:

- Financial Accounting Foundations
- Introduction to Finance
- Organizational Behavior
- Introduction to Business Statistics

Admission Requirements

- Completed Application Form
- Bachelor's degree from a regionally accredited institution
- Undergraduate GPA of 3.0 or higher (graduate degree GPAs will be considered along with the undergraduate GPA). Applicants with a cumulative GPA below 3.0 may be considered.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may email official electronic transcripts issued by a post-secondary institution directly to Drexel University Online (customerservice@drexel.com). All transcripts must be supplied, regardless of the number of credits earned or the type of school attended. If all post-secondary institutions are not listed on the application, and then listed on transcripts received from other institutions, application processing will be delayed until the remaining transcripts are submitted. Use Drexel’s Transcript Lookup Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions.
- Two letters of recommendation, professional or academic. Drexel University Online now accepts electronic letters of recommendation (http://www.drexel.edu/apply/recommend). If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
- Personal Essay, between 500–750 words, describing your interest in the program. Specifically, discuss the following:

Classification of Instructional Programs (CIP) code: 52.0211
Standard Occupational Classification (SOC) code: 11-9199
Degree Requirements

The Master of Science in Project Management requires completion of 45 credit hours (quarter) of study. The curriculum includes a core of 10 required courses (30 credits), a culminating capstone project experience integrating the knowledge and skills acquired during the program (PROJ 695 (https://nextcatalog.drexel.edu/graduate/schooloftechnologyandprofessionalstudies/projectmanagement), 3.0 credits) and 12.0 credits of electives.

Electives

Students may use electives to increase project management, creativity, communication, or leadership skills or to develop areas of specialization. Any appropriate graduate course offered in the University can serve as an elective if the student has sufficient background to take the course. In addition, the program will offer its own elective courses including special topics (PROJ 690 (https://nextcatalog.drexel.edu/graduate/schooloftechnologyandprofessionalstudies/projectmanagement)). Qualified students may also pursue independent study (PROJ 699 (https://nextcatalog.drexel.edu/graduate/schooloftechnologyandprofessionalstudies/projectmanagement)) for elective credit in special cases.

Curriculum

Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJ 501</td>
<td>Introduction to Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 502</td>
<td>Project Planning &amp; Scheduling</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 510</td>
<td>Project Quality Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 515</td>
<td>Project Estimation &amp; Cost Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 520</td>
<td>Project Risk Assessment &amp; Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 530</td>
<td>Managing Multiple Projects</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 535</td>
<td>International Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 540</td>
<td>Project Procurement Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 603</td>
<td>Project Leadership &amp; Teamwork</td>
<td>3.0</td>
</tr>
<tr>
<td>PROJ 645</td>
<td>Project Management Tools</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Free Electives (12.0 credits)

Capstone Project

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PROJ 695</td>
<td>Capstone Project in Project Management</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits 45.0

Sociology Faculty

Robert J. Brulle, PhD (George Washington University). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

Emmanuel F. Koku, PhD (University of Toronto). Associate Professor. Social network analysis; qualitative/quantitative research; medical sociology; social epidemiology; social demography; sociology of development; communication and information technology; community and urban sociology.

Diamantino Machado, PhD (Temple University). Teaching Professor. Globalization, political economy, political sociology, philosophy of social science, postmodernism and social reflection.

Mimi Sheller, PhD (New School for Social Research) Director, Center for Mobilities Research and Policy. Professor. Sustainable mobility and mobility justice: new cultures and infrastructures of travel, transport, mobile communication, and urbanism; Caribbean Studies: history, culture and political theory of the region, including intersections of race, ethnicity, gender, sexuality and class.

Diane Sicotte, PhD (Arizona State University). Associate Professor. Sociology of environmental injustice: inequalities in the citing of environmental hazards; community-based research in neighborhoods dealing with industrial hazards; sociology of the environment; urban sociology; social inequalities.

Interdepartmental Faculty

Mary Ebeling, PhD (University of Surrey). Associate Professor. Science and technology studies; emerging technologies and biocapital; media and democratic cultures; radical social movements; sociology of markets; political sociology; and ethnographic methodologies.

Kelly Joyce, PhD (Boston College) Director, Master's Program in Science Technology & Society. Professor. Science, medicine and technology; aging and technology; qualitative social science methods, social theory; healthcare and medicine.

Property Management

Major: Property Management

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 45.0

Classification of Instructional Programs (CIP) code: 52.1501

Standard Occupational Classification (SOC) code: 11-9141

About the Program

The only online program of its kind in the nation, Drexel's Master of Science in Property Management prepares graduate students to drive innovation and lead the real estate management industry. Graduates with an MS in Property Management benefit from a transdisciplinary, comprehensive education in the real estate industry. The rigorous curriculum is designed to challenge and engage students. Students have access to courses anytime, anywhere.

The Master of Science in Property Management is a part-time online program with a structured plan of study. The curriculum stresses strategic decision-making, critical thinking, independent research, and analysis and synthesis of issues and concepts from all disciplines associated with the
Introduction to Project Management
Property Security Emergency & Risk Management
3.0
3.0
Measuring and Maximizing Financial Performance
Capstone in Property Management I
Real Estate Economics in Urban Markets
3.0
3.0
3.0
Business Statistics
Real Estate Development
Real Estate Valuation & Analysis
Facilities Management
Community Sustainability
3.0
3.0
3.0
3.0
3.0
3.0
3.0

For additional information, visit the Master of Science in Property Management (http://www.drexel.edu/engmgmt/propmgmt/academics/ms) page.

Admission Requirements

- Completed application
- Current resume or CV
- Bachelor’s degree from a regionally accredited, top-tier institution
- Undergraduate GPA of 3.0 or higher out of a 4.0 scale
- Applicants with a cumulative Undergraduate GPA below 3.0 with extensive related experience and relevant industry credentials (e.g. CPM®) may be considered.
- Graduate degree GPAs will be considered along with the Undergraduate GPA.
- Official transcripts from all universities or colleges and other post-secondary educational institutions attended. Email official electronic transcripts issued by a post-secondary institution directly to Drexel University Online (customerservice@drexel.com). All transcripts must be supplied, regardless of the number of credits earned or the type of school attended. If all post-secondary institutions are not listed on the application, and then listed on transcripts received from other institutions, application processing will be delayed until the remaining transcripts are submitted. Use Drexel’s Transcript Lookup Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions.
- Two letters of recommendation, professional or academic. Drexel University Online now accepts electronic letters of recommendation (http://www.drexel.edu/apply/recommend). If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
- An essay of at least 1,000 words describing your interest in the program. Your essay should include discussion of the following:
  • The degree’s connection to your Bachelor’s degree and/or other graduate coursework
  • The extent your past experiences (personal and professional) will enhance your classroom engagement, complement your coursework, and strengthen your performance
  • The program’s relationship to current employment and potential for career growth
  • Your plan to apply the degree to future goals
  • If this is a change to your academic plans and/or career, explain the catalyst and your expectations
  • International students must submit a TOEFL score indicating a minimum of 600 (paper exam) or 250 (CBT exam). For more information regarding international applicant requirements, view the International Students Admissions Information (http://drexel.edu/iss/ NewStudent.html) page.
- An interview may be requested

Visit the MS in Property Management Online Application (http://www.drexel.com/online-degrees/business-degrees/ms-property-management/apply.aspx) page for more information about requirements and deadlines, as well as instructions for applying online.

Degree Requirements

Required Core Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PROJ 501</td>
<td>Introduction to Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>BUSN 502</td>
<td>Essentials of Economics</td>
<td>3.0</td>
</tr>
<tr>
<td>STAT 601</td>
<td>Business Statistics</td>
<td>3.0</td>
</tr>
<tr>
<td>PRMT 603</td>
<td>Property Asset Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PRMT 610</td>
<td>Facilities Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PRMT 625</td>
<td>Property Financial Analysis &amp; Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>PRMT 640</td>
<td>Property Security Emergency &amp; Risk Management</td>
<td>3.0</td>
</tr>
<tr>
<td>PRMT 645</td>
<td>Property Management Technology Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>REAL 568</td>
<td>Real Estate Development</td>
<td>3.0</td>
</tr>
<tr>
<td>REAL 572</td>
<td>Advanced Market Research &amp; Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>REAL 574</td>
<td>Real Estate Economics in Urban Markets</td>
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<tr>
<td>REAL 575</td>
<td>Real Estate Finance</td>
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Electives

Select Two (2) Courses From the Following: 6.0

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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>BUSN 501</td>
<td>Measuring and Maximizing Financial Performance</td>
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<tr>
<td>STAT 632</td>
<td>Datamining for Managers</td>
</tr>
<tr>
<td>REAL 576</td>
<td>Real Estate Valuation &amp; Analysis</td>
</tr>
<tr>
<td>REAL 577</td>
<td>Legal Issues in Real Estate Development</td>
</tr>
<tr>
<td>CMGT 558</td>
<td>Community Sustainability</td>
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<tr>
<td>PRMT T680</td>
<td>Special Topics in PRMT</td>
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Capstone in Property Management

<table>
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<tr>
<th>Course Code</th>
<th>Course Name</th>
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<tbody>
<tr>
<td>PRMT 695</td>
<td>Capstone in Property Management I</td>
</tr>
</tbody>
</table>

Total Credits 45.0

Politics Faculty

Scott Barclay, PhD (Northwestern University) Department Head, Politics. Professor. Judicial systems, civil rights, public policy and administration.

Zoltan Buzas, PhD (Ohio State University). Post-Doctoral Fellow. International relations theory, international security, race and politics, diplomatic history.

George Ciccariello-Maher, PhD (University of California, Berkeley). Assistant Professor. Colonialism, social movements, political theory.

Rose Corrigan, PhD (Rutgers University). Associate Professor. Women, public law, American politics and policy.

Richardson Dilworth, PhD (Johns Hopkins University) Director, Center for Public Policy. Associate Professor. American political development, urban politics, public policy.

Erin R. Graham, PhD (Ohio State University). Assistant Professor. International institutions, international relations theory, global environmental politics.

Amelia Hoover Green, PhD (Yale University). Assistant Professor. Dynamics of conflict-related violence; intra-armed group politics and socialization; statistics in human rights.

Christian Hunold, PhD (University of Pittsburgh). Associate Professor. Environmental policy; comparative politics; political theory.
Alison Kenner, PhD (Rensselaer Polytechnic Institute). Assistant Professor. Science, technology, and health; environmental health problems; cities and place; feminist theory; medical anthropology; digital humanities.

Julie Mostov, PhD (New York University) Vice Provost for Global Initiatives. Professor. Modern political thought, democratic theory, nationalism, gender studies, South Eastern Europe and the Balkans.

Gwen Ottinger, PhD (University of California, Berkeley). Assistant Professor. Social studies of science and technology, environmental justice, science and engineering ethics, environmental ethics.

William L. Rosenberg, PhD (Temple University). Professor. Behavioral politics, public opinion, and political communication.

Chloé Silverman, PhD (University of Pennsylvania). Associate Professor. Parent advocacy for autism and pollinator health research.

Interdepartmental Faculty

Joel E. Oestreich, PhD (Brown University) Director of International Area Studies. Associate Professor. International organizations, international finance, development, and human rights.

Emeritus Faculty

Richard L. Rosen, PhD (Case Western Reserve University), Associate Professor Emeritus. History of science, appropriate technology, and world history.

Michael J. Sullivan, PhD (University of Virginia). Professor Emeritus. Comparative politics and developing nations.

Systems Engineering

Major: Systems Engineering
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 48.0
Classification of Instructional Programs (CIP) code: 14.2701
Standard Occupational Classification (SOC) code: 17-2199

About the Program

The Master of Science in Systems Engineering is an online curriculum integrating systems and financial management and planning. The degree enables engineering leaders to perform, lead, and manage systems development throughout the life cycle, from conceptual development and engineering design through the operation and sustainment phases.

Elective courses for the curriculum:

- Include models relevant to sustainable, high performance systems and topics related to living, learning, effectiveness, power, influence, networking, and systems thinking as they relate to effective systems engineering.
- Expose students to model-based system development using SysML and DODAF, also covering major aspects of the systems domain.
- Teach SE processes and skills to integrate user needs, manage requirements, conduct technological evaluation, and build elaborate system architectures, assess risk and establish financial and schedule constraints.
- Prepare students to intelligently manage and contribute to any engineering challenge, from concept development, technology assessment, and architecture selection, to proposal development, stimulating and challenging as they consider sustainability-oriented projects and become serious systems engineering managers and practitioners.

Program Outcomes

Graduates of the Drexel University Master of Science in Systems Engineering will be competent in their ability to:

- develop and implement models and tools to enhance and optimize complex systems;
- develop and manage processes relevant to complex systems development;
- architect, design, implement, integrate, verify, validate, support and decommission complex systems;
- use systems engineering tools and practices to identify and execute effective technical solutions;
- manage system-intensive projects within cost and schedule constraints;
- consider financial elements in all complex systems solutions.

Certificate Opportunity

A student may first complete a Certificate as an individual pursuit or as a gateway to the full Master of Science in Systems Engineering. A student may apply for admission to the Masters of Science in Systems Engineering degree program at any point in a certificate series. Upon admission, graduate courses successfully completed in the certificate series may be applied toward the Master’s degree as applicable. Certificate opportunities include:

- Certificate in Systems Design and Development (p. 328)
- Certificate in Systems Engineering Analysis (p. 329)
- Certificate in Systems Engineering Fundamentals (p. 329)
- Certificate in Systems Reliability Engineering (p. 330)

Admission Requirements

Degree and GPA Requirement

A bachelor’s degree in an Engineering discipline from an ABET-accredited college or university is required. A bachelor’s degree in science (Physics, Mathematics, Computer Science, etc.) can also acceptable. Applicants with degrees in sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a U.S. bachelor’s degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor’s degree as well as for any subsequent graduate-level work is required.

GRE Requirement

The GRE General Test is only required of applicants for full-time studies; part-time applicants do not need to take the GRE. For those taking the GRE, a minimum score of approximately 1200 is recommended. Official documents of the exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted. The GRE can be waived for students who have successfully completed a Master’s degree or a Drexel certificate in the systems curriculum.
TOEFL Requirement

For students whose native language is not English and who do not hold a degree from a U.S. institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum of 600 (paper-based), 250 (computer-based), or 100 (internet-based). Official documents of this exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

Other Requirements

- Submission of an application
- Official, sealed college transcripts
- An essay
- Two or more letters of recommendation

Degree Requirements

The master of science in systems engineering degree requires 48.0 credits, including 36.0 credits in required core courses and 12.0 graduate elective credits. These electives may be taken in other colleges at Drexel consistent with the plan of study and any required prerequisites.

Students may take their required elective credits from any graduate-level course(s) in engineering, business, or another college for which they have adequate preparation and can obtain approvals from the college and the systems engineering program.

All candidates are encouraged to discuss areas of interest with the program advisor and to develop a proposed plan of study during the early stages of the program.

Note: Specific course requirements will be waived for students who have taken equivalent courses elsewhere.

Engineering Management Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EGMT 531</td>
<td>Engineering Economic Evaluation &amp; Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 571</td>
<td>Managerial Statistics</td>
<td>3.0</td>
</tr>
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<td>EGMT 572</td>
<td>Statistical Data Analysis</td>
<td>3.0</td>
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<td>EGMT 573</td>
<td>Operations Research</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 685</td>
<td>Systems Engineering Management</td>
<td>3.0</td>
</tr>
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</table>

Systems Engineering Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>EGMT 688</td>
<td>Systems Engineering Analysis I</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 690</td>
<td>Systems Engineering Analysis II</td>
<td>3.0</td>
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<tr>
<td>SYSE 510</td>
<td>Systems Engineering Process</td>
<td>3.0</td>
</tr>
<tr>
<td>SYSE 520</td>
<td>Sustainment and Integrated Logistics</td>
<td>3.0</td>
</tr>
<tr>
<td>SYSE 521</td>
<td>Integrated Risk Management</td>
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</tr>
<tr>
<td>SYSE 533</td>
<td>Systems Integration and Test</td>
<td>3.0</td>
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Capstone in Systems Engineering

<table>
<thead>
<tr>
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<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>SYSE 598</td>
<td>Capstone in Systems Engineering</td>
<td>3.0</td>
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Electives

12.0

Complete four of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>SYSE 511</td>
<td>Systems Engineering Tools</td>
</tr>
<tr>
<td>SYSE 522</td>
<td>Supply Chain Systems Engineering</td>
</tr>
<tr>
<td>SYSE 523</td>
<td>Systems Reliability Engineering</td>
</tr>
<tr>
<td>SYSE 524</td>
<td>Systems Reliability, Availability &amp; Maintainability Analysis</td>
</tr>
<tr>
<td>SYSE 525</td>
<td>Statistical Modeling &amp; Experimental Design</td>
</tr>
<tr>
<td>SYSE 530</td>
<td>Systems Engineering Design</td>
</tr>
</tbody>
</table>

Total Credits: 48.0

* Electives from other engineering disciplines and/or Drexel colleges may be considered with review and approval by the advisor.
** If a student decides to pursue the Master's Thesis option, the student will complete the 12 core courses, one elective course and nine thesis credits. Advisor/Director consultation and approval is required if a student is interested in waiving core courses when pursuing the Master's Thesis option.

Dual Degree Opportunity

Students may pursue the Master of Science in Systems Engineering as part of a dual degree option with approval from the graduate advisors of both programs. Students may transfer as many as 15 credits from one program to the other, usually in the form of electives, and are therefore required to complete a minimum of 63 graduate credits in order to complete a dual master's degree program (the actual credit total may be higher, depending on each department's core requirements). Examples of permissible dual pursuits could include MS SYSE/MS EE and MS SYSE/MS Finance.

Secondary Master's Degree Pursuit Opportunity

Students with a previously completed master's degree may pursue a second master's degree in a different major without the need to go through the admission process again or to complete another 45 credits of graduate coursework. Because the student has already completed a master's degree at Drexel, he or she may transfer up to 15 credits from the first into the second master's degree program, depending upon, departmental requirements in the new major, and may, therefore, complete the second master's degree with a minimum of 33 new graduate credits.

Readmission into the second master's degree program is requested through the new departmental graduate advisor, with final approval by the Graduate Studies Office. During the term in which the student expects to complete the second master's degree, he/she must file an application for degree form through DrexelOne.
Career Opportunities

The MS Systems Engineering prepares students to become effective systems engineers, leaders, managers, and future executives. With a systems engineering background, students are able to tackle a wide array of engineering challenges from the entire systems life cycle, including concept development, technology assessment, architecture selection, and proposal development.

Systems engineers are highly valued in industry because their skills complement those in traditional engineering fields. Whereas other engineering disciplines usually focus deeply in only one area, systems engineers must integrate all of those areas into a comprehensive and effective system. This is a versatile skill-set that allows for a flexible career path, as systems engineering expertise is sought by a wide range of industries such as healthcare, defense, communications, aerospace, government, transportation, finance, and more. Drexel University’s MS Systems Engineering will prepare students from any of these fields to lead large, complex projects in their organizations.

Anthropology Faculty

Anthony Glascock, PhD (University of Pittsburgh) Coordinator of the Anthropology Program. Professor. Aging and health, definitions of functionality and impairment, technology and aging, social organization, Ireland, East Africa.

Barbara Hornum, PhD (Bryn Mawr College) Director of Center for Academic Excellence (DCAE). Associate Professor. Comparative gerontology, planned communities, continuing care communities, retirement, faculty development.

David Kutzik, PhD (Temple University). Professor. Sociology and philosophy of science; applied gerontological research; political economy of health care; microprocessor-based assistive technologies to improve case management and increase independent living among frail populations.

Brent Luvaas, PhD (UCLA). Assistant Professor. DIY and independent media production; transnational consumer culture; popular music; new media and mediated subjectivities; youth culture in the US and Indonesia.

Usha Menon, PhD (University of Chicago). Associate Professor. Self, identity & personhood, emotional functioning, Hindu morality, gender relations in Hindu society, adult development, popular Hinduism, post-colonial feminism, Hindu religious nationalisms and Islamic radicalism.

Rakhmiel Peltz, PhD (Columbia University, Linguistics; University of Pennsylvania, Biological Sciences) Director of Judaic Studies Program. Professor. Sociolinguistics, ethnography of communication, social history of Yiddish language and culture, Yiddish culture of Eastern Europe, language planning, language and ethnic identity, language and group memory, aging and ethnicity, history of urban neighborhoods.

Robert Powell, PhD (Temple University). Assistant Teaching Professor. Early and Middle Bronze Age Crete; archaeoastronomy; early state formation; archaeology and anthropology of frontiers; mass communication.

Rachel R. Reynolds, PhD (University of Illinois at Chicago). Associate Professor. Sociolinguistics, ethnography of communication, intercultural communication, globalization and the rhetoric of community, political economy of immigration, race and ethnicity, new African immigrants in the United States, Igbo studies.

Wesley Shumar, PhD (Temple University) Department Head, Anthropology. Professor. Ethnography of cyberspace, online learning communities, political economy of higher education, globalization, activity theory, semiotics, critical realism, psychoanalysis, identity and the self.

Judith Storniolo, PhD (University of Pennsylvania). Teaching Professor. Historical and comparative linguistics, Mesoamerican languages and culture, applied anthropology, public policy, oral traditions and narratives, ideology and ritual, Mesoamerican ethnohistory; and pre-Columbian literature.

Certificate in Systems Design and Development

Certificate Level: Graduate

Admission Requirements: Bachelor's degree in engineering or other science

Certificate Type: Graduate Certificate

Number of Credits to Completion: 15.0

Expected Time to Completion: 3 years

Financial Aid Eligibility: Not aid eligible

Classification of Instructional Program (CIP) Code: 14.2701

Standard Occupational Classification (SOC) Code: 17-2199

About the Program

The courses in this certificate focus on teaching students engineering design and management of large complex systems including software intensive systems. These courses will expose the students to the systems engineering design body of knowledge and allow them to develop systems skills in stimulating and challenging environments that will prepare them to be industry leaders who can make a significant difference. Upon completion of this certificate the students will be able to design, lead and manage any systems engineering effort regardless of size, complexity, technologies, or engineering emphasis.

Degree and GPA Requirement

A bachelor's degree in an engineering discipline from an ABET-accredited college or university is required. A bachelor's degree in the sciences (physics, mathematics, computer science, etc.) may also be acceptable. Applicants with degrees in the sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor's degree as well as for any subsequent graduate-level work is required.

TOEFL Requirement

For students whose native language is not English and who do not hold a degree from a US institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum of 600 (paper-based), 250 (computer-based) or 100 (internet-based). Official documents of this exam must be submitted.
directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

Other Requirements
- Submission of an application
- Official, sealed college transcripts
- An essay
- Two or more letters of recommendation

Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EGMT 685</td>
<td>Systems Engineering Management</td>
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<tr>
<td>EGMT 688</td>
<td>Systems Engineering Analysis I</td>
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</tr>
<tr>
<td>SYSE 530</td>
<td>Systems Engineering Design</td>
<td>3.0</td>
</tr>
<tr>
<td>SYSE 531</td>
<td>Systems Architecture Development</td>
<td>3.0</td>
</tr>
<tr>
<td>SYSE 532</td>
<td>Software Systems Engineering</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits 15.0

Certificate in Systems Engineering Analysis

Certificate Level: Graduate
Admission Requirements: Bachelor's degree in engineering or other science
Certificate Type: Graduate Certificate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 15.1501
Standard Occupational Classification (SOC) Code: 11-9041

About the Program
This courses in this certificate focus on teaching students statistical analysis and the use of mathematical models to solve a variety of problems. The courses are structured to discuss theory, process and application. The primary emphasis is application as the objectives of the courses are to provide students with skills to model problems, determine a quantitative solution and to perform sensitivity analysis. Theory and process are also studied so students learn how the models work by understanding the underlying theory associated with a particular model. Understanding of theory also enforces skills to conduct sensitivity analysis and helps answer “what if” type questions. Upon successful completion of this certificate, students will be able to formulate mathematical models and solve quantitative problems.

Any students interested in decision sciences or advanced mathematical modeling and analysis should consider pursuing this certification.

Admission Requirements
Degree and GPA Requirement
A bachelor's degree in an engineering discipline from an ABET-accredited college or university is required. A bachelor's degree in the sciences (physics, mathematics, computer science, etc.) may also be acceptable. Applicants with degrees in the sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor's degree as well as for any subsequent graduate-level work is required.

TOEFL Requirement
For students whose native language is not English and who do not hold a degree from a US institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum of 600 (paper-based), 250 (computer-based) or 100 (internet-based). Official documents of this exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

Other Requirements
- Submission of an application
- Official, sealed college transcripts
- An essay
- Two or more letters of recommendation

Requirements

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<th>Credits</th>
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<tr>
<td>EGMT 571</td>
<td>Managerial Statistics</td>
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<tr>
<td>EGMT 572</td>
<td>Statistical Data Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 573</td>
<td>Operations Research</td>
<td>3.0</td>
</tr>
<tr>
<td>EGMT 690</td>
<td>Systems Engineering Analysis II</td>
<td>3.0</td>
</tr>
<tr>
<td>SYSE 525</td>
<td>Statistical Modeling &amp; Experimental Design</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits 15.0

Certificate in Systems Engineering Fundamentals

Certificate Level: Graduate
Admission Requirements: Bachelor's degree in engineering or other science
Certificate Type: Graduate Certificate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 14.2701
Standard Occupational Classification (SOC) Code: 17-2199

About the Program
This certificate focuses on teaching students the process and the art of systems engineering. Students will learn systems engineering tools and skills to integrate user needs, manage requirements, conduct technological evaluation and build elaborate system architectures. The courses devote particular attention to knowledge, skills, mindset and leadership qualities needed to be a successful systems engineering leader in the field.

Any students working or interested in the field of systems engineering should consider pursuing and completing this certificate.

Admission Requirements
Degree and GPA Requirement
A bachelor's degree in an engineering discipline from an ABET-accredited college or university is required. A bachelor's degree in the sciences (physics, mathematics, computer science, etc.) may also be acceptable. Applicants with degrees in the sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor's degree as well as for any subsequent graduate-level work is required.

**TOEFL Requirement**

For students whose native language is not English and who do not hold a degree from a US institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum of 600 (paper-based), 250 (computer-based) or 100 (internet-based). Official documents of this exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

**Other Requirements**

- Submission of an application
- Official, sealed college transcripts
- An essay
- Two or more letters of recommendation

**Requirements**

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<tbody>
<tr>
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<tr>
<td>EGMT 690</td>
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**Total Credits** 18.0

**Certificate in Systems Engineering Integrated Logistics**

**Certificate Level:** Graduate  
**Admission Requirements:** Bachelor's degree in engineering or other science  
**Certificate Type:** Graduate Certificate  
**Number of Credits to Completion:** 18.0  
**Instructional Delivery:** Online  
**Calendar Type:** Quarter  
**Expected Time to Completion:** 3 years  
**Financial Aid Eligibility:** Not aid eligible  
**Classification of Instructional Program (CIP) Code:** 14.2701  
**Standard Occupational Classification (SOC) Code:** 17-2199

**About the Program**

The courses in this certificate focus on teaching students to understand, analyze and enhance the performance of complex and dynamic global supply chains. The certificate is structured with three quantitative courses: EGMT 571, EGMT 572, and EGMT 573, that will provide the students with mathematical and statistical tools to analyze and evaluate the supply chain.

In addition, the certificate offers three courses: SYSE 520, SYSE 522 SYSE 690 and that will allow the students to understand the dynamic and complex nature of global supply chains from a systems engineering perspective, as well as to implement the quantitative tools learned during the first three courses to efficiently manage the supply chain. Students will evaluate and analyze diverse types of supply chains through case studies, and analyze and discuss the best practices in supply chains across the world.

All affiliate courses may be applied to the Master of Science in Systems Engineering (p. 326) and the Master of Science in Engineering Management (p. 314).

**Admission Requirements**

**Degree and GPA Requirement**

A bachelor's degree in an engineering discipline from an ABET-accredited college or university is required. A bachelor's degree in the sciences (physics, mathematics, computer science, etc.) may also be acceptable. Applicants with degrees in the sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor's degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor's degree as well as for any subsequent graduate-level work is required.

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**Other Requirements**

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<td>SYSE 522</td>
<td>Supply Chain Systems Engineering</td>
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**Total Credits** 18.0

**Certificate in Systems Reliability Engineering**

**Certificate Level:** Graduate  
**Admission Requirements:** Bachelor's degree in engineering or other science  
**Certificate Type:** Graduate Certificate  
**Number of Credits to Completion:** 18.0  
**Instructional Delivery:** Online  
**Calendar Type:** Quarter  
**Expected Time to Completion:** 3 years  
**Financial Aid Eligibility:** Not aid eligible
About the Program

The courses in this certificate focus on teaching students to design for sustainability and reliability of systems during the life cycle of operation. Students will take the first three courses that will teach them the analytical tools required to perform reliability and maintainability modeling and analysis. Then, the students will take three courses that focus on systems reliability, maintainability and availability analysis (RM&A) for systems. The courses have an application to all phases of the systems engineering process including requirements definition through systems design and development. The students will learn the process that starts with RM&A in the initial phases of development, conducting trade off analysis during the system development phase to optimize reliability and availability of the system. The students will also learn to improve the reliability and availability of a product or a system by modeling and analysis of systems reliability using probability models.

 Upon completion of the courses, students will be able to understand RM&A and modeling, apply reliability models for a product or system during its life-cycle: design, production, and warranty, as well as how to conduct trade off analysis to enhance availability and reliability of the system and development of maintenance concepts that are cost effective and support sustainment of the system.

Admission Requirements

Degree and GPA Requirement

A bachelor’s degree in an engineering discipline from an ABET-accredited college or university is required. A bachelor’s degree in the sciences (physics, mathematics, computer science, etc.) may also be acceptable. Applicants with degrees in the sciences may be required to take a number of undergraduate or post-baccalaureate courses. An undergraduate degree earned abroad must be deemed equivalent to a US bachelor’s degree. A minimum 3.0 GPA (on a 4.0 scale) for a bachelor’s degree as well as for any subsequent graduate-level work is required.

TOEFL Requirement

For students whose native language is not English and who do not hold a degree from a US institution, the Test of English as a Foreign Language (TOEFL) is required. TOEFL scores must be less than two years old to be considered. Minimum of 600 (paper-based), 250 (computer-based) or 100 (internet-based). Official documents of this exam must be submitted directly to the Graduate Admissions Office. Unofficial photocopies will not be accepted.

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Total Credits 18.0

Materials Science and Engineering

Major: Materials Science and Engineering
Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 45.0 (MS); 90.0 (PhD)
Classification of Instructional Programs (CIP) code: 17-2199

About the Program

The graduate program in Materials Science and Engineering aims to provide an education which encompasses both the breadth and depth of the most recent knowledge base in the materials science and engineering fields in a format suitable for individuals seeking careers in academia and/ or industry.

In addition, the program provides students with research training through their courses and thesis research at the MS and PhD levels.

The graduate student body reflects a broad spectrum of undergraduate backgrounds. Because of the expansion into interdisciplinary areas, qualified physical and biological science graduates may also join the program. Non-engineering graduates are required to take MATE 503- Introduction to Materials Engineering.

Graduate work in materials science and engineering is offered both on a regular full-time and on a part-time basis. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study.

Career Opportunities

Graduates go on to careers in engineering firms, consulting firms, law firms, private industry, business, research laboratories, academia, and national laboratories. Materials scientists and materials engineers find employment in such organizations as Hewlett-Packard, Intel, IBM, 3M, DuPont, Lockheed-Martin, Johnson and Johnson, Merck, AstraZeneca, Arkema, Army Research Laboratory, Los Alamos National Laboratory, Air Products, Micron, Xerox, Motorola, Monsanto, Corning, and Eastman Kodak.

For more information about Materials Science and Engineering, visit the Department of Materials Science and Engineering (http://www.materials.drexel.edu) web page.

Admission Requirements

Applicants must meet the graduate requirements for admission to Drexel University. The graduate student body reflects a broad spectrum of undergraduate backgrounds. Because of the expansion into interdisciplinary areas, qualified non-MSE engineering, physical and biological science graduates may also join the program.

For specific information on how to apply to this program, visit Drexel University’s Materials Science and Engineering Graduate Admissions
Master of Science in Materials Science and Engineering

The 45.0 quarter credits required for the MS degree include two required core courses on MATE 510-Thermodynamics of Solids and MATE 512-Introduction to Solid State Materials. Students choose four additional core courses.

Thesis Options
All full-time students are required to undertake a 9.0 credit thesis on a topic of materials research supervised by a faculty member. MS students can select the Non-thesis Option if carrying out research is not possible, in which case, the thesis may be replaced by either (a) a 6.0 credit Thesis Proposal and 3.0 credit coursework, or (b) 9.0 credits of coursework.

All students are required, during their first year, to propose an advisor supported research thesis topic or literature survey for approval by the department. Students are urged to make a choice of topic as early as possible and to choose appropriate graduate courses in consultation with their advisor.

The program is organized so that part-time students may complete the degree requirements in two to four years. Full-time students may complete the program in two years.

MS to PhD Program
There is no general exam required for MS students. If an MS student wishes to continue for a PhD then: (a) the student must be admitted to the PhD program (there is no guarantee that an MS student will be admitted to the PhD program), and (b) the student must take the Candidacy Exam during the first term after being admitted to the PhD program.

The required 90 credits for a PhD degree are tabulated below:

- Required Core Courses: 6.0 credits
- Additional Required Courses: 7.0 credits (MATE 504 & MATE 536 (1 credit for first 6 terms)
- Selected Core Courses: 12.0 credits
- Optional Courses: 9 credits
- Research or additional option courses: 47 credits
- Dissertation: 9.0 credits (MATE 998)

Total: 90.0 credits

** Of the 18 technical elective credits, at least 9 credits must be taken as Materials Science and Engineering (MATE) courses, while the rest may be taken within the College of Engineering, College of Arts and Sciences, or at other colleges if consistent with the student's plan of study (and given advance written approval by his/her advisor). At least 9 of these 18 technical electives must be exclusive of independent study courses or research credits.

PhD in Materials Science and Engineering Curriculum

A student must have at least the required 90 quarter credits for the PhD degree. An MS degree is not a prerequisite for the PhD degree, but can count for 45 quarter credits if the courses are approved by the Graduate Advisor. For students without an MS degree, but with previous graduate course work, they may transfer no more than 15 credits (equivalent to 12 semester-credits) from approved institutions, provided they follow the rules and regulations described in the Materials Requirements of Graduate Degrees (http://mse.drexel.edu/media/49885/mse-graduate-program.pdf).

The required 90 credits for a PhD degree are tabulated below:

- Required Core Courses: 6.0 credits
- Additional Required Courses: 7.0 credits (MATE 504 & MATE 536 (1 credit for first 6 terms)
- Selected Core Courses: 12.0 credits
- Optional Courses: 9 credits
- Research or additional option courses: 47 credits
- Dissertation: 9.0 credits (MATE 998)

Total: 90.0 credits

Materials Science and Engineering (MSMSE) Core Courses

Required core courses:

- MATE 510 Thermodynamics of Solids 3.0
- MATE 512 Introduction to Solid State Materials 3.0

Select four additional core courses from the following: 12.0

- MATE 501 Structure and Properties of Polymers
- MATE 507 Kinetics
- MATE 515 Experimental Technique in Materials
- MATE 535 Numerical Engineering Methods
- MATE 610 Mechanical Behavior of Solids
- MATE 661 Biomedical Materials I

Any additional related courses if approved by the graduate advisor/thesis advisor (such as MATE 514 and MATE 573)

Optional Core Courses **

18.0

Thesis and Alternatives

9.0

9.0 credits MS thesis OR 6.0 credits of thesis proposal (literature review) + 3.0 credit course OR 9.0 credits of electives

Total Credits 45.0

* PhD candidates must achieve a minimum B- grade in each of the core courses. Waiver of any of the 6 core courses must be approved by the MSE Department Graduate Advisor and the student's Thesis Advisor in Advance.
MATE 573  Electronic, Magnetic and Optical Characterization of Energy Materials  3.0
MATE 576  Recycling of Materials  3.0
MATE T580  Special Topics in MATE  3.0
MATE 582  Materials for Energy Storage  3.0
MATE 583  Environmental Effects on Materials  3.0
MATE 585  Nanostructured Carbon Materials  3.0
MATE 602  Soft Materials  3.0
MATE 702  Natural Polymers  3.0
MATE 897  Research  1.0-12.0

Other MSE courses that may be available
Out-of-department courses, as approved by the Graduate Advisor/Thesis Advisor

PhD students must achieve a minimum "B" grade in each of the core courses. Waiver of any of the six (6) core courses must be approved by the MSE Department Graduate Advisor and the student's Thesis Advisor in advance. MATE 536 is a 1.0 credit course that must be repeated 6 times.

An introductory course, MATE 503, is required for students without an undergraduate materials science and engineering degree.

Additional courses are encouraged for students entering the department with an MS degree. Students entering the department at the BS level must satisfy the course requirements for the MS degree. Students choose a doctoral thesis topic after consultation with the faculty. Students are required to consider topics early in the program. An oral thesis presentation and defense are scheduled at the completion of the thesis work.

In addition to the graduate seminar, which is required of all graduate students, doctoral program students must pass an oral candidacy examination and an original proposal defense. The exam is designed to improve and assess the communication skills and the analytical abilities of the student. The following procedures should be followed to complete the PhD.

Candidacy Exam Requirement

All MSE PhD students are required to take the PhD Candidacy Examinations administered by the MSE Department.

For more information, visit the Department of Materials Science and Engineering (http://www.materials.drexel.edu) web page.

Facilities

Biomaterials and Biosurfaces Laboratory
This laboratory contains 10 kN biaxial and 5 kN uniaxial servo-hydraulic mechanical testing machines, a Fluoroscan X-ray system, a microscopic imaging system, a spectra fluorometer, a table autoclave, centrifuge, vacuum oven, CO2 incubators, biological safety cabinet, thermostatic water baths, precision balance and ultrasonic sterilizer.

Nanobiomaterials and Cell Engineering Laboratory
This laboratory contains fume hood with vacuum/gas dual manifold, vacuum pump and rotary evaporator for general organic/polymer synthesis; gel electrophoresis and electrolotting for protein characterization; bath sonicator, glass homogenizer and mini-extruder for nanoparticle preparation; centrifuge; ultrapure water conditioning system; precision balance; pH meter and shaker.

Ceramics Processing Laboratory
This laboratory contains a photo-resist spinner, impedance analyzer, Zeta potential meter, spectrofluorometer, piezoelectric d33 meter, wire-bonder, and laser displacement meter.

Dynamic Characterization Laboratory
This laboratory contains metallographic sample preparation (sectioning, mounting and polishing) facilities; inverted metallograph; microhardness tester; automated electropolishing for bulk and TEM sample preparation; GEM tensile stage for EBSD; magneto-optical Kerr effect (MOKE) magnetometer.

MAX Phase Ceramics Processing Laboratory
This laboratory contains a vacuum hot-press; cold isostatic press (CIP) and hot isostatic press (HIP) for materials consolidation and synthesis; precision dilatometer; laser scattering particle size analyzer; impedance analyzer, creep testers, and assorted high temperature furnaces.

Mechanical Testing Laboratory
This laboratory contains mechanical and closed-loop servo-hydraulic testing machines, hardness testers, impact testers, equipment for fatigue testing, metallographic preparation facilities and a rolling mill with twin 6" diameter rolls.

Mesoscale Materials Laboratory
This laboratory contains instrumentation for growth, characterization, device fabrication, and design and simulation of electronic, dielectric, ferroelectric and photonic materials. Resources include physical and chemical vapor deposition and thermal and plasma processing of thin films, including oxides and metals, and semiconductor nanowire growth. Facilities include pulsed laser deposition, atomic layer deposition, chemical vapor deposition, sublimation growth, and resistive thermal evaporation. Variable-temperature high-vacuum probe station and optical cryostats including high magnetic field, fixed and tunable-wavelength laser sources, several monochromators for luminescence and Raman scattering spectroscopies, scanning electron microscopy with electron beam lithography, and a scanning probe microscope.

Nanomaterials Laboratory
This laboratory contains instrumentation for testing and manipulation of materials under microscope, high-temperature autoclaves, Sievert's apparatus; glove-box; high-temperature vacuum and other furnaces for the synthesis of nano-carbon coatings and nanotubes; electro-spinning system for producing nano-fibers.

Oxide Films and Interfaces Laboratory
This laboratory contains an oxide molecular beam epitaxy (MBE) thin film deposition system; physical properties measurement system for electronic transport and magnetometry measurements from 2 – 400K, up to 9 T fields; 2 tube furnaces.

Powder Processing Laboratory
This laboratory contains vee blenders, ball-mills, sieve shaker - sieves for powder classification, several furnaces (including one with controlled atmosphere capability); and a 60-ton Baldwin press for powder compaction.

Soft Matter Research and Polymer Processing Laboratories
These laboratories contain computerized thermal analysis facilities including differential scanning calorimeters (DSC), dynamic mechanical analyzer (DMA) and thermo-gravimetric analyzer (TGA); single-fiber tensile tester; strip biaxial tensile tester; vacuum evaporator, spincoater;
centrifuge; optical microscope with hot stage; liquid crystal tester; microbalance; ultrasonic cleaner; laser holographic fabrication system; polymer injection molder and single screw extruder.

Natural Polymers and Photonics Laboratory
This laboratory contains a spectroscopic ellipsometer for film characterization; high purity liquid chromatography (HPLC) system; lyophilizer; centrifuge; refractometer; electro-spinning system for producing nano-fibers.

X-ray Tomography Laboratory
This laboratory contains a high resolution X-ray tomography instrument and a cluster of computers for 3D microstructure reconstruction; mechanical stage, a positioning stage and a cryostage for in-situ testing. For more information on departmental facilities, please visit the Department’s Facilities web page (http://www.materials.drexel.edu/ research/facilities).

Centralized Research Facilities
The Department of Materials Science & Engineering relies on Core Facilities within the University for materials characterization and micro- and nano-fabrication. These facilities contain state-of-the-art materials characterization instruments, including environmental and variable pressure field-emission scanning electron microscopes with Energy Dispersive Spectroscopy (EDS) for elemental analysis, and Orientation Image Microscopy (OIM) for texture analysis; a Transmission Electron Microscope (TEM) with STEM capability and TEM sample preparation equipment; a dual beam focused ion beam (FIB) system for nano-characterization and nano fabrication; a femtosecond/ terahertz laser Raman spectrometer; visible and ultraviolet Raman micro spectrometers with a total of 7 excitation wavelengths for non-destructive chemical and structural analysis and Surface Enhanced Raman (SERS); a Fourier Transform Infrared (FTIR) spectrometer with a microscope and full array of accessories; a Nanoindenter; an X-ray Photoelectron Spectrometer (XPS)/Electron Spectroscopy for Chemical Analysis (ESCA) system; and X-Ray Diffractometers (XRD), including small angle/wide angle X-Ray scattering (SAX/WAX).

More details of these instruments, information how to access them and instrument usage rates can be found on the Core Facilities web page (http://crf.coe.drexel.edu).

Materials Science and Engineering Faculty
Michel Barsoum, PhD (Massachusetts Institute of Technology) A. W. Grosvenor Professor. Professor. Processing and characterization of novel ceramics and ternary compounds, especially the MAX and 2-D MXene phases.

Hao Cheng, PhD (Northwestern University). Assistant Professor. Drug delivery, molecular self-assembly, cell-nanomaterial interactions, regenerative medicine and cell membrane engineering.

Yury Gogotsi, PhD (Kiev Polytechnic Institute) Director, A. J. Drexel Nanotechnology Institute. Distinguished University & Trustee Chair Professor. Nanomaterials; carbon nanotubes; nanodiamond; graphene; MXene; materials for energy storage, supercapacitors, and batteries.

Richard Knight, PhD (Loughborough University) Associate Department Head and Undergraduate Advisor. Teaching Professor. Thermal plasma technology; thermal spray coatings and education; plasma chemistry and synthesis.

Christopher Y. Li, PhD (University of Akron). Professor. Soft and hybrid materials for optical, energy, and bio applications; polymeric materials, nanocomposites, structure and properties.

Michele Marcolongo, PhD, PE (University of Pennsylvania) Senior Associate Vice Provost for Translational Research. Professor. Orthopedic biomaterials; acellular regenerative medicine, biomimetic proteoglycans; hydrogels.

Steven May, PhD (Northwestern University). Assistant Professor. Synthesis of complex oxide films, superlattices, and devices; materials for energy conversion and storage; magnetic and electronic materials; x-ray and neutron scattering.

Ekaterina Pomerantseva, PhD (Moscow State University, Russia). Assistant Professor. Solid state chemistry; electrochemical characterization, lithium-ion batteries, energy generation and storage; development and characterization of novel nanostructured materials, systems and architectures for batteries, supercapacitors and fuel cells.

James Rondinelli, PhD (University of California, Santa Barbara). Assistant Professor. Electronic structure theory of inorganic materials; atomic structure driven view of functional properties; density functional theory-based materials design; inorganic carbides, oxides and fluorides for electronic, magnetic, optical and electrochemical applications.

Caroline L. Schauer, PhD (SUNY Stony Brook) Graduate Advisor. Associate Professor. Polysaccharide thin films and nanofibers.

Wei-Heng Shih, PhD (Ohio State University). Professor. Colloidal ceramics and sol-gel processing; piezoelectric biosensors, optoelectronics, and energy harvesting devices; nanocrystalline quantum dots for bioimaging, lighting, and solar cells.

Jonathan E. Spanier, PhD (Columbia University) Associate Dean, Strategic Planning, College of Engineering. Professor. Electronic, ferroic and plasmonic nanostructures and thin-film materials and interfaces; scanning probe microscopy; laser spectroscopy, including Raman scattering.

Mitra Taheri, PhD (Carnegie Mellon University) Hoeganes Assistant Professor of Metallurgy. Assistant Professor. Development of the ultrafast Dynamic Transmission Electron Microscope (DTEM) for the study of laser-induced microstructural evolution/phase transformations in nanostructured materials; use of various in-situ Transmission Electron Microscopy techniques.

Garritt Tucker, PhD (Georgial Institute of Technology). Assistant Professor. Computational materials science and engineering; microstructural evolution and material behavior in extreme environments; interfacial-driven processes for improving material functionality; multi-scale physics modeling.

Christopher Weyant, PhD (Northwestern University). Associate Teaching Professor.

Antonios Zavaliangos, PhD (Massachusetts Institute of Technology). Department Head and Professor. Constitutive modeling; powder compaction and sintering; pharmaceutical tableting, X-ray tomography.
**Interdepartmental Faculty**

Jason Baxter, PhD *(University of California, Santa Barbara)*. Associate Professor. Solar cells, semiconductor nanomaterials, ultrafast spectroscopy.

Yossef A. Elabd, PhD *(Johns Hopkins University)*. Professor. Fuel cells; polymer membranes; diffusion in polymers.

Adam K. Fontecchio, PhD *(Brown University)* Electrical and Computer Engineering. Professor. Electro-optics; remote sensing; active optical elements; liquid crystal devices.

Alexander Fridman, DSc, PhD *(Moscow Institute of Physics and Technology)* Mechanical Engineering and Mechanics. John A. Nyheim Endowed University Chair Professor, Director of the Drexel Plasma Institute. Professor. Plasma science and technology; pollutant mitigation; super-adiabatic combustion; nanotechnology and manufacturing.

Haviva M. Goldman, PhD *(City University of New York)* Neurobiology and Anatomy. Associate Professor. Understanding how the size and shape of whole bones, as well as the distribution quantity and quality of the mineralized tissue that forms the bone, reflect both evolutionary constraints of skeletal growth and development, and responsiveness to mechanical loading during life.

Lin Han, PhD *(Massachusetts Institute of Technology)*. Assistant Professor. Nanoscale structure-property relationships of biological materials, genetic and molecular origins soft joint tissue diseases, biomaterials under extreme conditions, coupling between stimulus-responsiveness and geometry.

Emin Caglan Kumbur, PhD *(Pennsylvania State University)*. Assistant Professor. Next generation energy technologies; fuel cell design and development.

Kenneth K.S. Lau, PhD *(Massachusetts Institute of Technology)*. Associate Professor. Surface science; nanotechnology; polymer thin films and coatings; chemical vapor deposition.

Bahram Nabet, PhD *(University of Washington)* Associate Dean for Special Projects, College of Engineering; Electrical and Computer Engineering. Professor. Optoelectronics; fabrication and modeling; fiber optic devices; nanoelectronics; nanowires.

Giuseppe R. Palmese, PhD *(University of Delaware)* Department Head, Chemical and Biological Engineering. Professor. Reacting polymer systems; nanostructured polymers; radiation processing of materials; composites and interfaces.

Wan Young Shih, PhD *(Ohio State University)* School of Biomedical Engineering, Science and Health Systems. Associate Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Karl Sohler, PhD *(University of Delaware)*. Associate Professor. Computational and theoretical materials-related chemistry: (1) complex catalytic materials; (2) mechanical and electrical molecular devices.

Margaret Wheatley, PhD *(University of Toronto)* School of Biomedical Engineering, Science and Health Systems. John M. Reid Professor. Ultrasound contrast agent development (tumor targeting and triggered drug delivery), controlled release technology (bioactive compounds), microencapsulated allografts (ex vivo gene therapy) for spinal cord repair.

**Emeritus Faculty**

Roger D. Cornelussen, PhD *(University of Chicago)*. Professor Emeritus. Fracture, blends and alloys, as well as compounding.

Roger D. Doherty, PhD *(Oxford University)*. Professor Emeritus. Metallurgical processing; thermo-mechanical treatment.

Ihab L. Kamel, PhD *(University of Maryland)*. Professor Emeritus. Nanotechnology, polymers, composites, biomedical applications, and materials-induced changes through plasma and high energy radiation.

Jack Keverian, PhD *(Massachusetts Institute of Technology)*. Professor Emeritus. Rapid parts manufacturing, computer integrated manufacturing systems, strip production systems, technical and/or economic modeling, melting and casting systems, recycling systems.

Alan Lawley, PhD *(University of Birmingham, England)*. Professor Emeritus. Mechanical and physical metallurgy, powder metallurgy, materials engineering design, engineering education.

**Mechanical Engineering and Mechanics**

Major: Mechanical Engineering and Mechanics

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0 (MS) or 90.0 (PhD)

Classification of Instructional (CIP) code: 14.1902

Standard Occupational Classification (SOC) code: 17-2141

**About the Program**

The Mechanical Engineering and Mechanics (MEM) Department *(http://drexel.edu/mem)* offers MS and PhD degrees. The courses often associate with one or more areas of specialization: design and manufacturing, mechanics, systems and control, and thermal and fluid sciences. The mechanical engineering field is rapidly changing due to ongoing advances in modern science and technology. Effective mechanical engineers must possess expertise in mechanical engineering core subjects, interdisciplinary skills, teamwork skills, as well as entrepreneurial and managerial abilities. The degree programs are designed so students can learn the state-of-the-art knowledge now, and have the foundation to acquire new knowledge as they develop in future.

The MS degree program is offered on both a full-time and a part-time basis. The General (Aptitude) Test of the Graduate Record Examination (GRE) is required for applicants pursuing full-time study. Graduate courses are often scheduled in the late afternoon and evening, so full-time students and part-time students can take the same courses. The department has recently adopted the Graduate Co-op program at the master's level as an option.

The PhD degree program is offered for full-time students only and is a research intensive program. The research areas include, but are not limited to, bio-engineering, energy systems, high performance materials, nanotechnology, plasma science and engineering, and robotics.
Admission Requirements

Applicants must meet the graduate requirements for admission to Drexel University. Students holding a bachelor’s degree in a science or engineering discipline other than mechanical engineering are advised to take several undergraduate courses as preparation for graduate studies. Though these courses are not counted toward the required credits for the degree, they also must be listed in the student’s plan of study. Outstanding students with a GPA of at least 3.5 in their master’s program will be considered for admission to the program leading to the doctor of philosophy degree in mechanical engineering.

Master of Science in Mechanical Engineering and Mechanics

Requirements

The MS program has a two-fold mission: to prepare some students for continuation of their graduate studies and research toward a PhD degree, and to prepare other students for a career in industry upon graduation with the MS degree. The MS program has a non-thesis option and a thesis option. Students who plan to continue to the PhD degree are advised to select the thesis option.

The MS program is structured so that students have the opportunity to specialize in areas of interest while also obtain the broadest engineering education possible. Of the required 45.0 credits (15 courses) MS students are required to complete two core-course sequences (two terms each) from two different core areas. Students can take eight technical elective courses of which up to four courses can be from outside the Mechanical Engineering and Mechanics Department if they are approved in the students’ plan of study. MS students have opportunity to apply to the optional graduate Co-op program. Students in the MS program should consult with the department graduate adviser at the beginning of their program and must file a plan of study prior to the third quarter of study. Further details can be obtained from the department’s Graduate Programs Manual.

Typical MS Program

Two Core-Course Sequences (required)  12.0
Three Mathematics Courses (required) *  9.0
Eight Technical Electives (including 9 credits for thesis option)  24.0
Total Credits  45.0

* Mathematics courses: MEM 591, MEM 592, MEM 593.

Core Areas

All students take core courses in the department’s areas of specialization as part of a comprehensive and flexible program. Further details can be obtained from the department’s Graduate Programs Manual (http://www.drexel.edu/mem/academics/graduate/grad-manual).

The core courses in each area are listed below:

Mechanics Area

Theory of Elasticity
MEM 660  Theory of Elasticity I  3.0
MEM 661  Theory of Elasticity II  3.0

Solid Mechanics
MEM 663  Continuum Mechanics  3.0
MEM 664  Introduction to Plasticity  3.0

Advanced Dynamics
MEM 666  Advanced Dynamics I  3.0
MEM 667  Advanced Dynamics II  3.0

Systems and Control Area

Robust Control Systems
MEM 633  Robust Control Systems I  3.0
MEM 634  Robust Control Systems II  3.0

Non-Linear Control Theory
MEM 636  Theory of Nonlinear Control I  3.0
MEM 637  Theory of Nonlinear Control II  3.0

Real-Time Microcomputer Control
MEM 639  Real Time Microcomputer Control I  3.0
MEM 640  Real Time Microcomputer Control II  3.0

Thermal and Fluid Sciences Area

Advanced Thermodynamics
MEM 601  Statistical Thermodynamics I  3.0
MEM 602  Statistical Thermodynamics II  3.0

Heat transfer
MEM 611  Conduction Heat Transfer  3.0
MEM 612  Convection Heat Transfer  3.0
or MEM 613  Radiation Heat Transfer

Fluid Mechanics
MEM 621  Foundations of Fluid Mechanics  3.0
MEM 622  Boundary Layers-Laminar & Turbulent  3.0

* Consult the Thermal and Fluid Sciences area advisor for other options.

PhD in Mechanical Engineering

Outstanding students with a GPA of at least 3.5 in their master’s program will be considered for admission to the program leading to the Doctor of Philosophy degree in mechanical engineering.

PhD Course Requirements

At least 90.0 credits are required for the PhD degree. The master’s degree is not a prerequisite for the PhD, but does count as 45.0 credits toward the 90.0 credit requirement.

For students entering the PhD program with a prior MS degree:

• 45.0 credits of graduate courses out of which 18.0 credits are graduate courses exclusive of independent study and dissertation. If the MS degree was not from Drexel's Mechanical Engineering and Mechanics (MEM) Department, 12.0 of these 18.0 credits must be MEM graduate courses (600-level or above). The remaining 27.0 credits consist of a combination of dissertation, independent study, and additional advanced coursework consistent with the approved plan of study.

For students entering the PhD program with a BS degree but without a prior master’s degree:

• 90.0 credits of graduate courses. 45.0 of these 90.0 credits must satisfy the MS in Mechanical Engineering degree requirements. The remaining 45.0 credits must satisfy the requirements above.

PhD Candidacy Examination

A graduate student in the PhD program needs be nominated by his/her supervising adviser to take the candidacy examination. A student who...
enters the PhD program with a prior MS degree must take the Candidacy Examination within the first year after entry to the PhD program. A student who enters the PhD program without a prior MS degree must take the Candidacy Examination within 2 years after entry to the PhD program.

The Candidacy Examination consists of two components: A course-component examination and a research-component examination. The student must demonstrate excellence in both components. The research-component examination consists of a written report and an oral presentation. The Candidacy Committee selects three or more research papers in the student’s declared research area for student to conduct a critical review. In three weeks the student submits a written report. One week after the written report is submitted the student makes an oral presentation. The presentation is followed by questions by the Committee. The goals of the questions: To evaluate the student’s knowledge in the scientific fields related to the research area, including related background and fundamental material, and the student’s ability to integrate information germane to success in research. Additional details are given in the Mechanical Engineering and Mechanics Graduate Program Manual.

**Thesis Proposal**

At least one year prior to graduation, the PhD candidate must give a thesis proposal to the dissertation advisory committee. The student must submit a written proposal and make a presentation. The written proposal normally includes: abstract, introduction, detailed literature review, preliminary results, proposed research tasks and timetable. The committee will approve/reject the thesis topic, the scope of work and the general method of attack.

**Thesis Defense**

A final examination consisting of a presentation and defense of the research dissertation is required, before the PhD degree is granted. Further details can be obtained from the department's Graduate Programs Manual.

**Facilities**

A. J. Drexel Plasma Institute ([http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=11](http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=11))
The A. J. Drexel Plasma Institute (DPI) was formed in 2002 to stimulate and coordinate research projects related to plasma and other modern high energy engineering techniques. Today the DPI is an active multidisciplinary organization involving 23 faculty members from 6 engineering departments working in close collaboration with School of Biomedical Engineering, College of Arts and Sciences and College of Nursing and Health Professions.

Advanced Design and Manufacturing Laboratory ([http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=6](http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=6))
This laboratory provides research opportunities in design methodology, computer-aided design, analysis and manufacturing, and materials processing and manufacturing. Facilities include various computers and software, I-DEAS, Pro/E, ANSYS, MasterCAM, Mechanical Desktop, SurfCAM, Euclid, Strim, ABQUS, and more. The machines include two Sanders Model Maker rapid prototyping machines, a BridgePort CNC Machining Center, a BOY 220 injection molding machine, an Electra high-temperature furnace for metal sintering, infiltration, and other heat treatment.

Biofluid Mechanics Laboratory ([http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=5](http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=5))
The biofluid mechanics laboratory conducts computational and experimental research on the dynamics of flow in the cardiovascular and respiratory system, and the effects of flow on biological processes, particularly hemostasis and thrombosis. Lab resources include high-performance engineering workstations, commercial computational fluid dynamics (CFD) software, and basic experimental facilities including Laser Doppler Velocimetry (LDV), pressure and flow transducers, pumps, and microscopes.

Biological Systems Analysis Laboratory ([http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=5](http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=5))
The research in the Laboratory for Biological Systems Analysis involves the integration of biology with systems level engineering analysis and design, with an emphasis on: (1) the development of robotic systems that borrow from nature's designs and use novel technologies to achieve superior performance and function; and (2) the use of system identification techniques to evaluate the functional performance of animal physiological systems under natural, behavioral conditions. Facilities include rapid prototyping machines, compliant material manufacturing, mold making facilities, and a traditional machine shop and electronics workshop.

Biomechanics Laboratory ([http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=2](http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=2))
Emphasis in this laboratory is placed on understanding the mechanical properties of human joints, characterization of the mechanical properties of biological materials, studies of human movements, and design and development of artificial limbs. Facilities include a 3-D kinematic measuring system, Instron testing machine, and microcomputers for data acquisition and processing. Additional biomechanical laboratory facilities are available at Moss Rehab Hospital.

Combustion, Fuel Chemistry, and Emissions Laboratory ([http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1](http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1))
Emphasis in this laboratory is placed on developing an understanding of both the chemical and physical factors that control and, hence, can be used to tailor combustion processes for engineering applications. Facilities include two single cylinder research engines, a pressurized flow reactor (PFR) facility, flat flame and slot burner systems, and complete analytical and monitoring instrumentation. The engine systems are used to study the effects of operating variables, fuel type, ambient conditions, and control devices on engine performance and emissions. The PFR facility is used for detailed kinetic studies of hydrocarbon pyrolysis and oxidation processes.

Combustion Diagnostics Laboratory ([http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1](http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1))
High speed cameras, spectrometers, and laser systems are used to conduct research in (1) low temperature hydrocarbon oxidation, (2) cool flames, and (3) plasma-assisted ignition and combustion. Research in optical diagnostic development is conducted in this lab with a specific focus on tools to measure small peroxy radicals.

Complex Fluids and Multiphase Transport Laboratory ([http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1](http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1))
The research focus of this lab lies at the interface of thermal-fluid sciences, nano materials, and colloid and surface sciences. We apply these fundamental sciences to advance energy conversion and storage systems, to provide effective thermal management solutions, and to enable scalable additive nanomanufacturing. Facilities include materials printing systems, fluorescence microscope and imaging systems, complex fluid characterization, microfluidics and heat transfer testers, coating and solar cell testing devices, electrochemical characterization, and high performance computing facilities.
Composite Mechanics Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)

Emphasis in this laboratory is placed on the characterization of performance of composite materials. Current interest includes damage mechanisms, failure processes, and time-dependent behavior in resin-, metal-, and ceramic-matrix composites. Major equipment includes servo-hydraulic and electromechanical Instron testing machines, strain/displacement monitoring systems, environmental chambers, microcomputers for data acquisition and processing, composites fabrication facility, interferometric displacement gauge, X-radiography, and acoustic emission systems.

Dynamic Multifunctional Materials Laboratory (DMML) (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)
The focus of DMML is mechanics of materials; namely fracture and failure mechanisms under extreme conditions and their correlation to meso- and microstructural characteristics. Utilizing highly integrated experimental facilities such as a Kolsky (split-Hopkinson pressure bar), single-stage, and two stage light-gas gun, complex material behavior is deconstructed into dominant time and length scales associated with the energetics of damage evolution. In-situ laser and optical diagnostics such as caustics, interferometry techniques, schlieren visualization and virtual grid method, are used to investigate coupled field properties of multifunctional materials with the goal of not only analyzing and understanding behavior, but ultimately tailoring material properties for specific applications.

Electrochemical Energy Systems Laboratory (ECSL) (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)
The ECSL specializes in the design, diagnostics and characterization of next generation electrochemical energy conversion and storage systems. Current areas of research include flow-assisted supercapacitors, next generation flow battery technology and fuel cells for transportation, stationary and portable applications. ECSL utilizes a comprehensive approach, including: advanced diagnostics, system design, materials characterization, and computational modeling of electrochemical energy systems. The core mission of ECSL is to develop novel diagnostic and computational tools to understand critical issues in flow-assisted electrochemical systems and enable better system design. Due to the complex nature of these systems, our research is highly interdisciplinary and spans the interface of transport phenomena, materials characterization, electrochemistry and system engineering.

Microcomputer Controls Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=7)
This laboratory provides an environment conducive to appreciating aspects of systems and control through hands-on experiments. They range from data acquisition and processing to modeling of dynamical systems and implementing a variety of controllers to control systems, such as DC motors and the inverted pendulum. Facilities also include microcontrollers such as Basic Stamp and the Motorola 68HC11. Active research is being conducted on control reconfiguration in the event of actuator failures in aircrafts.

Non-Newtonian Fluid and Heat Transfer Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=7)
Emphasis in this laboratory is placed on the study of hydrodynamic and thermal performance of various non-Newtonian viscoelastic fluids in complex flow geometries. Facilities and equipment include a 20-foot-long recirculating flow loop with a 500-gallon reservoir tank and a thermal conductivity measurement cell. A complete data acquisition system provides fully automated experimental operation and data reduction. A state-of-the-art finite element code FIDAP running on a CDC 180 computer provides three-dimensional flow and heat transfer simulations of flows in complex geometries, with a complete post-processing graphic capability backed by template.

Precision Instrumentation and Metrology Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=7)
This laboratory is focused on activities related to precision measurement, computer-aided inspection, and precision instrument design. Facilities include 3D Coordinate Measuring Machine (Brown & Sharpe) with Micro Measurement and Reverse engineering software, Surface Profilometer, and Laser Displacement Measuring System.

Rheology Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=7)
Emphasis in this laboratory is placed on developing tools for rheological property measurement of various non-Newtonian fluids, including friction-reducing viscoelastic fluids, molten polymers, coal-water slurries, ceramic slurries, and bonding cements for biomedical applications. A capillary tube viscometer, falling ball and needle viscosimeters, and Brookfield rotating viscometer are available. In particular, the capillary tube viscometer is designed to allow fully automated operation, thus avoiding time-consuming data collection procedures. A high-temperature and high-pressure capillary tube viscometer is under development, so that viscosities of advanced polymer materials can be measured at relatively high temperatures and shear rates.

Space Systems Laboratory (SSL) (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)
The objective of SSL is "... to inspire future generations to advance aerospace engineering." It provides research opportunities in orbital mechanics, rendezvous and docking maneuvers, mission planning, and space environment. The lab provides facilities for activities in High Altitude Balloons, construction of air-vehicles and nano-satellites, 0-g flights, and STK simulation package for satellite flights and trajectories.

Theoretical and Applied Mechanics Group (TAMG) (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)
Research in the TAMG focuses on using experimental, analytical and computational tools to understand deformation and failure of materials, components and structures in a broad range of time and length scales. To accomplish this goal, TAMG develops procedures that include mechanical behavior characterization coupled with non-destructive testing and modern computational tools. This information is used both for understanding the role of important material scales in the observed bulk behavior and for the formulation of constitutive laws that can model the response including damage initiation and progression according to prescribed loading conditions. Equipment and facilities used by TAMG include a range of mechanical testing equipment for testing in tension, compression, fatigue and fracture as well as a) two multichannel Acoustic Emission systems, b) a 5 Megapixel Digital Image Correlation system, c) a FLIR infrared thermography camera, and d) a 64-core High Performance Computational Cluster. TAMG has further developed procedures to use several pieces of equipment and facilities at Drexel University including the Machine Shop, Centralized Research Facilities and the University Research Computing Faci

Thermal Systems Laboratory (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)
The thermal systems laboratory is outfitted with an array of instrumentation and equipment for conducting single- and multiphase heat transfer experiments in controlled environments. Facilities include computer-controlled data acquisition (LabVIEW) systems, a Newport holographic interferometric system with associated lasers and optics, image enlargers, power amplifiers, precision voltmeters, slip-ring
assemblies, and workstation for large-scale computing and simulation. A draft-free room is available with independent temperature control for carrying out natural convection experiments. An experimental test-rig is available for studying heat transfer from rotating surfaces. A bubble column has been recently built to study multiphase flow and heat transfer problems. Facilities are also available for measuring thermal conductivities of thin films using a thermal comparator.

Vascular Kinetics Laboratory (VKL) (http://www.mem.drexel.edu/current/labs/?m=research&a=lab_desc&labID=1)
The VKL uses engineering methods to understand how biomechanics and biochemistry interact in cardiovascular disease. In particular, we study fluid flow and blood vessel stiffness impact cellular response to glucose, growth factors, and inflammation to lead to atherosclerosis and metabolic syndrome. We then apply these discoveries to novel biomaterials and therapies, with a particular focus on treating cardiovascular disease in under-served populations. This research is at the interface of engineering and medicine, with close collaborations with biologists and physicians and a strong emphasis on clinical applications.

Mechanical Engineering and Mechanics Faculty

Jonathan Awerbuch, DSc (Technion, Israel Institute of Technology). Professor. Mechanics of composites; fracture and fatigue; impact and wave propagation; structural dynamics.

Philipp Boettcher, PhD (California Institute of Technology). Assistant Teaching Professor. Thermal and hot surface ignition of hydrocarbons; high speed flow diagnostics; absorption and emission spectroscopy.

Nicholas P. Cernansky, PhD (University of California-Berkeley) Hess Chair Professor of Combustion. Professor. Combustion chemistry and kinetics; combustion generated pollution; utilization of alternative and synthetic fuels.

Bor-Chin Chang, PhD (Rice University). Professor. Computer-aided design of multivariable control systems; robust and optimal control systems.

Young I. Cho, PhD (University of Illinois-Chicago). Professor. Heat transfer; fluid mechanics; non-Newtonian flows; biofluid mechanics; rheology.

Alisa Clyne, PhD (Harvard-Massachusetts Institute of Technology). Associate Professor. Cardiovascular biomechanics.

Bakhtier Farouk, PhD (University of Delaware) Billings Professor of Mechanical Engineering. Professor. Heat transfer; combustion; numerical methods; turbulence modeling; materials processing.

Alexander Fridman, DSc, PhD (Moscow Institute of Physics and Technology) Mechanical Engineering and Mechanics. John A. Nyheim Endowed University Chair Professor, Director of the Drexel Plasma Institute. Professor. Plasma science and technology; pollutant mitigation; super-adiabatic combustion; nanotechnology and manufacturing.

Ani Hsieh, PhD (University of Pennsylvania). Assistant Professor. Multi-robot systems, decentralized and distributed control, bio-inspired control, swarm robotics.

Andrei Jablakow, PhD (University of Wisconsin; Madison). Associate Teaching Professor. Computational kinematics; geometric modeling.

Suhada Jayasuriya, PhD (Wayne State University) Department Head, Mechanical Engineering and Mechanics. Distinguished Professor. Multi-agent systems; machine diagnostics in turbomachinery; human-machine interaction; structural health monitoring; alternative energy systems; gait studies in biomechanics.

Antonios Kontsos, PhD (Rice University). Assistant Professor. Applied mechanics; probabilistic engineering mechanics; modeling of smart multifunctional materials.

Emin Caglan Kumbur, PhD (Pennsylvania State University). Assistant Professor. Next generation energy technologies; fuel cell design and development.

Harry G. Kwatny, PhD (University of Pennsylvania) S. Herbert Raynes Professor of Mechanical Engineering. Professor. Dynamic systems analysis; stochastic optimal control; control of electric power plants and systems.

John Lacontora, PhD (New Jersey Institute of Technology). Associate Research Professor. Service engineering; industrial engineering.

Leslie Lamberson, PhD (California Institute of Technology). Assistant Professor. Dynamic behavior of materials, dynamic fracture, damage micromechanics, active materials.

Alan Lau, PhD (Massachusetts Institute of Technology) Associate Department Head for Graduate Affairs, Department of Mechanical Engineering and Mechanics. Professor. Deformation and fracture of nano-devices and macroscopic structures; damage-tolerant structures and microstructures.


David L. Miller, PhD (Louisiana State University). Professor. Gas-phase reaction kinetics; thermodynamics; biofuels.

Alexander Moseenov, PhD (Drexel University). Assistant Teaching Professor. Sustainability; engineering design; humanitarian (appropriate) technology; international development; service learning.

Hongseok Noh, PhD (Georgia Institute of Technology). Associate Professor. MEMS; BioMEMS; lab-on-a-chip; microfabrication; microfluidics.

Paul Y. Oh, PhD (Columbia University) Associate Department Head for External Affairs, Department of Mechanical Engineering and Mechanics. Professor. Smart sensors servomechanisms; machine vision and embedded microcomputers for robotics and mechatronics.

Sorin Siegler, PhD (Drexel University). Professor. Orthopedic biomechanics; robotics; dynamics and control of human motion; applied mechanics.

Wei Sun, PhD (Drexel University) Albert Sofa Chair Professor of Mechanical Engineering. Professor. Computer-aided tissue engineering; solid freeform fabrication; CAD/CAM; design and modeling of nanodevices.

Ying Sun, PhD (University of Iowa). Associate Professor. Transport processes in multi-component systems with fluid flow; heat and mass transfer; phase change; pattern formation.
Tein-Min Tan, PhD (Purdue University) Associate Department Head for Undergraduate Affairs, Department of Mechanical Engineering and Mechanics. Associate Professor. Mechanics of composites; computational mechanics and finite-elements methods; structural dynamics.

James Tangorra, PhD (Massachusetts Institute of Technology) Associate Department Head for Finance and Administration, Department of Mechanical Engineering and Mechanics. Associate Professor. Analysis of human and (other) animal physiological systems; head-neck dynamics and control; balance, vision, and the vestibular system; animal swimming and flight; robotics; system identification; bio-inspired design.

Christopher Weinberger, PhD (Stanford University). Assistant Professor. Multiscale materials modeling of mechanical properties including DFT, atomistics, mesoscale and microscale FEM modeling.

Ajmal Yousuff, PhD (Purdue University). Associate Professor. Optimal control; flexible structures; model and control simplifications.

Jack G. Zhou, PhD (New Jersey Institute of Technology). Professor. CAD/CAM; computer integrated manufacturing systems; rapid prototyping; system dynamics and automatic control.

**Emeritus Faculty**

Leon Y. Bahar, PhD (Lehigh University). Professor Emeritus. Analytical methods in engineering, coupled thermoelasticity, interaction between analytical dynamics and control systems.


Donald H. Thomas, PhD (Case Institute of Technology). Professor Emeritus. Biocontrol theory, biomechanics, fluidics and fluid control, vehicle dynamics, engineering design.

Albert S. Wang, PhD (University of Delaware) Albert and Harriet Soffa Professor. Professor Emeritus. Treatment of damage evolution processes in multi-phased high-temperature materials, including ceramics and ceramic-matrix composites.
The College of Medicine

Overview

Renowned for its innovative, student-centered educational programs, Drexel University College of Medicine (http://www.drexelmed.edu) (DUCOM) is the consolidation of two venerable medical schools with rich and intertwined histories: Hahnemann Medical College and Woman’s Medical College of Pennsylvania. Established in 1848 and 1850, respectively, they were two of the earliest medical colleges in the United States, and Woman’s was the very first medical school for women in the nation.

Today, there are over 1,000 medical students. There are some 625 residents, 700 clinical and basic science faculty, and more than 2,000 affiliate and other non-compensated faculty.

Within the College of Medicine, The School of Biomedical Sciences and Professional Studies (p. 54) offers an additional 24 majors and 8 professional certificates.

Major

- Medicine (MD) (p. 341)

About the College of Medicine

Mission Statement

Drexel University College of Medicine excels and innovates in education, research, and delivery of compassionate care in our culture of diversity, spirited inquiry, collaboration, and opportunity.

About the College

The College of Medicine’s main campus, Queen Lane, is in a suburban-like setting in the East Falls section of Philadelphia. Additional facilities are located at the Center City campus, next to Hahnemann University Hospital. Our Pediatrics Department is at St. Christopher’s Hospital for Children, and the Psychiatry Department is based at Friends Hospital. Students can receive clinical education at more than 20 affiliated hospitals and ambulatory sites chosen for their commitment to teaching as well as medical excellence. The College of Medicine is renowned for its innovative educational programs, enhanced by the use of technology that permeates all components of the curriculum.

The College’s medical practice, Drexel Medicine®, is a patient-focused practice emphasizing quality, innovation and community service, and enhanced by physician involvement in the research and educational programs.

Collaborative projects leveraging Drexel University’s technological expertise continue to push the frontiers of nanomedicine and neuroengineering. The College of Medicine is a major regional center for spinal cord research, and has developed one of the leading centers for malaria study in the nation. Additionally, the College is home to a memory disorders center dedicated to ground-breaking research in Alzheimer’s and related dementias.

Drexel University College of Medicine houses one of eight National Institute on Drug Abuse (NIDA) Centers of Excellence for Physician Information, one of 21 National Centers of Excellence in Women’s Health designated by the Department of Health & Human Services, the Executive Leadership in Academic Medicine (ELAM) program, and the Archives and Special Collections on Women in Medicine. It has developed the largest HIV/AIDS primary care practice in the Mid-Atlantic region, with extensive NIH-funded research in prevention and therapeutic intervention. Faculty clinicians are highly respected in numerous other specialties, including cardiology and pain management.

The Doctor of Medicine (MD) Program

About the Program

With its dedication to academic and clinical excellence, Drexel University College of Medicine has earned national recognition as an institution that provides innovation in medical education. Medical students are trained to consider each patient’s case and needs in a comprehensive integrated manner, taking into account many more factors than the presenting physiological condition. The medical college is dedicated to preparing “Physician Healers” – doctors who practice the art, science and skill of medicine.

Recognizing that students have different learning styles, students choose between two innovative academic curricula for their first two years of study. Both options focus on professional medical education, preparing students to pursue a career as either a generalist or specialist. Both stress problem solving, lifelong learning skills and the coordinated teaching of basic science with clinical medicine.

Both curricular tracks give early exposure to clinical skills training by using standardized patients to help students learn the art and skill of taking histories, counseling and educating patients, and performing physical exams.

The IFM Curriculum

The Interdisciplinary Foundations of Medicine (http://www.drexelmed.edu/Home/AcademicPrograms/MDProgram/DrexelsInnovativeCurriculum/YearsOneandTwo/InterdisciplinaryFoundationsofMedicine.aspx) (IFM) curriculum integrates basic science courses and presents them through clinical symptom-based modules. Each first-year module focuses on clinical symptoms and features relevant material from the perspective of several basic and behavioral science disciplines. By the end of the first year, the basic and behavioral science courses have presented their entire core content, integrating it with related material in other disciplines. In the second year, students study basic and clinical sciences using an organ system approach. Students learn in lectures, labs, and small group settings.

The PIL Curriculum

Students who choose the Program for Integrated Learning (http://www.drexelmed.edu/Home/AcademicPrograms/MDProgram/DrexelsInnovativeCurriculum/YearsOneandTwo/ProgramforIntegratedLearning.aspx) (PIL), a problem-based curriculum, learn primarily in small groups which are supervised and facilitated by faculty. There are seven 10-week blocks over the first two years. Each block contains 10 case studies, detailing real patient issues relating to the topics of the block. The cases serve as the stimulus and context for students to search out the information they need to understand, diagnose, and treat clinical problems. Developing the information they need to learn is crucial to the PIL approach. Sharing information, concept mapping, evaluating and giving and receiving feedback are essential facets of the curriculum. Laboratories and lectures complement the case studies.
Years 3 and 4
The third year curriculum (http://www.drexelmed.edu/Home/AcademicPrograms/MDProgram/DrexelsInnovativeCurriculum/YearThree.aspx) is devoted to required clinical clerkship rotations in medicine, family medicine, obstetrics and gynecology, pediatrics, psychiatry, and surgery. The clerkships all embody the following principles:

- Common curricular objectives at all sites
- Students spend 30% of their clinical time in expanded ambulatory care experiences
- Each clerkship incorporates the concept of interdisciplinary teaching, with representatives of other departments or service areas
- Each clerkship integrates the teaching of basic sciences into clinical material

All third year clerkships take place in Drexel’s affiliated hospitals (http://www.drexelmed.edu/Home/AboutTheCollege/AffiliatedHospitals.aspx). Students’ assignments for the third year are based on the results of a lottery system.

The fourth-year curriculum (http://www.drexelmed.edu/Home/AcademicPrograms/MDProgram/DrexelsInnovativeCurriculum/YearFour.aspx) is structured in the form of “pathways” – courses that give students a well-rounded educational experience with some focus on potential careers. Students can choose a discipline-specific or generalist pathway. All students have a pathway advisor. The pathway system is structured so that students take both required courses and electives. The required courses include a sub internship in internal medicine, a clerkship in neurology and an additional course specific to the pathway chosen. Students also choose six elective courses, in close consultation with their pathway advisor.

Fourth-year students complete their required courses at Drexel’s affiliated hospitals. However, pathway advisors usually advise their students to select electives outside the Drexel system. Additionally, opportunities exist for fourth-year electives at international sites.

For more information, visit the College of Medicine’s MD Program (http://www.drexelmed.edu/TheMDProgram/tabid/87/Default.aspx) web site.

Dual Degree Programs
MD/PhD Program
The MD/PhD program is designed for a limited number of individuals who are strongly motivated toward a career in academic medicine and medically oriented research. The program trains individuals in the fundamental clinical aspects of medicine and offers advanced training in biochemistry, microbiology and immunology, molecular and cellular biology, neuroscience and pharmacology, as well as medical engineering. Physicians with extensive research training are uniquely positioned to advance medical care and to teach at the cutting edge of medical discovery. Tuition scholarships and stipends for medical school and graduate school are provided for a limited number of students.

MD/MPH
With Drexel’s School of Public Health, the College of Medicine offers a joint five-year program for highly qualified students to pursue both the MD and the Master of Public Health degrees. Students are taught to be physicians with a public-health orientation to the development, planning, delivery, and evaluation of health care programs and policies.
The School of Biomedical Engineering, Science, and Health Systems

Mission Statement

The mission of the School of Biomedical Engineering, Science and Health Systems is to promote health and quality of life through education, research and innovation that integrates engineering and life sciences in a global context.

The School of Biomedical Engineering, Science, and Health Systems (http://www.biomed.drexel.edu/new04/default.cfm) is a nationally recognized center for research in biomedical engineering and science. The School offers multidisciplinary instruction on a full- and part-time basis at the graduate level and full-time instruction at the undergraduate level. The faculty includes individuals with engineering, physics, mathematics, biostatistics, life science, medical, and clinical specialties. Multidisciplinary and translational research is carried out through collaboration among Drexel University faculty members and with medical schools and hospitals in the Philadelphia area.

The School offers MS and PhD programs in biomedical engineering and biomedical science. Areas of specialization available include biomaterials and tissue engineering, neuroengineering, biosensors and devices, biomedical imaging, biostatistics, genome science and bioinformatics, systems biology, biomechanics, human factors and performance engineering.

Majors

• Biomedical Engineering (MS, PhD) (p. 345)
• Biomedical Science (MS, PhD) (p. 348)

Certificates

• Bioinformatics (p. 344)
• Biomedical Technology Development (p. 345)
• Medical Product Design and Device Development (p. 351)
• Tissue Engineering (p. 345)

About the School

The School of Biomedical Engineering, Science, and Health Systems (http://www.biomed.drexel.edu) (formerly the Biomedical Engineering and Science Institute, founded in 1961) is a leader in biomedical engineering and biomedical science research and education. The undergraduate program was inaugurated in September 1998 and has steadily grown to attract the highest ability students at the University.

The School’s areas of academic thrust, both in research and education, are at the forefront of biosensing, bioimaging, bioinformation engineering and integrated bioinformatics, drug delivery, biomedical ultrasound & optics, bionanotechnology, cellular tissue engineering, neuroengineering and human performance. Emerging initiatives include skin bioengineering, pediatric engineering and homeland security technologies. Various departments at Drexel University offer courses that are suited for students in biomedical engineering and biomedical science. The School of Biomedical Engineering, Science and Health Systems’ curriculum complements the strengths of the Colleges of Arts & Sciences, Business, Engineering, Computing and Informatics, Law and Medicine.

The marriage of technology with biology and medicine drives the 21st Century industrial enterprise. Consistent with this mission, the School strives for clinical and industrial relevance in academic pursuits, and enjoys a strong entrepreneurship program in biomedical technologies. The School's alliance with regional economic development agencies and corporations together with advisors from business development, legal, and investment communities sustains the growth of this program. The students and faculty of the School are committed to move their discoveries from our laboratories to clinical practice or home use. The success of Drexel's Translational Research in Biomedical Technologies program has been recognized and funded regionally as well as nationally.

The School has experienced remarkable growth in recent years thanks to outstanding research portfolio, high quality and innovative undergraduate program, and a multidisciplinary approach to education and research. Another competitive advantage is the unique free-standing university-level administrative structure with its own tenure-track faculty lines, budget and space. This helps transcend the traditional organizational boundaries of engineering, sciences and medicine. The School of Biomedical Engineering, Science and Health Systems’ independence allows for the pursuit of growth and collaborations in various disciplines. Its small size provides agility to reconfigure and reorganize in response to emerging opportunities. The University Strategic Plan recognizes the School of Biomedical Engineering, Science and Health Systems as “Drexel’s prototype of academic integration. ”

Metropolitan Philadelphia has one of the nation’s highest concentrations of medical institutions and pharmaceutical, biotechnology, medical device and systems industry. The School has forged strategic partnerships with select universities, research institutes, health care institutions and industries in the region. The School enjoys a close working relationship with Drexel's College of Medicine as well as alliances with prominent medical institutions in the region to develop joint research and educational programs. These include University of Pennsylvania, Thomas Jefferson University, the Fox Chase Cancer Center and the Wistar Institute. These collaborative initiatives provide students with ample opportunities in basic and clinical research as well as innovative academic programs.

The School maintains extensive facilities and laboratories devoted to areas of research. Visit the School's BIOMED Research Facilities and Laboratory Map (http://www.biomed.drexel.edu/new04/Content/research/facilities) web page for more details about the laboratories and equipment available.

Applicants to the graduate program must meet the requirements for admission to graduate studies at Drexel University. Candidates for degrees in the School of Biomedical Engineering, Science and Health Systems are required to maintain academics standards applicable to all graduate students at Drexel University.

Program Objectives

The overall objective of the graduate programs offered by the School of Biomedical Engineering, Science, and Health Systems is to provide multidisciplinary curricula with an instructional core and research opportunities for students. Graduate biomedical engineering students are typically individuals with undergraduate degrees in engineering, physical sciences, or mathematics. The core curriculum provides the necessary training in life and medical sciences, modeling and simulation, and biomedical engineering applications to allow students to apply their
engineering skills and perspective to solve current problems in biology and medicine. Areas in which students may focus their advanced studies and research attention include biomechanics and biomaterials, cellular and tissue engineering, biomedical sensing and imaging, human factors and performance engineering, neuroengineering, and bioinformatics. Students without an academic background in engineering or physical science who wish to enter the biomedical engineering program may enroll in the Crossover Program.

The core courses in the Biomedical Science program are designed to educate life-science students in quantitative analysis, mathematical modeling, systems analysis, and fundamental computational and informatics skills. Students are then encouraged to combine their knowledge of the life sciences with their newly acquired analytical skills to focus in such areas as tissue engineering and/or bioinformatics.

A recent agreement with the Interdepartmental Medical Science Program (http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/Programs/PreMedicalPrograms/InterdepartmentalMedicalScienceIMSProgram.aspx) at the Drexel College of Medicine allows students to spend one year taking courses at the College of Medicine and their second year at the School of Biomedical Engineering, Science and Health Systems—leading to a Master's degree in Biomedical Science.

A non-thesis MS degree is available to non-traditional students seeking advanced studies in biomedical engineering and biomedical science to enhance their careers.

Admission Requirements

Acceptance for graduate study at Drexel's School of Biomedical Engineering, Science and Health Systems requires a four-year bachelor's degree from an accredited institution in the United States or equivalent international institution. Regular acceptance requires a minimal cumulative grade point average of 3.0 (B) on a 4.0 scale for the last two years of undergraduate work, and for any graduate level work undertaken.

Drexel's School of Biomedical Engineering, Science and Health Systems normally requires a TOEFL score of at least 260. Verbal, analytical, and quantitative scores on the GRE General Test are recommended for admission and are required for financial assistantship consideration.

The School practices a rolling admissions policy—students are able to apply at any term during the year, but students are encouraged to matriculate in the fall to ensure proper sequence of coursework.

In addition to the School's requirements, students must satisfy the requirements of the Office of Research and Graduate Studies in matters such as academic standing, thesis, examinations, and time limits.

Students without an academic background in engineering or physical science should review information about the Crossover Program. (http://www.biomed.drexel.edu/content_frame_v2.cfm?DISPLAYED_CONTENT=academics&DISPLAYED_SUBCONTENT=academic_programs#crossover)

Financial Assistance

Financial support for qualified students pursuing studies toward the MS and PhD degrees is available in the form of research assistantships, teaching assistantships, graduate assistantships, and fellowships.

Calhoun Graduate Assistantships are supported by the School's Calhoun Endowment. To be considered for a fellowship, students must submit GRE scores along with all their application materials. The application deadline is February 28 for the following academic year. For more information, please contact Dr. Rami Seliktar (seliktar@coe.drexel.edu).

Dean's Fellowships are available for outstanding applicants to the School when other forms of financial assistance are not available. This Fellowship provides approximately 40% of a student's tuition for the first year and is renewable depending on the student's academic performance. Fellowship applicants must be seeking full-time study only at the master's level. Other requirements include a GPA of 3.5 or better in their bachelor's program and submission of GRE scores. For international students, a TOEFL score of 260 or better is required. For more information regarding international applicant requirements, view the International Students Admissions Information (http://drexel.edu/issss/NewStudent.html) page.

For further assistance, students should contact the Office of Graduate Admissions (http://www.drexel.edu/em/grad).

All applicants will automatically be considered for departmental assistantships. There is no additional paperwork to apply. Applicants interested in graduate assistantships must submit GRE scores. These awards are based on academic merit.

About Graduate Co-op

Drexel University's long tradition in the field of experiential learning has now been extended into many of its master's programs in science, business, and engineering.

This option, called Graduate Co-op (http://www.drexel.edu/scdc/co-op/graduate.requirements), provides students with the opportunity to gain work experience directly related to their career goals while earning academic credit. Students who have earned a minimum of 24 credits with a GPA of at least 3.0 are eligible to participate. Employment typically lasts six months, during which students enroll in a special 3 credit GCP course coinciding with their term of employment. Students gain work experience while earning salaries. It is important to note that the GCP program does not guarantee a job. It is a market-driven process for the candidates as well as employers. GCP provides the tools and contacts; the student must qualify for the job on the basis of merit, qualifications, and skills.

Further information on the GCP program is available at the Drexel Steinbright Career Development Center. (http://www.drexel.edu/scdc)
methods used in systems biology: pathway and circuitry, feedback and control, cellular automata, sets of partial differential equations, stochastic analysis, and biostatistics.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMES 543</td>
<td>Quantitative Systems Biology</td>
<td>4.5</td>
</tr>
<tr>
<td>BMES 544</td>
<td>Genome Information Engineering</td>
<td>4.5</td>
</tr>
<tr>
<td>BMES 545</td>
<td>Biosystems Modeling</td>
<td>4.5</td>
</tr>
<tr>
<td>BMES 546</td>
<td>Biocomputational Languages</td>
<td>4.0</td>
</tr>
<tr>
<td>BMES 551</td>
<td>Biomedical Signal Processing</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 604</td>
<td>Pharmacogenomics</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits** 23.5

**Advanced Certificate in Biomedical Technology Development**

**Certificate Level:** Graduate  
**Admission Requirements:** Bachelor's degree  
**Certificate Type:** Certificate  
**Number of Credits to Completion:** 24.0  
**Instructional Delivery:** Campus  
**Calendar Type:** Quarter  
**Expected Time to Completion:** 2 years  
**Financial Aid Eligibility:** Not aid eligible  
**Classification of Instructional Program (CIP) Code:** 15.0401  
**Standard Occupational Classification (SOC) Code:** 17-3029

This certificate program is designed for working engineers interested in medical devices and technology. Students enrolled in this program will develop an understanding of the critical regulatory, economic, and legal issues in addition to the project management skills that facilitate the development of new medical devices.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMES 501</td>
<td>Medical Sciences I</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 502</td>
<td>Medical Sciences II</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 503</td>
<td>Medical Sciences III</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 509</td>
<td>Entrepreneurship for Biomedical Engineering and Science</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 534</td>
<td>Design Thinking for Biomedical Engineers</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 538</td>
<td>Biomedical Ethics and Law</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 588</td>
<td>Medical Device Development</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 590</td>
<td>Clinical Rotation</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits** 24.0

**Advanced Certificate in Tissue Engineering**

**Certificate Level:** Graduate  
**Admission Requirements:** Bachelor's degree  
**Certificate Type:** Certificate  
**Number of Credits to Completion:** 20.0  
**Instructional Delivery:** Campus  
**Calendar Type:** Quarter  
**Expected Time to Completion:** 2 years  
**Financial Aid Eligibility:** Not aid eligible  
**Classification of Instructional Program (CIP) Code:** 14.0501  
**Standard Occupational Classification (SOC) Code:** 17-2031

The certificate in tissue engineering is designed to provide advanced training in cellular and molecular biology relevant to tissue engineering and behavior of materials used in biomedical applications.

**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMES 631</td>
<td>Tissue Engineering I</td>
<td>4.0</td>
</tr>
<tr>
<td>BMES 632</td>
<td>Tissue Engineering II</td>
<td>4.0</td>
</tr>
<tr>
<td>BMES 660</td>
<td>Biомaterials I</td>
<td>4.0</td>
</tr>
<tr>
<td>BMES 661</td>
<td>Biомaterials II</td>
<td>4.0</td>
</tr>
<tr>
<td>BMES 675</td>
<td>Biомaterials and Tissue Engineering III</td>
<td>4.0</td>
</tr>
</tbody>
</table>

**Total Credits** 20.0

**Biomedical Engineering**

**Major:** Biomedical Engineering  
**Degree Awarded:** Master of Science (MS) or Doctor of Philosophy (PhD)  
**Calendar Type:** Quarter  
**Total Credit Hours:** 45.0-51.0 (MS) or 90.0 (PhD)  
**Classification of Instructional Programs (CIP) code:** 14.0501  
**Standard Occupational Classification (SOC) code:** 17-2031

**About the Program**

The curriculum develops graduates who can identify and address unmet clinical, diagnostic, and healthcare needs by using their knowledge of modern theories, engineering systems, and mathematical and engineering tools. Biomedical engineers require the analytical tools and broad knowledge of modern engineering and science, fundamental understanding of the biological or physiological system, and familiarity with recent technological breakthroughs.

Master students can choose to include a 6 months graduate co-op cycle as part of their studies. Students may also choose to enroll in a concentration in Biomedical Device Development, or specialize in biomaterials and tissue engineering, biomechanics, neuroengineering, imaging and devices or bioinformatics, or may pursue a dual-degree MS option. Graduating students work in industry in such fields as medical devices, health care, pharmaceuticals and biotechnology, continue academic careers (PhD), or continue to medical schools.

**Additional Information**

Andres Kriete, PhD  
Associate Director for Graduate Studies  
School of Biomedical Engineering, Science and Health Systems  
ak3652@drexel.edu

Natalia Broz  
Associate Director for Graduate Programs  
School of Biomedical Engineering, Science and Health Systems  
njb33@drexel.edu

For more information, visit the The School of Biomedical Engineering, Science, and Health Systems (http://www.biomed.drexel.edu) website.
The curriculum includes room for specialization in several areas of biomedical engineering, as well as a concentration in biomedical technology development.

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>BMES 501</td>
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<td>3.0</td>
</tr>
<tr>
<td>BMES 503</td>
<td>Medical Sciences III</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 672</td>
<td>Biosimulation I</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 673</td>
<td>Biosimulation II</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 864</td>
<td>Seminar</td>
<td>0.0</td>
</tr>
</tbody>
</table>

Electives

The sum of electives, core credits, and/or thesis credits must total 45.0 for thesis students and 51.0 for non-thesis students. Elective choices would depend upon the student’s area(s) of focus or concentration.

Thesis

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BMES 897</td>
<td>Research</td>
<td>1.0-12.0</td>
</tr>
<tr>
<td>BMES 898</td>
<td>Master’s Thesis</td>
<td>0.5-20.0</td>
</tr>
</tbody>
</table>

* The research for the thesis may include work carried out during an internship.

### Biomedical Technology Development Concentration

Students enrolled in this concentration will develop an understanding of critical regulatory, economic, and legal issues in addition to the project management skills that facilitate the development of new medical devices and positive working relationships with intellectual property lawyers, management skills that facilitate the development of new medical devices and positive working relationships with intellectual property lawyers, insurance companies, and the federal government.

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
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</tr>
</thead>
<tbody>
<tr>
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</tr>
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<td>BMES 590</td>
<td>Clinical Rotation</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits 15.0

### PhD in Biomedical Engineering Degree Requirements

To be awarded the PhD degree, students must complete 90.0 required credits and fulfill the one-year residency requirement. The following milestones have to be satisfied during the course of the program:

- Students must successfully pass the candidacy examination.
- Students must submit a PhD dissertation proposal and successfully defend it.
- Students must write a dissertation and successfully pass final oral defense.

Post-Baccalaureate Requirements and Post-Master’s Requirements

Both post-baccalaureate and post-master's students are admitted into the doctoral program in Biomedical Engineering, but have slightly differing sets of requirements.

For post-master's students, 45.0 of the credits that they earned toward their Master's degree may be applied toward the PhD. If coming from the Master’s program in Biomedical Engineering at Drexel University, those courses they took would apply. For non-Drexel students who have completed their master’s elsewhere, there may be exceptions made. If these students believe that they have covered the material of the required courses in another program, they must show evidence of such material and obtain a formal waiver of this requirement from the Graduate Advisor.

For post-baccalaureate students, students must complete a minimum of 90.0 credits and a research thesis. These 90.0 credits include the core courses required by Drexel’s MS in Biomedical Engineering.

Core Courses

<table>
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<td>BMES 672</td>
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<td>3.0</td>
</tr>
<tr>
<td>BMES 864</td>
<td>Seminar</td>
<td>0.0</td>
</tr>
</tbody>
</table>

In addition to the required courses, post-baccalaureate PhD students must take at least 21.0 more credits in courses. This balance may be taken as research and/or thesis/dissertation credits.

Thesis Advisor/Plan of Study

During the first year of the program all Doctoral students are required to identify a Thesis Advisor and complete a plan of study. The student’s Thesis Advisor and the Graduate Advisor will guide the student in developing this plan of study. Each plan of study is individually tailored to the student, and includes a combination of research and course credits most beneficial and complimentary to the student’s chosen thesis topic.

The Candidacy Examination

Doctoral students must successfully pass a candidacy examination, preferably at the end of the first year of their study. The overall objective of the candidacy examination is to test the student’s basic knowledge and preparedness to proceed toward a PhD in Biomedical Engineering. After a satisfactory performance on the candidacy examination the student is awarded the Doctoral Candidate status. Candidates must submit a Thesis Proposal by the end of the second year and defend it in an oral presentation to a committee of five faculty members.

Thesis Defense

After the student has successfully completed all the necessary research and composed a thesis manuscript, in accordance with the guidelines specified by the Office of Research and Graduate Studies, he or she then must formally defend their thesis. A formal thesis defense includes an oral presentation of research accomplishments in front of a committee of faculty members. The thesis defense is open to the general public.

Prospective PhD students are welcome to contact the school to discuss their research interests. For a more detailed description of the PhD requirements, please visit the School of Biomedical Engineering and Health Systems’ Biomedical Engineering (http://www.biomed.drexel.edu/new04) web site.
Areas of Specialization

Areas of specialization can be pursued within the Biomedical Engineering graduate program. Students can plan their own focus area that will give them strength in a particular sub-discipline. Alternatively, the student can specialize by conducting research and writing a thesis.

Biomaterials and Tissue Engineering
Biomaterials and tissue engineering is designed to provide students with advanced training in cellular and molecular biology relevant to tissue engineering and behavior of materials used in biomedical applications.

Biomedical Technology Development
Students pursuing the concentration will develop an understanding of critical regulatory, economic, and legal issues in addition to the project management skills that facilitate the development of new medical devices and positive working relationships with intellectual property lawyers, insurance companies, and the federal government. (This is a formal concentration with specific course requirements.)

Bioinformatics
Bioinformatics emphasizes a systems engineering approach to provide a foundation in systems biology and pathology informatics. Students are provided with hands-on experience in the application of genomic, proteomic, and other large-scale information to biomedical engineering as well as experience in advanced computational methods used in systems biology; pathway and circuitry, feedback and control, cellular automata, sets of partial differential equations, stochastic analysis, and biostatistics.

Biomechanics and Human Performance Engineering
Biomechanics and human performance engineering is designed to meet two objectives: to acquaint students with the responses of biological tissues to mechanical loads as well as with the mechanical properties of living systems and to provide students with the background and skills needed to create work and living environments which improve human health and enhance performance. Biomechanics and human performance also involves the study of orthopedic appliances and the broader aspect of rehabilitation engineering and the management of disability.

Biomedical Systems and Imaging
Biomedical systems and imaging focuses on the theoretical and practical issues related to machine vision, image processing and analysis, and signal processing associated with such medical applications as well biomedical instrumentation and product development.

Neuroengineering
Neuroengineering is broadly defined to include the modeling of neural and endocrine systems, neural networks, complexity in physiological systems, evolutionary influences in biological control systems, neurocontrol, neurorobotics, and neuropsychotics.

Biomedical Engineering, Science and Health Systems Faculty

Fred D. Allen, PhD (University of Pennsylvania). Assistant Professor. Tissue engineering, cell engineering, orthopedics, bone remolding, wound healing, mechanotransduction, signal transduction, adhesion, migration.

Sriram Balasubramanian, PhD (Wayne State University). Assistant Professor. Structural characteristics of the pediatric thoracic cage using CT scans and developing an age-equivalent animal model for pediatric long bones.

Kenneth A. Barbee, PhD (University of Pennsylvania). Professor. Cellular biomechanics of neural and vascular injury, mechanotransduction in the cardiovascular system, mechanical control of growth and development for wound healing and tissue engineering.

Lin Han, PhD (Massachusetts Institute of Technology). Assistant Professor. Nanoscale structure-property relationships of biological materials, genetic and molecular origins soft joint tissue diseases, biomaterials under extreme conditions, coupling between stimulus-responsiveness and geometry.

Uri Herschberg, PhD (Hebrew University of Jerusalem, Israel). Assistant Professor. Bioinformatics, immunology, neural computation, system biology, somatic selection, autoimmunity, genetic stability, germine diversity, dendritic cell, transcription elements, pathogens, computational and mathematical modeling, complex systems, cognition and inflammation.

Joshua Jacobs, PhD (University of Pennsylvania). Assistant Professor. Neuroengineering, electrocorticographic (ECoG), electroencephalography (EEG), single-neuron spiking, brain oscillations, episodic memory, working memory, spatial navigation, conceptual representations.

Dov Jaron, PhD (University of Pennsylvania) Calhoun Distinguished Professor of Engineering in Medicine. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Andres Kriete, PhD (University in Bremen Germany) Associate Director for Graduate Studies and Academic Operations. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Ryszard Lec, PhD (University of Warsaw Engineering College). Professor. Biomedical applications of visoelastic, acoustoptic and ultrasonic properties of liquid and solid media.

Peter Lewin, PhD (University of Denmark, Copenhagen-Lyngby) Richard B. Beard Professor, School Of Biomedical Engineering, Science & Health Systems. Professor. Biomedical ultrasonics, piezoelectric and polymer transducers and hydrophones; shock wave sensors.

Hualou Liang, PhD (Chinese Academy of Sciences). Associate Professor. Neuroengineering, neuroinformatics, cognitive and computational neuroscience, neural data analysis and computational modeling, biomedical signal processing.

Donald L. McEachron, PhD (University of California at San Diego) Associate Director, Research Professor. Animal behavior, autoradiography, biological rhythms, cerebral metabolism, evolutionary theory, image processing, neuroendocrinology.

Karen Moxon, PhD (University of Colorado). Associate Professor. Cortico-thalamic interactions; neurobiological perspectives on design of humanoid robots.

Banu Onaral, Ph.D. (University of Pennsylvania) H.H. Sun Professor / Director, School of Biomedical Engineering Science and Health Systems. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (Rensselaer Polytechnic University). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.
Arye Rosen, PhD (Drexel University). Biomedical Engineering and Electrical Engineering. Microwave components and subsystems; utilization of RF/microwaves and lasers in therapeutic medicine.

Ahmet Sacan, PhD (Middle East Technical University). Assistant Professor. Indexing and data mining in biological databases; protein sequence and structure; similarity search; protein structure modeling; protein-protein interaction; automated cell tracking.

Joseph J. Sarver, PhD (Drexel University). Teaching Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

Rahamim Seliktar, PhD (University of Strathclyde, Glasgow) Vice Director, School of Biomedical Engineering, Science & Health Systems. Professor. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Adrian C. Shieh, PhD (Rice University). Assistant Professor. Contribution of mechanical forces to tumor invasion and metastasis, with a particular emphasis on how biomechanical signals may drive the invasive switch, and how the biomechanical microenvironment interacts with cytokine signaling and the extracellular matrix to influence tumor and stromal cell behavior.

Wan Young Shih, PhD (Ohio State University) School of Biomedical Engineering, Science and Health Systems. Associate Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (Drexel University). Assistant Professor. Cell-biomaterial interactions, biomaterial design, and international engineering education.

Aydin Tozeren, PhD (Columbia University) Distinguished Professor and Director, Center for Integrated Bioinformatics, School of Biomedical Engineering, Science & Health Systems. Professor. Breast cell adhesion and communication, signal transduction networks in cancer and epithelial cells; integrated bioinformatics, molecular profiling, 3D-tumors, bioimaging.

Margaret Wheatley, PhD (University of Toronto) School of Biomedical Engineering, Science and Health Systems, John M. Reid Professor. Ultrasound contrast agent development (tumor targeting and triggered drug delivery), controlled release technology (bioactive compounds), microencapsulated allografts (ex vivo gene therapy) for spinal cord repair.

Yinghui Zhong, PhD (Georgia Institute of Technology). Assistant Professor. Spinal cord repair, and engineering neural prosthesis/brain interface using biomaterials, drug delivery, and stem cell therapy.

Interdepartmental Faculty

Douglas L. Chute, PhD (University of Missouri) Louis and Bessie Stein Fellow. Professor. Neuropsychology and rehabilitation; technological applications for the cognitively compromised and those with acquired brain injuries.

Patricia A. Shewokis, PhD (University of Georgia). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy(NIRF) and electroencephalography (EEG) and methodology and research design.

Emeritus Faculty

William Freedman, PhD (Drexel University). Professor Emeritus. Motor control; sensory and motor systems; reflexes; eye movements; neural networks.

John M. Reid, PhD (University of Pennsylvania) Calhoun Professor Emeritus. Professor Emeritus. Diagnostic ultrasound, wave propagation and scattering in inhomogeneous media, imaging, instrumentation.

Hun H. Sun, PhD (Cornell University). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Biomedical Science

Major: Biomedical Science

Degree Awarded: Master of Science (MS) or Doctor of Philosophy (PhD)

Calendar Type: Quarter

Total Credit Hours: 45.0-51.0 (MS) or 90.0 (PhD)

Classification of Instructional Programs (CIP) code: 26.0102

Standard Occupational Classification (SOC) code: 19.1042

About the Program

The Biomedical Science program at the School of Biomedical Engineering, Science and Health Systems applies fundamental biological research, analysis and technology to human health. The program educates students whose undergraduate education is in basic life sciences (e.g., biology) or paramedical disciplines in quantitative data analysis, mathematical modeling, systems analysis and informatics.

For students entering with degrees in physics, mathematics, and/or computer science, the School, in close collaboration with the Department of Biology, provides the coursework needed to acquire proficiency in the life sciences.

Master students can choose to include a 6 months co-op cycle as part of their studies. Students may also choose to enroll in concentrations such as as biomedical technology development, biomaterials and tissue engineering, or bioinformatics. They can also specialize in neuroengineering, biomechanics or imaging and devices. Students who graduate with a master’s degree from the biomedical science program often continue clinical training in medicine, dentistry, or veterinary medicine; pursue further graduate study toward the PhD degree; or work in industry in such fields as health care, pharmaceuticals, biotechnology, medical devices, etc.

The Biomedical Science program has an articulation with Interdepartmental Medical Science (IMS) at the Drexel College of Medicine, which can be pursued after taking one year of required classes. Applicants to the IMS program include students who are late in their decision to apply to medical school, students interested in improving their academic record before applying or re-applying to medical schools, or students who would like a year in a medical school setting before deciding whether medicine is the career for them.

Additional Information

Andres Kriete, PhD
Associate Director for Graduate Studies
School of Biomedical Engineering, Science and Health Systems
ak3652@drexel.edu

Natalia Broz
Associate Director for Graduate Programs
PhD in Biomedical Science Degree Requirements

Students with training in natural science or engineering, as well as individuals with academic or professional degrees in the medical science disciplines will be considered for admission to the doctoral program.

To be awarded the PhD degree, students must complete 90.0 required credits and fulfill a one-year residency requirement.

The following milestones have to be satisfied during the course of the program:

- Students must successfully pass the candidacy examination.
- Students must submit a PhD dissertation proposal and successfully defend it.
- Students must write a dissertation and successfully pass final oral defense.

Post-Baccalaureate Requirements and Post-Master’s Requirements

Both post-baccalaureate and post-master's students are admitted into the doctoral program in Biomedical Science, but have slightly differing sets of requirements.

For post-master’s students, 45.0 of the credits that they earned toward their Master’s degree may be applied toward the PhD. If coming from the Master’s program in Biomedical Science at the School of Biomedical Engineering, those courses they took would apply.

For post-baccalaureate students, students must complete a minimum of 90.0 credits and a research thesis. These 90.0 credits include the core courses required by Drexel’s MS in Biomedical Science.

In addition to the required courses, post-baccalaureate PhD students must take at least 21.0 more credits in courses. This balance may be taken as research and/or thesis/dissertation credits.

Thesis Advisor/Plan of Study

During the first year of the program all Doctoral students are required to identify a Thesis Advisor and complete a plan of study. The student’s Thesis Advisor and the Graduate Advisor will guide the student in developing this plan of study. Each plan of study is individually tailored to the student, and includes a combination of research and course credits most beneficial and complimentary to the student’s chosen thesis topic.

The Candidacy Examination

Doctoral students must successfully pass a candidacy examination, preferably at the end of the first year of their study.

The overall objective of the candidacy examination is to test the student’s basic knowledge and preparedness to proceed toward a PhD in Biomedical Science. After a satisfactory performance on the candidacy examination the student is awarded the Doctoral Candidate status. Candidates must submit a Thesis Proposal by the end of the second year and defend it in an oral presentation to a committee of five faculty members.

Thesis Defense

After the student has successfully completed all the necessary research and composed a thesis manuscript, in accordance with the guidelines specified by the Office of Research and Graduate Studies, he or she then
must formally defend their thesis. A formal thesis defense includes an oral presentation of research accomplishments in front of a committee of faculty members. The thesis defense is open to the general public.

Prospective PhD students are welcome to contact the school to discuss their research interests. For a more detailed description of the PhD requirements, please visit the School of Biomedical Engineering and Health Systems' Biomedical (http://www.biomed.drexel.edu/new04) Science (http://www.biomed.drexel.edu/new04/Content/academic_programs/Biomedical_Science) web site.

For more information, visit the School’s web site and click on Graduate Programs (http://www.biomed.drexel.edu/new04/Content/grad_prog/academic_programs) .

**Interdepartmental Medical Science Pathway to the MS in Biomedical Science**

The School of Biomedical Engineering, Science and Health Systems collaborates with the Drexel College of Medicine, specifically with the Interdepartmental Medical Science Program (IMSP) (p. 70), to offer a unique pathway to a Masters in Biomedical Science. Students complete 1 year in the IMS program (described below) and then complete their second year at the School. This involves completing the core sequence and a thesis or taking a non-thesis option with additional coursework.

**Interdepartmental Medical Science Program Curriculum**

The IMS curriculum involves a full-time commitment to rigorous coursework with strong academic requirements. Six major medical school courses are taken simultaneously with the College of Medicine first-year class. These include Medical Biochemistry, Cell Biology & Microanatomy, Medical Physiology, Medical Nutrition, Medical Immunology, and Medical Neuroscience.

The students take the exact same courses and exams as the medical students and are evaluated based on their performance in comparison to our medical school students. Performance on tests, quizzes, and assignments equal to the mean grade of the medical school class signifies a letter grade of “B” for the IMS students. Thus, IMS students receiving A’s and B’s are performing at the top 50% of the medical school class and can then present themselves with strong academic credentials before the admissions committee. This permits medical school admissions committees to directly evaluate the student’s competence compared with their own first year medical school class. This allows students an opportunity to test their preparation, motivation, and commitment to medicine.

In addition to the medical school courses, students take a medical ethics course each semester. The campuses are approximately five miles apart and a University shuttle provides free transportation between the two.

Additionally, course conferences and laboratory components for IMS students are conducted at the Health Sciences Campus where the program is based. The IMS curriculum allows exposure to both medical school lectures and individual attention from medical school professors in small group conferences.

For more information, visit Drexel's College of Medicine's Interdepartmental Medical Science Program (http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PremedicalPrograms/InterdepartmentalMedicalScienceMSPProgram/Curriculum.aspx) web page.

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**Biomedical Engineering, Science and Health Systems Faculty**

Fred D. Allen, PhD (University of Pennsylvania). Assistant Professor. Tissue engineering, cell engineering, orthopedics, bone remodeling, wound healing, mechanotransduction, signal transduction, adhesion, migration.

Sriram Balasubramanian, PhD (Wayne State University). Assistant Professor. Structural characteristics of the pediatric thoracic cage using CT scans and developing an age-equivalent animal model for pediatric long bones.

Kenneth A. Barbee, PhD (University of Pennsylvania). Professor. Cellular biomechanics of neural and vascular injury, mechanotransduction in the cardiovascular system, mechanical control of growth and development for wound healing and tissue engineering.

Lin Han, PhD (Massachusetts Institute of Technology). Assistant Professor. Nanoscale structure-property relationships of biological materials, genetic and molecular origins soft joint tissue diseases, biomaterials under extreme conditions, coupling between stimulus-responsiveness and geometry.

Uri Hershberg, PhD (Hebrew University of Jerusalem, Israel). Assistant Professor. Bioinformatics, immunology, neural computation, system biology, somatic selection, autoimmunity, genetic stability, germ line diversity, dendritic cell, transcription elements, pathogens, computational and mathematical modeling, complex systems, cognition and inflammation.

Joshua Jacobs, PhD (University of Pennsylvania). Assistant Professor. Neuroengineering, electrocorticography (ECoG), electroencephalography (EEG), single-neuron spiking, brain oscillations, episodic memory, working memory, spatial navigation, conceptual representations.

Dov Jaron, PhD (University of Pennsylvania). Calhoun Distinguished Professor of Engineering in Medicine. Professor. Mathematical, computer and electromechanical simulations of the cardiovascular system.

Andres Kriete, PhD (University in Bremen Germany) Associate Director for Graduate Studies and Academic Operations. Systems biology, bioimaging, control theory, biology of aging, skin cancer.

Ryszard Lec, PhD (University of Warsaw Engineering College). Professor. Biomedical applications of visoelastic, acoustoptic and ultrasonic properties of liquid and solid media.

Peter Lewin, PhD (University of Denmark, Copenhagen-Lyngby) Richard B. Beard Professor, School Of Biomedical Engineering, Science & Health Systems. Professor. Biomedical ultrasonics, piezoelectric and polymer transducers and hydrophones; shock wave sensors.

Hualou Liang, PhD (Chinese Academy of Sciences). Associate Professor. Neuroengineering, neuroinformatics, cognitive and computational neuroscience, neural data analysis and computational modeling, biomedical signal processing.

Donald L. McEachron, PhD (University of California at San Diego) Associate Director. Research Professor. Animal behavior, autoradiography, biological rhythms, cerebral metabolism, evolutionary theory, image processing, neuroendocrinology.
Karen Moxon, PhD (University of Colorado). Associate Professor. Corticothalamic interactions; neurobiological perspectives on design of humanoid robots.

Banu Onaral, Ph.D. (University of Pennsylvania) H.H. Sun Professor / Director, School of Biomedical Engineering Science and Health Systems. Professor. Biomedical signal processing; complexity and scaling in biomedical signals and systems.

Kambiz Pourrezaei, PhD (Rensselaer Polytechnic University). Professor. Thin film technology; nanotechnology; near infrared imaging; power electronics.

Arye Rosen, PhD (Drexel University) Biomedical Engineering and Electrical Engineering. Microwave components and subsystems; utilization of RF/microwaves and lasers in therapeutic medicine.

Ahmet Sacan, PhD (Middle East Technical University). Assistant Professor. Indexing and data mining in biological databases; protein sequence and structure; similarity search; protein structure modeling; protein-protein interaction; automated cell tracking.

Joseph J. Sarver, PhD (Drexel University). Teaching Professor. Neuromuscular adaptation to changes in the myo-mechanical environment.

Rahamim Seliktar, PhD (University of Strathclyde, Glasgow) Vice Director, School of Biomedical Engineering, Science & Health Systems. Professor. Limb prostheses, biomechanics of human motion, orthopedic biomechanics.

Adrian C. Shieh, PhD (Rice University). Assistant Professor. Contribution of mechanical forces to tumor invasion and metastasis, with a particular emphasis on how biomechanical signals may drive the invasive switch, and how the biomechanical microenvironment interacts with cytokine signaling and the extracellular matrix to influence tumor and stromal cell behavior.

Wan Young Shih, PhD (Ohio State University) School of Biomedical Engineering, Science and Health Systems. Associate Professor. Piezoelectric microcantilever biosensors development, piezoelectric finger development, quantum dots development, tissue elasticity imaging, piezoelectric microcantilever force probes.

Kara Spiller, PhD (Drexel University). Assistant Professor. Cell-biomaterial interactions, biomaterial design, and international engineering education.

Aydin Tozeren, PhD (Columbia University) Distinguished Professor and Director, Center for Integrated Bioinformatics, School of Biomedical Engineering, Science & Health Systems. Professor. Breast cell adhesion and communication, signal transduction networks in cancer and epithelial cells; integrated bioinformatics, molecular profiling, 3D-tumors, bioimaging.

Margaret Wheatley, PhD (University of Toronto) School of Biomedical Engineering, Science and Health Systems, John M. Reid Professor. Ultrasound contrast agent development (tumor targeting and triggered drug delivery), controlled release technology (bioactive compounds), microencapsulated allografts (ex vivo gene therapy) for spinal cord repair.

Yinghui Zhong, PhD (Georgia Institute of Technology). Assistant Professor. Spinal cord repair, and engineering neural prosthesis/brain interface using biomaterials, drug delivery, and stem cell therapy.

Interdepartmental Faculty

Douglas L. Chute, PhD (University of Missouri) Louis and Bessie Stein Fellow. Professor. Neuropsychology and rehabilitation; technological applications for the cognitively compromised and those with acquired brain injuries.

Patricia A. Shewokis, PhD (University of Georgia). Professor. Roles of cognition and motor function during motor skill learning; role of information feedback frequency on the memory of motor skills, noninvasive neural imaging techniques of functional near infrared spectroscopy (NIRS) and electroencephalography (EEG) and methodology and research design.

Emeritus Faculty

William Freedman, PhD (Drexel University). Professor Emeritus. Motor control; sensory and motor systems; reflexes; eye movements; neural networks.

John M. Reid, PhD (University of Pennsylvania) Calhoun Professor Emeritus. Professor Emeritus. Diagnostic ultrasound, wave propagation and scattering in inhomogeneous media, imaging, instrumentation.

Hun H. Sun, PhD (Cornell University). Professor Emeritus. Biological control systems, physiological modeling, systems analysis.

Certificate in Medical Product Design and Device Development

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Graduate Certificate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 14.0501
Standard Occupational Classification (SOC) Code: 17-2031

Over the past 50 years, the practice of medicine has become increasingly driven by technological innovations. However, simply being able to design and develop a new technology is no guarantee that the technology will reach its intended audience, whether that audience be made of medical professionals or patients. To reach the goal of introducing a medical technology into the marketplace, a biomedical engineer must run the gauntlet of regulations, attitudes, and financial considerations that make up the United States health care system.

Medical devices are subject to extensive FDA regulations. Thus, biomedical engineers who design medical technologies must be proficient in the regulatory and economic components of introducing a new medical device into the US health market. Knowledge of intellectual property law is also a prerequisite for those who plan to develop novel medical technologies. Because the cost of obtaining FDA is steep, obtaining intellectual property protection for extended periods of time is necessary to recovering project costs. Along similar lines, biomedical engineers must also appreciate the role of Medicare and other insurers and their requirements for reimbursement.

This certificate program is designed to prepare biomedical engineers to understand the environment into which their innovations will be placed and the users who will interact with them. Professionals enrolled in the
Certificate in Medical Product Design and Device Development

certificate will develop an understanding of critical regulatory, economic, and legal issues in addition to the project management skills that facilitate the development of new medical devices and positive working relationships with intellectual property lawyers, insurance companies, and the federal government.

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>BMES 509</td>
<td>Entrepreneurship for Biomedical Engineering and Science</td>
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<tr>
<td>BMES 538</td>
<td>Biomedical Ethics and Law</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 588</td>
<td>Medical Device Development</td>
<td>3.0</td>
</tr>
<tr>
<td>BMES 821</td>
<td>Medical Instrumentation</td>
<td>3.0</td>
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Select one of the following: 3.0

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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>BMES 520</td>
<td>Introduction to Medical Science</td>
</tr>
<tr>
<td>BMES 822</td>
<td>Medical Instrumentation II</td>
</tr>
</tbody>
</table>

Total Credits 15.0

Additional Information

For addition information, please contact Carolyn Riley (Professional Programs, cr63@drexel.edu) or Professor Kambiz Pourrezaei (Program Coordinator, pourrezk@drexel.edu).
The School of Education

The School of Education (http://www.drexel.edu/soe) seeks to enrich knowledge and practice related to lifespan learning, based on the most current and appropriate research and practice. The School's goal is to improve human understanding through programs and activities that emphasize creative uses of human effort, technology, leadership, and problem solving.

This department offers an extensive and comprehensive array of diverse graduate, doctoral, and certificate programs that encompass all aspects of the educational field. These programs prepare non-traditional students for a variety of careers in human resource development, higher education, global and international education, learning technologies, educational administration, policy and leadership.

The School also offers Pennsylvania Department of Education-approved programs to certify students who already hold bachelor's degrees to be teachers in elementary education (grades PreK-4 with an emphasis on mathematics, science, and technology), secondary education (in biology, chemistry, earth and space science, English, general science, mathematics, physics or social studies), and K-12 (environmental education, instructional technology specialist, and library science). Special education, teaching English as a second language, principal and superintendent certifications are also available. Individuals who complete the minimum requirements receive a PA Instructional I teaching certificate and have the option to continue coursework to fulfill requirements in the graduate Science of Instruction or teaching learning and curriculum (initial certification track) master's degree programs.

Other master's degree programs are also available to those who already have teacher certification and/or do not wish to obtain a teaching certificate. Students who would like to pursue the teaching English as a second language, special education, principal or superintendent certification must already have Pennsylvania Instructional I certification, satisfactory professional school experience on a state-issued certificate appropriate for the assignment, or appropriate equivalent.

** Majors**

- Applied Behavior Analysis (MS) (p. 363)
- Creativity and Innovation (MS) (p. 365)
- Education Improvement and Transformation (MS) (p. 366)
- Educational Administration (MS) (p. 368)
- Educational Leadership and Management (EdD) (p. 359)
- Educational Leadership Development and Learning Technology (PhD) (p. 391)
- Global and International Education (MS) (p. 372)
- Higher Education (MS) (p. 375)
- Human Resource Development (MS) (p. 378)
- Learning Technologies (MS) (p. 380)
- Mathematics Learning and Teaching (MS) (p. 383)
- Special Education (MS) (p. 385)
- Teaching, Learning and Curriculum (MS) (p. 388)

**Certificates**

- Adult Education (p. 354)
- Advanced Teaching/Curriculum (p. 353)
- Applied Behavior Analysis (p. 394)
- Autism Spectrum Disorders (p. 354)
- Community College Administration and Leadership (p. 355)
- Creativity and Innovation (p. 355)
- E-Learning Leadership (p. 356)
- Educational Policy (p. 356)
- Human Resource Development (p. 356)
- Instructional Design (p. 357)
- Instructional Technology Specialist (p. 363)
- Learning in Game-Based Systems Environments (p. 357)
- Math Leadership & Coaching (p. 358)
- Mathematics Learning and Teaching (p. 358)
- Multisensory Reading Instruction Level I (p. 391)
- Museum Education (p. 358)
- School Principal Certificate (p. 401)
- Post-Baccalaureate Teaching: Elementary (p. 396)
- Post-Baccalaureate Teaching: Secondary (p. 398)
- Reading Specialist Certification (p. 400)
- Special Education 7-12 (p. 394)
- Special Education PreK-8 (p. 397)
- Special Education Leadership (p. 395)
- STEM Education Certificate (p. 400)
- Student Development and Affairs (p. 359)
- Teaching Certificate: Graduate Intern Program (p. 362)
- Teaching English as a Second Language (p. 402)

**Resource Centers**

The centers at the School of Education represent a variety of educational, professional, and public service divisions. Each distinct entity provides programming, services and, resources designed to creatively meet your individual needs.

The Center for the Prevention of School-Aged Violence promotes public awareness about the need for youth-focused, evidence-based efforts aimed at preventing youth violence and the social and cognitive skills young people need to prevent violence on their own.

The Evaluation Research Network is a community of experienced researchers, committed to developing and implementing effective strategies and technologies for assessing and evaluating instruction and educational programs.

The Math Forum is the leading online resource for improving math learning, teaching, and communications since 1992.

The Torrance Center for Creative Studies was established as an outgrowth of the research of E. Paul Torrance, internationally renowned authority on creativity. The Center’s primary purpose is the identification and nurturance of creative potential. For more information, please call Dr. Fredricka Reisman at 215.895.6771 or email freddie@drexel.edu.

**Advanced Teaching/Curriculum Certificate**

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Graduate
Number of Credits to Completion: 18.0
Certificate in Adult Education

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Graduate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13.1201
Standard Occupational Classification (SOC) Code: 25-3011

The certificate in adult education prepares students to develop curricular and instructional strategies focused on the unique needs and characteristics of adult learners. The planned program will utilize authentic curricular and instructional strategies focused on the unique needs and assessment.

Upon completion of the ATCC, candidates will possess knowledge of the many facets of education:

- In-depth understanding of varying educational organizations and sectors
- Expertise in developing, analyzing, implementing and evaluating instructional strategies
- Ability to exhibit leadership
- Organizational, cross cultural, interpersonal, advocacy, and communication skills

In addition, the ATCC program will provide candidates opportunities to explore a variety of other roles in an educational setting including:

- Instructional leaders both in and beyond the classroom
- Researchers in local, state, national, or international organizations
- Professionals in foundations, associations, corporations, and private education institutions.

EDUC 530 Advanced Techniques in Instruction & Assessment 3.0
EDUC 533 Designing Virtual Communities 3.0
EDUC 537 Learning Disabilities II 3.0
EDUC 608 The Intercultural Learner 3.0
EDUC 714 Instructional and Curriculum Leadership 3.0
EDUC 813 Educational Issues Seminar 3.0

Total Credits 18.0

The program is administered through Drexel University Online. For the most current admission information, please visit www.drexel.com (http://www.drexel.com/online-degrees/education-degrees/cert-pbt).

Certificate in Autism Spectrum Disorders

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 16.5
Instructional Delivery: Online, Campus
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.1013
Standard Occupational Classification (SOC) Code: 25-2059

Within the past decade, the number of children diagnosed with an Autism Spectrum Disorder (ASD) has increased drastically. Consequently, the need for professionals trained in this specialized area has significantly increased. This course sequence is designed for those who seek additional expertise in this critical-need area. Students who complete the graduate-level Certificate in Autism Spectrum Disorders are equipped with the fundamental skills, knowledge, teaching methods, interventions, and supports needed to work with students with ASD who have varying profiles.

The program is a part-time graduate program consisting of 5 courses (16.5 credits). Teacher certification is not a requirement for admission to this program, however applicants are expected to have completed a bachelor's degree. Upon completion of the program, students with an active PA Instructional I or Instructional II teaching certificate are eligible for the Pennsylvania Department of Education Autism Spectrum Disorders Endorsement.

Admission Requirements

Students applying to this program should have the following:

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
• Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
• Two letters of recommendation - professional or academic.
• An essay describing why the applicant is interested in pursuing graduate study in this field.

**Introductory Course**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDEX 551</td>
<td>Teaching Students with Autism Spectrum Disorder (pre-requisite for core courses)</td>
<td>4.5</td>
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</table>

**Core Courses**

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDEX 556</td>
<td>Characteristics &amp; Methods: Autism</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 558</td>
<td>Characteristics &amp; Methods: High Functioning Autism</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 560</td>
<td>Communication &amp; Language Interventions: Autism Spectrum Disorders</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 562</td>
<td>Behavior &amp; Sensory Support: Autism Spectrum Disorders</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits** 16.5

A field component is required in each course.

Additional Information:

For more information about this program, contact the program manager:

Owen Schugsta  
School of Education  
Drexel University  
215.895.1690  
ocs23@drexel.edu

**Certificate in Community College Administration and Leadership**

Certificate Level: Graduate  
Admission Requirements: Bachelor's degree  
Certificate Type: Graduate  
Number of Credits to Completion: 18.0  
Instructional Delivery: Online  
Calendar Type: Quarter  
Expected Time to Completion: 2 years  
Financial Aid Eligibility: Not aid eligible  
Classification of Instructional Program (CIP) Code: 13-0407  
Standard Occupational Classification (SOC) Code: 11-9033

The certificate in community college administration and leadership is an option for students and professionals who have already completed a bachelor's degree and would like to enhance their professional credentials without pursuing a master's degree.

Additional Information

For additional information, visit Drexel University's Higher Education, Administration and Leadership (http://drexel.edu/soe/academics/graduate/higher-education) page.

**Required Courses**

<table>
<thead>
<tr>
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<th>Credits</th>
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<tbody>
<tr>
<td>EDHE 500</td>
<td>Foundations of Higher Education</td>
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<tr>
<td>EDHE 530</td>
<td>Higher Education Law</td>
<td>3.0</td>
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<tr>
<td>ORGB 631</td>
<td>Leading Effective Organizations</td>
<td>3.0</td>
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<tr>
<td>Select three of the following:</td>
<td></td>
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</tr>
</tbody>
</table>

**Certificate in Creativity and Innovation**

Certificate Level: Graduate  
Admission Requirements: Bachelor's degree  
Certificate Type: Certificate  
Number of Credits to Completion: 18.0  
Instructional Delivery: Online  
Calendar Type: Quarter  
Expected Time to Completion: 2 years  
Financial Aid Eligibility: Not aid eligible  
Classification of Instructional Program (CIP) Code: 13-9999  
Standard Occupational Classification (SOC) Code: 11-9199

The graduate-level certificate in creativity and innovation provides, in a concentrated format, the most contemporary knowledge and skills needed in this important area for students who do not wish to pursue a master's degree but who would value a credential that demonstrates their learning. Credits from the certificate can be applied toward the MS in Creativity and Innovation (http://www.drexel.com/online-degrees/business-degrees/ms-creativity-innovation).

In a world of increasing complexity, change, and competition, generating new ideas and bringing them to the table is now essential for corporate management. Creativity is multidisciplinary – it is in all professional fields from chemistry to engineering, from education to computer science, and from sociology to business. Successful organizations, in all fields, view creativity as vital and are the ones that instill creativity throughout the organization. The application of creativity skills distinguishes managers who maintain the status quo from leaders who inspire a new direction or vision. By internalizing the spirit of creativity and the principles of creative problem solving, individuals can be transformed into change leaders.

Upon completion of the certificate program, students will have formed an in depth understanding of creativity, enhanced communication, creative problem solving, and how these may be applied to practical situations that further their workplace culture. Participants will use their newly enhanced creative thinking skills to reflect critically on existing workplace practices and express coherent and cogent ideas and suggestions for continuous improvement.

For more information, visit Drexel Online's Graduate Certificate Creativity and Innovation (http://www.drexel.com/online-degrees/business-degrees/grad-cert-creativity) web page.

**Requirements**

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>CRTV 501</td>
<td>Foundations in Creativity</td>
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<td>CRTV 502</td>
<td>Tools and Techniques in Creativity</td>
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<tr>
<td>CRTV 503</td>
<td>Creativity in the Workplace</td>
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</tr>
<tr>
<td>CRTV 610</td>
<td>Creativity and Change Leadership</td>
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</tr>
<tr>
<td>CRTV 620</td>
<td>Research Methods and Assessment of Creative and Innovative Thinking</td>
<td>3.0</td>
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</tbody>
</table>
Certificate in E-Learning Leadership

Certificate in E-Learning Leadership

Certificate Level: Graduate
Admission Requirements: Bachelor's
Certificate Type: Graduate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13.0501
Standard Occupational Classification (SOC) Code: 25-9011

The graduate certificate in e-learning leadership is designed to meet the needs of today's working professionals across many fields. As the demand for academic programs and courses to be delivered via e-learning continues to grow, the corresponding need for leadership in this important area increases. Similarly, corporations continue to seek leaders to oversee training and development initiatives via e-learning. This certificate provides, in a concentrated format, the most contemporary knowledge and skills needed in this important area for students who do not wish to pursue a master's degree but who would value a credential that demonstrates their learning.

Admission requires a bachelor's degree from an accredited institution. Credits from the certificate in e-learning leadership can be applied toward an MS in Professional Studies (http://www.drexel.com/online-degrees/business-degrees/ms-prof-studies).

Objectives
Upon completion of the program, students will have formed an in-depth understanding of online and distance learning theories and will be able to answer the following questions:

- Which emerging technologies hold greatest promise for enriching learning experiences throughout the educational enterprise?
- What pedagogical strategies should designers embody in instructional materials, including those based on multimedia and those reflected in gaming environments?
- How should educators deploy, manage, and evaluate information and communication technologies in classrooms for optimal educational effects?
- What principles of design and practice should educators incorporate into distributed educational courses and programs?

For more information, visit Drexel Online's Graduate Certificate in E-Learning (http://www.drexel.com/online-degrees/business-degrees/cert-elearning) website.

Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>CRTV 630</td>
<td>Global Perspectives on Creativity</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 605</td>
<td>Design &amp; Delivery of E-Learning II</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 501</td>
<td>The Purpose and Business of E-Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 502</td>
<td>E-Learning Technologies</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 503</td>
<td>Teaching and Learning Issues in E-Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 504</td>
<td>Learning Technologies &amp; Disabilities</td>
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</tr>
<tr>
<td>ELL 604</td>
<td>Design &amp; Delivery of E-Learning I</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 632</td>
<td>Ethics in Educational Policy Making</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 636</td>
<td>Access &amp; Equity in Educational Policy Making</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 640</td>
<td>Educational Policy-Making Tactics &amp; Influence</td>
<td>3.0</td>
</tr>
<tr>
<td>Total Credits</td>
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</table>

Certificate in Educational Policy

Certificate in Educational Policy

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13.0406
Standard Occupational Classification (SOC) Code: 11-9039

The certificate in educational policy examines the concept of "policy" as it relates to education and educational institutions and their governance and practices. Students will learn the factors involved in educational policy-making, including the ethics in policy-making decisions, and the methods for analyzing phenomenon that impact educational policy.

The program is designed to prepare educators of all types in the decision-making process of educational policy development.

Requirements

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPO 620</td>
<td>Education Policy: Concepts, Issues, and Applications</td>
<td>3.0</td>
</tr>
<tr>
<td>EDPO 624</td>
<td>Shaping of American Education Policy: Global Forces</td>
<td>3.0</td>
</tr>
<tr>
<td>EDPO 628</td>
<td>American Educational Policy and U.S. Competitiveness</td>
<td>3.0</td>
</tr>
<tr>
<td>EDPO 632</td>
<td>Ethics in Educational Policy Making</td>
<td>3.0</td>
</tr>
<tr>
<td>EDPO 636</td>
<td>Access &amp; Equity in Educational Policy Making</td>
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<td>Educational Policy-Making Tactics &amp; Influence</td>
<td>3.0</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>18.0</td>
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</tbody>
</table>

Certificate in Human Resource Development

Certificate in Human Resource Development

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 52.1005
Standard Occupational Classification (SOC) Code: 13-1151

Note: Effective Summer Term 2015, students are no longer being accepted into this certificate program.

The certificate in human resource development prepares professionals in the field of education with the skills they need to strategically lead human resource development and align organizational learning with organizational goals.
Certificate in Instructional Design

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 27.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.0501
Standard Occupational Classification (SOC) Code: 25-9031

The Instructional Design Certificate prepares students to apply the principles, theories, models, tools, and techniques of systematic instructional design in diverse organizational settings. It is appropriate for students from varied professional backgrounds seeking careers that utilize the systematic design and development of effective instruction either in physical facilities, online, or blended environments. This includes individuals preparing to be professional instructional designers, teachers, and other learning design professionals for PK-20 education, adult education, and workplace training. It specifically addresses the needs of the millennial learner and collaborative, networked communities. Students are encouraged to integrate their professional experiences and engage co-learners from other environments in their explorations.

The outcomes of candidates who successfully complete the Instructional Design Certificate will be:

• create effective learning artifacts using a variety of media and methods including social media via mobile devices;
• design an effective instructional development plan that meets the needs of various stakeholders;
• collaborate with and lead a team of talented contributors to create an instructional product resulting in an effective and efficient outcome;
• design and integrate virtual community processes into learning environments;
• design effective learning experiences for online and blended students using tools and methods specific to these environments;
• apply knowledge from the quickly evolving field of learning science to the design process;
• create effective technology-enhanced instruction that includes analysis, design, development, implementation and evaluation;
• recognize and adapt learning environments, tools, methods, and strategies to engage and optimize learning for disabled populations;
• negotiate an effective instructional design and development initiative that meets the needs of a real client; and
• plan, develop, evaluate, and manage the rapid design/development of effective instructional materials.

Admission Requirements
Applicants for the program will follow the University standards for admission to graduate study. Prospective students must minimally have earned a bachelor’s degree from an accredited institution and have an undergraduate GPA of 3.0 or higher to be considered for admission (graduate degree GPAs will be considered along with the undergraduate GPA). In addition, prospective students are required to submit the following:

a) Completed Application Form including official transcripts from all universities or colleges attended
b) Two letters of recommendation
c) Personal essay
d) Resume
e) Application fee

The Program Manager will evaluate the applicant’s potential and commitment to succeed in graduate study seeking advice from the Program Director in cases where evidence is not clear. The applicant’s potential to contribute to the overall quality of the program of study will also be considered. An Interview/Intake Advisement session will be held for those candidates who pass the initial screening. Decisions will be made using dates corresponding to the regular University schedule for rolling admissions in Graduate Admissions.

Program Requirements

Required Core Courses:

EDLT 532 Designing Virtual Communities for Staff Development - Non-Field Experience 3.0
EDLT 536 Learning Sciences and Instructional Design 3.0
EDLT 550 Introduction to Instructional Design 3.0
EDLT 554 Learning with Social Media and Mobiles 3.0
EDLT 811 Designing and Developing Multimedia Applications for Learning 3.0
ELL 502 E-Learning Technologies 3.0
ELL 504 Learning Technologies & Disabilities 3.0

Required Capstone Courses:

EDLT 539 E-Learning Technologies 1.5
EDLT 540 E-Learning Technologies 4.5

Total Credits 27.0

Certificate in Learning in Game-Based Systems Environments

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 27.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13.0501
Standard Occupational Classification (SOC) Code: 25-9031
The certificate in learning in game-based system environments prepares educators to effectively use educational games in and out of the classroom and training center. The program provides an overview of game development processes, enables participants to build basic games, and most importantly, examines how to assess and evaluate the learning experience as it relates to educational games.

The certificate program culminates with a capstone project in which students produce their own basic educational game and subsequently formulate an evaluative process to address its effectiveness.

### Required Courses

**EDLT 541** Foundations of Game-Based Learning 3.0  
**EDLT 542** Research in Motivation & Game-based Learning 3.0  
**EDLT 543** Play & Learning in a Participatory Culture 3.0  
**EDLT 544** Integrating Games & Pedagogical Content Knowledge 3.0  
**EDLT 545** Design & Development of Learning Games I 3.0  
**EDLT 546** Design & Development of Learning Games II 3.0  
**EDLT 547** Capstone Project I 1.5  
**EDLT 548** Capstone Project II 4.5  
**EDUC 535** Researching & Evaluating Instructional Technology 3.0

**Total Credits** 27.0

* Certain courses an be waived if the student has completed equivalent courses in his or her undergraduate education and can demonstrate proficiency.

### Certificate in Mathematics Learning & Teaching

**Certificate Level:** Graduate  
**Admission Requirements:** Bachelor's degree  
**Certificate Type:** Graduate  
**Number of Credits to Completion:** 20.0  
**Instructional Delivery:** Online, Campus  
**Calendar Type:** Quarter  
**Expected Time to Completion:** 1 year  
**Financial Aid Eligibility:** Not aid eligible  
**Classification of Instructional Program (CIP) Code:** 13.1311  
**Standard Occupational Classification (SOC) Code:** 25-1022

Building on the existing offerings of the Mathematics Learning and Teaching Program, this graduate certificate will enable current mathematics teachers and leaders to apply for State-Approved Endorsements in Mathematics Coaching. The program is designed to address the needs of math coaches and leaders for all levels of pre-K-12 education. However, the program’s flexible design will allow for students to specialize in preK-12, pre-K-8 or 6-12 mathematics coaching and leadership through appropriate selection of Mathematics Education Core courses.

### Mathematics Education Core Courses

**Select Two Courses:** 6.0  
**MTED 500** Learning and Teaching Number and Operation  
**MTED 501** Proportional and Algebraic Reasoning  
**MTED 502** Geometry & Spatial Reasoning  
**MTED 503** Data Analysis and Probabilistic & Statistical Reasoning

**MTED 511** Functions through the Curriculum  
**MTED 521** Collaborative Instructional Design & Analysis I 3.0  
**MTED 542** Mathematics Coaching and Leadership 3.0  
**MTED 543** Practicum in Mathematics Coaching and Leadership 2.0  
**MTED 561** Problem Solving Strategies 3.0  
**EDAM 524** Mentoring and Collaborative Leadership 3.0

**Total Credits** 20.0

**Certificate in Mathematics Learning & Teaching**

### Certificate in Math Leadership & Coaching

**Certificate Level:** Graduate  
**Admissions Requirements:** Bachelor's degree  
**Certificate Type:** Graduate  
**Number of Credits to Completion:** 15.0  
**Instructional Delivery:** Online  
**Calendar Type:** Quarter  
**Expected Time to Completion:** 1 year  
**Financial Aid Eligibility:** Not aid eligible  
**Classification of Instructional Program (CIP) Code:** 13.1311  
**Standard Occupational Classification (SOC) Code:** 25-1022

The certificate in mathematics learning and teaching requires the completion of 15.0 credit hours of coursework and is designed to provide mathematics teachers with development opportunities for enhancing the quality of their instruction. Recognizing that many teachers pursue graduate studies while working full-time, the program has been designed such that it can be completed over five quarters (requiring only one course per quarter), and is offered in an online format.

Students in the certificate program take courses alongside those in the MS in Mathematics Learning & Teaching (p. 383). All of the certificate courses can be counted towards MS in Mathematics Learning & Teaching program. Additionally, certificate students may concurrently pursue the MS in Teaching, Learning and Curriculum (p. 388).

### Certificate Requirements

**Required Course**  
**MTED 601** Diagnosing Student Mathematical Thinking 3.0  
**Select two of the following:** 6.0  
**MTED 501** Proportional and Algebraic Reasoning  
**MTED 502** Geometry & Spatial Reasoning  
**MTED 503** Data Analysis and Probabilistic & Statistical Reasoning  
**MTED 511** Functions through the Curriculum  

Students select 6.0 additional credits from any 600-700 level MTED courses.

**Total Credits** 15.0

### Certificate in Museum Education

**Certificate Level:** Graduate  
**Admissions Requirements:** Bachelor’s  
**Certificate Type:** Certificate  
**Number of Credits to Completion:** 18.0  
**Instructional Delivery:** Campus
Certificate in Student Development and Affairs

Certificate Level: Graduate
Admission Requirements: Bachelor’s degree
Certificate Type: Graduate
Number of Credits of Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13.0406
Standard Occupational Classification (SOC) Code: 11-9033

The certificate in student development and affairs is an option for students and professionals who have already completed a bachelor’s degree and would like to enhance their professional credentials without pursing a master’s degree.

Additional Information
For additional information, visit Drexel University’s Higher Education, Administration and Leadership (http://drexel.edu/soe/academics/graduate/higher-education) page.
The program is offered through a blended delivery system combining both on-campus classes and online education. All on-campus courses have an online component. The other option is a fully online program.

For additional information about this program, visit the School of Education's Graduate (https://webedit.drexel.edu/soe/academics/graduate) web site.

**Admission Requirements**

**Application Requirements for New Applicants**

For details regarding the items below please review the Admission Application Checklist (http://www.drexel.edu/grad/apply/checklist).

- **Transcripts** from all colleges and universities attended verifying completion of a master's degree (with 3.5 GPA or better) in education or an appropriate field and undergraduate degree in an appropriate major
- **Résumé** indicating at least 3 years of work experience relevant to applicant's professional goals
- **Three letters of recommendation**: Use the Electronic Letter of Recommendation (https://deptapp.drexel.edu/em/LOR) form to submit recommendation letters
- **Essay**: Discuss professional goals and aspirations, including how current skills, along with advanced study of educational leadership, will be of support in the attainment of those goals.
- **Writing sample**: Submit a 5- to 30-page writing sample that demonstrates writing abilities and potential success in the program. Examples include, but are not limited to, a journal article, a paper written for a class, or a manual or technical report.
- **Interview**: at the discretion of the application review team.

**Supplemental Application Materials for New Applicants**

To make your application more competitive, applicants are encouraged to submit two (2) or more of the following items:

- Detailed statement describing sustained Leadership Activities
- Detailed statement describing significant Creative Activities/Products
- Detailed statement describing significant Research Activities/Publications
- GRE or MAT scores

Additional information about how to apply is available on the Graduate Admissions at Drexel University (http://www.drexel.edu/grad/programs/edu/educational-leadership-and-management) website.

**Degree Requirements**

Students in the EdD program are required to complete core courses including education courses and MBA courses. Students complete courses within their areas of specialization prior to completing required research courses. At that point, students begin the dissertation phase of the EdD program.

**EdD Candidacy Requirements**

In summary, the sequence of events leading to the EdD candidacy include the following:

- All courses must be passed with a grade of B or better.
- In the fifth quarter, the comprehensive exam must be passed.

- In the ninth quarter, the dissertation proposal must be approved by committee (proposal hearings; filing of the D4 and 4A forms upon approval. At this point students have completed 54.0 of the 60.0 credits required in the program.)
- In terms 10-12, students register for Dissertation. As per the current policy, students pay one credit of tuition but register for multiple credits. A minimum of two credits are needed in the twelfth quarter to accrue the needed 60.0 credits.

**Required Courses**

**Core Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 502</td>
<td>Essentials of Economics</td>
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</tr>
<tr>
<td>EDUC 800</td>
<td>Educational Leadership &amp; Change</td>
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</tr>
<tr>
<td>EDUC 801</td>
<td>Creative Strategies For Educational Leaders</td>
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<td>EDUC 802</td>
<td>Using and Integrating Learning Technologies</td>
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<tr>
<td>EDUC 804</td>
<td>Program Evaluation in Organizations</td>
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<tr>
<td>ORGB 625</td>
<td>Leadership and Professional Development</td>
<td>3.0</td>
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</table>

**Concentration Course Options (See Below)**

**Research Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 803</td>
<td>Educational Research Design I</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 810</td>
<td>Educational Research Design II</td>
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</tr>
<tr>
<td>EDUC 815</td>
<td>Writing for Research, Publication and Funding in Education</td>
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</tr>
<tr>
<td>EDUC 818</td>
<td>Applied Research Study</td>
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<td>EDUC 835</td>
<td>Quantitative Research Methods and Data Analysis</td>
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<td>EDUC 836</td>
<td>Qualitative Research Methods and Data Analysis</td>
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<tr>
<td>EDUC 881</td>
<td>Doctoral Seminar (EdD)</td>
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**EdD Candidacy Courses**

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<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EDUC 998</td>
<td>PhD Dissertation</td>
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</table>

**Total Credits**

60.5-61.5

**Concentration Course Options**

Students and their advisors craft a program concentration that is most appropriate for their needs and background. Concentration availability may depend on campus location as well as other factors. Students should work closely with their advisors at the School of Education.

There are two sets of concentration courses for Higher Education depending on whether or not students are already entering the program with a background in higher education.

**Higher Education**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EDHE 500</td>
<td>Foundations of Higher Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 510</td>
<td>Governance, Management &amp; Administration in Higher Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 530</td>
<td>Higher Education Law</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 669</td>
<td>Diversity in Higher Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 506</td>
<td>Comparative Higher Education Systems</td>
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</table>

**Total Credits**

15.0

* For students entering the program without previous formal study in Higher Education.

**Higher Education Concentration (alternative)**

<table>
<thead>
<tr>
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<th>Title</th>
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<tr>
<td>EDAE 601</td>
<td>Foundations of Adult Education</td>
<td>3.0</td>
</tr>
<tr>
<td>Course Code</td>
<td>Course Title</td>
<td>Credits</td>
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</tr>
<tr>
<td>EDHE 634</td>
<td>Proposal Writing &amp; Sponsored Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 640</td>
<td>Foundations of Institutional Research</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 646</td>
<td>Survey Tools, Statistical Software &amp; Effective Reporting</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 664</td>
<td>Strategies for Educational Success</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td>15.0</td>
</tr>
</tbody>
</table>

**For students entering the program with a strong background in Higher Education who are looking for an extension of their previous studies.**

### Educational Administration (Pennsylvania Superintendent Certification) †

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDEX 712</td>
<td>Instructional &amp; Curriculum Leadership in Special Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 817</td>
<td>Curriculum Models</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 820</td>
<td>School Superintendency</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 824</td>
<td>Parents and Schools</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 827</td>
<td>School Superintendant's Internship: Curriculum Models</td>
<td>1.0</td>
</tr>
<tr>
<td>EDUC 828</td>
<td>School Superintendant's Internship: Parents and Schools</td>
<td>1.0</td>
</tr>
<tr>
<td>EDUC 829</td>
<td>School Superintendent's Internship III</td>
<td>1.0</td>
</tr>
<tr>
<td>EDUC 830</td>
<td>School Superintendent's Internship IV</td>
<td>1.0</td>
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<tr>
<td><strong>Total Credits</strong></td>
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<td>16.0</td>
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</tbody>
</table>

† For students with the background and interest in seeking PA School Superintendent Certification

### Athletic Administration Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>SMT 601</td>
<td>Sports Industry Management</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 602</td>
<td>Sport Law &amp; Risk Management</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 606</td>
<td>Contemporary Issues in Sport</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 612</td>
<td>Development &amp; Fundraising Strategies in Sport</td>
<td>3.0</td>
</tr>
<tr>
<td>SMT 635</td>
<td>Sport Facilities &amp; Event Management</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Human Resource Development Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHRD 500</td>
<td>Foundations of Human Resources Development ††</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 601</td>
<td>Leading and Evaluating Change</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 602</td>
<td>Coaching and Mentoring for Sustainable Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 604</td>
<td>Development of Human Resources</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 606</td>
<td>Human and Organizational Performance</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td>15.0</td>
</tr>
</tbody>
</table>

†† A 3.0 credit substitute course will be identified to replace EHRD 500 for students who have already earned a master's degree in Human Resource Development.

### Educational Policy Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
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<td>EDPO 620</td>
<td>Education Policy: Concepts, Issues, and Applications</td>
<td>3.0</td>
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<td>EDPO 624</td>
<td>Shaping of American Education Policy: Global Forces</td>
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<td>EDPO 632</td>
<td>Ethics in Educational Policy Making</td>
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<td>EDPO 636</td>
<td>Access &amp; Equity in Educational Policy Making</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Global and International Education Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDGI 500</td>
<td>Introduction to Global, International &amp; Comparative Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 504</td>
<td>History and Theory of Comparative Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 510</td>
<td>Culture, Society &amp; Education in Comparative Perspective</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 512</td>
<td>Globalization and Educational Change</td>
<td>3.0</td>
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<tr>
<td>EDGI 514</td>
<td>Education and National Development</td>
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<tr>
<td><strong>Total Credits</strong></td>
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</table>

### Learning Technologies Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>EDLT 532</td>
<td>Designing Virtual Communities for Staff Development - Non-Field Experience</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 537</td>
<td>Technologies for Performance Support</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 543</td>
<td>Play &amp; Learning in a Participatory Culture</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 550</td>
<td>Introduction to Instructional Design</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 501</td>
<td>The Purpose and Business of E-Learning</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td>15.0</td>
</tr>
</tbody>
</table>

### Creativity & Innovation Concentration

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRTV 501</td>
<td>Foundations in Creativity</td>
<td>3.0</td>
</tr>
<tr>
<td>CRTV 502</td>
<td>Tools and Techniques in Creativity</td>
<td>3.0</td>
</tr>
<tr>
<td>CRTV 503</td>
<td>Creativity in the Workplace</td>
<td>3.0</td>
</tr>
<tr>
<td>CRTV 620</td>
<td>Research Methods and Assessment of Creative and Innovative Thinking</td>
<td>3.0</td>
</tr>
<tr>
<td>CRTV 630</td>
<td>Global Perspectives on Creativity</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td>15.0</td>
</tr>
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**Graduate Intern Teaching Certificate**

**Certificate Level:** Graduate

**Admission Requirements:** Bachelor's degree

**Certificate Type:** Post-Baccalaureate

**Number of Credits to Completion:** 33.0 (secondary); 42.0 (Pre-K)

**Instructional Delivery:** Campus, Online

**Calendar Type:** Quarter

**Expected Time to Completion:** 1 - 3 years

**Financial Aid Eligibility:** Not aid eligible

**Classification of Instructional Program (CIP) Code:** 13.1202; 13.1205

**Standard Occupational Classification (SOC) Code:** 25-2021; 25-2022; 25-2031

**Admission Requirements**

Applicants for the Graduate Intern Teaching Certificate program must complete an interview with a teacher education advisor before completing a graduate application. During this interview the applicant’s transcripts are evaluated in relation to Pennsylvania state standards for the specific certification area. If coursework is dated, a content exam or additional coursework may be required. Life experience that demonstrates knowledge of the content area will be considered. Additional coursework in the content area may be required to meet certification standards. In
addition, applicants must meet the general admission requirements for graduate studies at Drexel University.

Program Requirements
Graduate Intern Teaching Certificate applicants for secondary certification must have a bachelor’s degree in an area related to that in which they intend to become certified. Minimum coursework requirements include 33.0 credits (secondary) and 42.0 credits (PreK-4) of pedagogy, which may be incorporated into the graduate Teaching, Learning and Curriculum master’s degree program in the subject area of certification.

Intern teachers may obtain a full-time teaching position after they have been recommended for the Pennsylvania Department of Education Intern Teaching Certificate. To be recommended, students must be admitted into the Drexel graduate program, obtain at least a B in EDUC 520 Professional Studies in Instruction, EDEX 542 Fundamentals of Special Education, the appropriate methods course, and EDUC 540 Field Experience, and obtain the necessary scores on the appropriate sections of the Praxis Series assessment through Educational Testing Service (ETS) for Secondary Certification or PECT exams through Pearson Education for PreK-4 Certification.

Completion of all required pedagogy coursework with at least a B in each and a B average in required content courses and passing the appropriate Pennsylvania state licensing exams will satisfy requirements for Pennsylvania Instructional I Certification.

Instructional Technology Specialist Certificate
Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 34.5
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.0501
Standard Occupational Classification (SOC) Code: 25-9031

The instructional technology specialist certificate program was designed to address the dramatically increasing need in public education for certified instructional technology specialists at every level of K-12 schooling.

Applicants for instructional technology specialist certification should ideally possess valid Pennsylvania Instructional I or II Teaching Certification. Students working on their initial teaching certificate may begin working toward this certificate with special permission of a teacher education advisor. (Visit the School of Education [http://www.drexel.edu/soe] for additional information.)

Minimum coursework requirements for the instructional technology specialist certificate include 25.5-31.5 credits of specific pedagogy. The PA Certification requires a “B” or better in all certification coursework. If a student seeks the Instructional Technology Specialist PA Certification without a previous held teaching certificate, he or she will need to complete EDUC 522 (p. 363) and EDUC 525 (p. 363).

Core Courses
EDLT 534 Developing Educational Leaders Using Technology 3.0
EDLT 535 Researching & Evaluating Instructional Technology 3.0
EDUC 565 Foundations in Instructing English Language Learners 3.0
EDEX 542 Fundamentals of Special Education 3.0
EDEX 544 The Inclusive Classroom 3.0
EDEX 552 Integrating Technology for Learning & Achievement 4.5
INFO 520 Social Context of Information Professions 3.0
INFO 640 Managing Information Organizations 3.0

Additional required courses for candidates without prior teacher certification:
EDUC 522 Evaluation of Instruction 0.0-6.0
EDUC 525 Multi-Media Instructional Design

Total Credits 28.5-34.5

Applied Behavior Analysis
Major: Applied Behavior Analysis
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 42.2814
Standard Occupational Classification (SOC) code: 19-3031

Behavior analysis is a widely accepted and validated scientific approach to the description and investigation of the environmental arrangements that occasion behavior. More than 60 years of research with proven methods and impressive findings has helped develop the technology now called applied behavior analysis. Over the past five decades, behavior analytic clinical and research advances have led to significant contributions in education programming, and mental health and behavioral health therapies.

The Master of Science in Applied Behavior Analysis will prepare clinical and educational leaders in the field of evidence-based interventions using behavior analytic theory and techniques. Leaders from this program will be highly successful candidates for institutions searching for knowledgeable and skilled behavior analytic consultants, program coordinators, senior clinical directors and interventionists. These students will also be prepared to transition to PhD programs in Applied Behavior Analysis, School and Clinical Psychology, and Experimental Psychology.

The Behavior Analyst Certification Board, Inc.® has approved the Master's Core Applied Behavior Analysis course sequence as meeting the coursework requirements for eligibility to take the Board Certified Behavior Analyst Examination®. Applicants will have to meet additional requirements to qualify.

Additional Information
For more information about this program, contact:
Dr. Christina Vorndran
Associate Clinical Professor
Applied Behavior Analysis Program
cmv69@drexel.edu
Admission Requirements

Applicants for the program will follow the university standards for admission to graduate study. Prospective students must have earned a bachelor's degree from an accredited institution and have an undergraduate GPA of 3.0 or higher to be considered for admission (graduate degree GPAs will be considered along with the undergraduate GPA).

In addition, prospective students are required to submit the following:

- Completed Application Form including official transcripts from all universities or colleges attended
- Two letters of recommendation
- Personal essay
- Resume
- Application fee

The admissions committee will evaluate the applicant's potential and commitment to succeed in graduate study. The applicant's potential to contribute to the overall quality of the program of study will also be considered.

Interviews, in person or by phone, will be conducted by the admissions committee with those applicants who meet Graduate Admission's standard admissions criteria.

Decisions will be made using dates corresponding to the regular university schedule for rolling admissions in Graduate Admissions.

Additional Information

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Associate Clinical Professor
Applied Behavior Analysis Program
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Degree Requirements

Requirements

Core Applied Behavior Analysis Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDEX 630</td>
<td>Fundamental Elements of Behavior Change</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 631</td>
<td>Measurement and Experimental Design</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 632</td>
<td>Behavioral Assessment and Functional Analysis</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 633</td>
<td>Behavioral Interventions</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 634</td>
<td>Consultation, Systems Change and Supervision</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 635</td>
<td>Ethical Considerations and Professional Conduct</td>
<td>4.5</td>
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</table>

Select one option from the following: 12.0

Option 1: Autism Spectrum Disorders Concentration

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>EDEX 556</td>
<td>Characteristics &amp; Methods: Autism</td>
</tr>
<tr>
<td>EDEX 558</td>
<td>Characteristics &amp; Methods: High Functioning Autism</td>
</tr>
<tr>
<td>EDEX 560</td>
<td>Communication &amp; Language Interventions: Autism Spectrum Disorders</td>
</tr>
<tr>
<td>EDEX 562</td>
<td>Behavior &amp; Sensory Support: Autism Spectrum Disorders</td>
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Option 2: Professional Electives

<table>
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<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDEX 700</td>
<td>Practicum in Applied Behavior Analysis</td>
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Capstone Courses

<table>
<thead>
<tr>
<th>Course</th>
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<tr>
<td>EDEX 700</td>
<td>Practicum in Applied Behavior Analysis</td>
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<tr>
<td>EDEX 700</td>
<td>Practicum in Applied Behavior Analysis</td>
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</tr>
<tr>
<td>EDEX 700</td>
<td>Practicum in Applied Behavior Analysis</td>
<td></td>
</tr>
<tr>
<td>ABA elective (EDEX course, 3.0 credits, dealing with Autism selected in consultation with Program Manager or Advisor)</td>
<td></td>
<td></td>
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</tbody>
</table>

Total Credits 45.0

The Behavior Analyst Certification Board, Inc.® has approved the Core Applied Behavior Analysis course sequence as meeting the coursework requirements for eligibility to take the Board Certified Behavior Analyst Examination®. Applicants will have to meet additional requirements to qualify.

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Creativity and Innovation

Major: Creativity and Innovation
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 13-9999
Standard Occupational Classification (SOC) code: 11-9199

About the Program

In a world of increasing complexity, change, and competition, generating new ideas and bringing them to the table is now essential for corporate management. Creativity is multidisciplinary — it is in all professional fields from chemistry to engineering, from education to computer science, and from sociology to business. Successful organizations, in all fields, view creativity as vital and are the ones that instill creativity throughout the organization. The application of creativity skills distinguishes managers who maintain the status quo from leaders who inspire a new direction or vision. By internalizing the spirit of creativity and the principles of creative problem solving, individuals can be transformed into change leaders.

Upon successful completion of this master's degree program, students will be able to recognize problematic situations within various settings. They will also enable their organization to foster creative environments and identify creative problem-solvers within their workforce.

For more information, visit Drexel University Online's MS in Creativity and Innovation (http://www.drexel.com/online-degrees/business-degrees/ms-creativity-innovation) website.

Degree Requirements

Required Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CRTV 501</td>
<td>Foundations in Creativity</td>
<td>3.0</td>
</tr>
<tr>
<td>CRTV 502</td>
<td>Tools and Techniques in Creativity</td>
<td>3.0</td>
</tr>
<tr>
<td>CRTV 503</td>
<td>Creativity in the Workplace</td>
<td>3.0</td>
</tr>
</tbody>
</table>
CRTV 610  Creativity and Change Leadership  3.0
CRTV 620  Research Methods and Assessment of Creative and Innovative Thinking  3.0
CRTV 630  Global Perspectives on Creativity  3.0
CRTV 640  Creativity & Innovation: 1500-Present  3.0
CRTV 650  Current Trends in Creativity & Innovation  3.0
CRTV 660  Diagnostic Creative Intervention  3.0

Total Core Credits  27.0
Professional Electives  18.0
Electives will be selected in consultation with the Program Director and/or Advisor.
Total Credits  45.0

Suggested Electives
Consider three courses from the following options:
EDAM 500  Leading in Urban, Rural and Suburban Settings
EDPO 620  Education Policy: Concepts, Issues, and Applications
EDPO 628  American Educational Policy and U.S. Competitiveness
EDPO 632  Ethics in Educational Policy Making
EDHE 680  Foundations of Evaluation
EDHE 682  The Evaluation Process
EDLT 537  Technologies for Performance Support
EDLT 538  New Media Literacies
EDUC 516  Diversity and Today's Teacher
EDUC 532  Designing Virtual Communities for Staff Development - Non-Field Experience
EDUC 561  Mediating and Resolving Conflict in School Settings
EDUC 702  School Leadership & Decision Making
EDUC 800  Educational Leadership & Change
EDUC 804  Program Evaluation in Organizations

Education Improvement and Transformation

Major: Education Improvement and Transformation
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 13-9999
Standard Occupational Classification (SOC) code: 11-9032; 11-9033; 11-9099

About the Program

One of the great challenges of our time is the improvement of the American education system from pre-school through retirement. Once the envy of the world, there are cracks in the education crucible which must be repaired or reforged. The system has endured social, intellectual, and economic challenges beyond its capacity to respond in a way that provides a sound foundation for all Americans, while keeping our country safe and competitive for the future.

The MS in Education Improvement and Transformation program is designed to prepare professional educators—as well as other professionals whose career interests lie in leading significant change in education—in the process of initiating transformative (reform) in formal and informal education sectors.

The program is comprised of “Professional Development Concentrations” (PDC), each focusing on specific topics pertaining to the improvement and transformation of education. Each PDC is comprised of nine credits (or 3 courses) of focused course work in a specific area, i.e.:

• Collaborative Special Education Law and Process
• Creativity and Innovation
• E-Learning Leadership
• Educational Policy
• Evaluation and Assessment
• Instructional Design
• Leadership in Educational Settings
• Learning in Game-based Environments
• Learning Technologies
• Special Education Leadership
• Urban Education

Students may opt to create their own PDC with advisement of the Program Manager for the MS in Education Improvement and Transformation program.

After students complete four PDC’s totaling a minimum of 36.0 credits, they will finish the program by enrolling in two sequential courses (9.0 additional credits) that jointly form a capstone project to provide a real-life, hands-on experience in being an agent for change in transformative education. The combination of the 4 PDC’s and the two capstone project courses provides the student with the 45.0 credits required for the MS degree.

Additional Information

For additional information, visit Drexel University’s Master of Science Program’s in Education (http://www.drexel.edu/soe/academics/graduate) page.
Degree Requirements

The Master of Science in Education Transformation program is comprised of 14 courses. The core of the program is made up of four "Professional Development Concentrations" in strategic education improvement areas and topics.

These concentrations are listed under the Certificate Programs in Education and Transformation (https://nextcatalog.drexel.edu/graduate/schoolofeducation/educationimprovement), and include areas such as assessment, strategic partnership, change leadership, educational policy, disabilities, virtual schools, charter schooling, home schooling, community engagement & development, urban education, school boards, and financing education. Additional concentrations may be developed on a topical needs or special population-based basis.

The final two courses of the program consist of a 4.5 credit Evaluation & Assessment courses and a 4.5 credit Capstone Project. The Capstone Project is an individualized course.

Degree Requirements

Students complete four areas of professional development concentration. These 9.0 credit concentrations correspond to certificates offered in the Education and Improvement and Transformation program. View those certificate programs for a list of courses.

Project/Capstone Requirements

<table>
<thead>
<tr>
<th>EIT 715</th>
<th>EIT Evaluation, Assessment and Capstone Preparation</th>
<th>4.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 799</td>
<td>Course EDUC 799 Not Found (EIT Capstone Project)</td>
<td>4.5</td>
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**Educational Administration**

**Major: Educational Administration**

**Degree Awarded: Master of Science (MS)**

**Calendar Type: Quarter**

**Total Credit Hours: 45.0**

**Classification of Instructional Programs (CIP) code: 13.0401**

**Standard Occupational Classification (SOC) code: 11-9032**

**About the Program**

The MS in Educational Administration program is designed to prepare and mentor future leaders using state and national leadership standards with the practical skills, knowledge, and internship experiences to become effective leaders in rural, urban, and suburban schools. The vision of the program is to create a collaborative and mentoring community of school leaders who contribute to a “research of practice” that significantly improves learning for all students.

Using state and national leadership standards, this master’s degree is designed to prepare and mentor future elementary and secondary educational leaders with the practical skills, knowledge and internship experiences to become effective leaders in rural, city and suburban schools. This program is ideal for prospective students holding a teaching or counseling certificate who wish to advance into school administration with principal certification.

The program is designed as a part-time cohort model, and can be completed in two years. View the degree requirements (p. 369) for more detailed information about the courses.

**Program Objectives**

Graduates of the MS in Educational Administration program will be prepared to:

- Meet Pennsylvania certification standards
- Facilitate the development, articulation, implementation, and stewardship of a school/district vision of learning that is shared and supported by the school community
- Advocate, nurture, and sustain a school culture and instructional program conducive to student learning and staff professional growth
- Ensure management of the organization, operations, and resources for a safe, efficient, and effective learning environment
- Collaborate with families and community members, responding to diverse community interests and needs, and mobilizing community resources
- Act with integrity, fairness, and in an ethical manner
- Understand, respond to, and influence the larger political, social, economic, legal, and cultural context
- Monitor and evaluate students’ achievements and programs on challenging standards for external and internal accountability goals
- Build teacher leadership capacity and mentor principal interns
- Conduct and share action research that documents sustainability in meeting school accountability goals and has practical, immediate, and useful application for other educators

For additional information, visit the School of Education’s MS in Educational Administration (http://drexel.edu/soe/academics/graduate/educational-administration) web page or the Drexel University Online (http://www.drexel.com/online-degrees/education-degrees/ms-ed-admin) web site.

**Admission Requirements**

Acceptance for graduate study in Drexel University’s School of Education requires:

- Bachelor’s degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate degree GPAs will be considered along with the undergraduate GPA).
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, you may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online (use our email address, customerservice@drexel.com). You must supply transcripts regardless of the number of credits earned or the type of school you attended. If you do not list all post-secondary institutions on your application and these are listed on transcripts received from other institutions, processing of your application will be delayed until you have submitted the remaining transcripts. Use the Transcript Lookup Tool (http://www.drexel.com/tools/transcript.aspx) to assist you in contacting your previous institutions. If a college or university that you
attended offers the option to send transcripts in a secure, password-protected electronic format, you may have the transcript sent to customerservice@drexel.com.

- Two letters of recommendation, either professional or academic.
  - Drexel University Online now accepts electronic letters of recommendation. Please access the following webpage for instructions regarding their submission: https://deptapp08.drexel.edu/ems/LOR/. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
  - One letter of recommendation must come from the principal of the school where the applicant has worked. (Recommendation must include applicant’s presentation skills and experiences in leadership roles help in a K-12 school setting as well as the skills observed that would have a strong bearing on the applicant’s success as a school leader and administrator.)
  - An essay describing why the applicant is interested in pursuing graduate study in this field.
  - Applicant must include two paragraphs briefly describing their educational philosophy and explaining how principals shape learning in K-12 schools.

- International Students (http://www.drexel.com/online-degrees/education-degrees/ms-ed-admin/international.aspx): must submit a TOEFL score of 550 or higher. Students with transcripts from non-US institutions should have such transcripts evaluated by World Education Service (WES). The TOEFL examination is required for some non-citizens.

### Degree Requirements

#### Option 1: MS in Educational Administration (with principal certification)

<table>
<thead>
<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>EDUC 702</td>
<td>School Leadership &amp; Decision Making</td>
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</tr>
<tr>
<td>EDUC 705</td>
<td>School Law and Politics</td>
<td>3.0</td>
</tr>
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<td>and Management</td>
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<td>EDUC 710</td>
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<td>EDUC 715</td>
<td>School Principal Internship: Technology</td>
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<td>EDUC 716</td>
<td>School Principal Internship: Finance</td>
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<td>EDUC 717</td>
<td>School Principal Internship: Leadership</td>
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<tr>
<td>EDUC 718</td>
<td>School Principal Internship: School and Community Relations</td>
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**Advanced Leadership Courses**

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<tbody>
<tr>
<td>EDAM 500</td>
<td>Leading in Urban, Rural and Suburban Settings</td>
<td>3.0</td>
</tr>
<tr>
<td>EDAM 502</td>
<td>Resource Management, Allocation and Entrepreneurship</td>
<td>3.0</td>
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<tr>
<td>EDAM 522</td>
<td>Evaluation &amp; Assessment Competencies</td>
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<tr>
<td>EDAM 524</td>
<td>Mentoring and Collaborative Leadership</td>
<td>3.0</td>
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<tr>
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<td>EDAM 528</td>
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<td>3.0</td>
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<tr>
<td>EDAM 540</td>
<td>Action Research Project</td>
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**Option 2: MS in Educational Administration (without principal certification)**

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<td>Integration of Technology with School Instruction</td>
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<td>and Management</td>
<td></td>
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<td>EDUC 710</td>
<td>School Finance and Facilities</td>
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<td>EDAM 522</td>
<td>Evaluation &amp; Assessment Competencies</td>
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#### 6 credits of MS electives

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</tbody>
</table>

**Total Credits** 45.0

- An MS elective can be any graduate course at Drexel University, as long as the student has attained prior Program Manager/Director approval for taking the course.

#### Performances

The performances for meeting Pennsylvania leadership standards and National Leadership Standards include a Leadership Portfolio. The Leadership Portfolio includes:

- Four Log Reflections – explaining growth in log reflection over each term
- Evidence of 600 hours across four terms logged in the Internship
- Logs over 48 weeks
- Four term Goal Statements and Reflections on accomplishments
- Two to three artifacts on each of the ELCC standards totaling 14 to 21 or more artifacts
- An explanation of how each artifact shows applications of skill on each identified standard
- Four evaluations on the ELCC Standards and Drexel Competencies completed by the school site supervising principal

In addition, students must have a passing score of 163 on the Pennsylvania PRAXIS, School Leaders Licensure Assessment (6011).

### Special Education Leadership Concentration

The Special Education Leadership concentration within the MS in Educational Administration leads to the Supervisor of Special Education Certification. The concentration is designed to produce educators who are equipped with the advanced skills, knowledge and competencies they will need to collaboratively lead programs that meet the needs of students at risk and with disabilities in multiple settings. The 46.0 credit program fulfills the requirements for the Pennsylvania Department of Education approved certification and a master's degree in Educational Leadership.

Candidates are required to complete 300 internship hours for the Supervisor of Special Education Certification. Eligibility for PA Special Education Leadership certificate requires verification that the candidate has completed five years of satisfactory professional school experience...
on a state-issued certificate appropriate for the assignment. All courses must be completed with a B or better.

**Required Core Courses for the MS Program**

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**Core Certification Courses**

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<td>Organization &amp; Administration of Special Education</td>
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</tr>
<tr>
<td>EDEX 721</td>
<td>Supervisor of Special Education Internship: Special Education Leadership</td>
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<tr>
<td>EDEX 722</td>
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<td>EDEX 723</td>
<td>Supervisor of Special Education Internship: Collaboration &amp; Personnel</td>
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<tr>
<td>EDEX 724</td>
<td>Supervisor of Special Education Internship: Finance &amp; Management</td>
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**MS elective**  

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</table>

**Total Credits**  

46.0

* An MS elective can be any graduate course at Drexel University, as long as the student has attained prior Program Manager/Director approval for taking the course.

**Special Education Leadership & Principal Leadership Concentration**

The Special Education Leadership & Principal Leadership concentration within the MS in Educational Administration leads to the Supervisor of Special Education Certification and Principal Certification. The concentration is designed to prepare future leaders with the tools and knowledge to collaboratively address special education programs and issues within a school setting. The 49.0 credit dual certification program fulfills the requirements for both Pennsylvania Department of Education approved certifications and a master’s degree.

Candidates are required to complete 300 internship hours for the Supervisor of Education Certification and 400 internship hours for Principal Certification.

Eligibility for PA Special Education Leadership certificate requires verification that the candidate has completed five years of satisfactory professional school experience on a state-issued certificate appropriate for the assignment.

Eligibility for the PA Principal certificate requires verification that the candidate has completed three years of satisfactory professional school experience on a state-issued certificate appropriate for the assignment and appropriate Praxis exam. All courses must be completed with a B or better.

**Required Core Courses for the MS Program**

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<td>Supervisor of Special Education Internship: Finance &amp; Management</td>
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</table>

**Total Credits**  

49.0

**Education Faculty**

W. Edward Bureau, PhD *(University of Pennsylvania)* Director of the Sacramento EdD. Clinical Associate Professor. Leadership, supervision, and capacity development.

Holly Carpenter, PhD *(Arizona State University)*. Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD *(University of Southern California)*. Program Coordinator for the MS in Higher Education Program at the Center for Graduate Studies in Sacramento. Clinical Professor. Higher education leadership and administration.

Ellen Clay, PhD *(University of Southwestern Louisiana)*. Auxiliary Assistant Professor. Professional development opportunities for teachers in the area of mathematics and mathematical thinking.
Rebecca Clothey, PhD (University of Pittsburgh) Director, Higher Education Program. Auxiliary Assistant Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

Marion Dugan, EdD (University of Pennsylvania). Auxiliary Associate Professor. Language arts, student teaching.

Stephen C. Ehrmann Associate Clinical Professor. Learning technologies, learning science, assessment, evaluation, and professional development strategies, used to help educators make visible improvements in programmatic learning outcomes.

Salvatore V. Falletta, EdD (North Carolina State University) Director of the Human Resource Development (HRD) program at Drexel University. Associate Clinical Professor. Human Resource intelligence (i.e., HR research and analytics practices); HRD assessment, measurement, and evaluation models and taxonomies; organizational diagnostic models; web-based employee and organizational survey methods, and computational modeling.

Aroutis N. Foster, PhD (Michigan State University). Assistant Professor. Educational psychology and educational technology, especially the following: Motivation; Technological Pedagogical Content Knowledge (TPACK); Immersive Interactive Digital Environments (simulation, games, virtual realities).

Kathy Geller, PhD (Fielding Graduate University). Assistant Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (University of Louisville, Kentucky). Assistant Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (University of Pittsburgh) Harrisburg EdD Educational Leadership & Change Program. Associate Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Mary Jo Grdina, PhD (Case Western Reserve University). Auxiliary Assistant Professor. Undergraduate studies, science education, curriculum design.

Dominic F. Gullo, PhD (Indiana University). Professor. Studying the relative and long-range effects of early schooling experiences in prekindergarten and kindergarten on children’s achievement and social adaptation to school routine.


Elizabeth Haslam, PhD (University of Pennsylvania). Auxiliary Associate Professor. Educational field coordinator, instructional design, qualitative evaluation, writing across the curriculum.

Jennifer Katz-Buonincontro, MFA, PhD (University of Oregon). Assistant Professor. Educational administration.

Kristine Lewis, PhD (Temple University). Assistant Professor. Experiences of students of African descent at predominantly white colleges and universities, college access and college student development, youth civic engagement in urban school reform, qualitative research and evaluation.

William Lynch, PhD (University of Maryland) Dean, Goodwin College of Professional Studies. Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.

Sonya Martin, PhD (Curtin University, Science and Mathematics Education Centre, Perth, Australia). Assistant Professor.

Michel Miller, PhD (University of Miami, Florida). Auxiliary Assistant Professor. Special education.

Sarah P. Reynolds, EdD (Saint Joseph's University) Program Director. Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Ellen B. Scales, PhD (Pennsylvania State University). Auxiliary Assistant Professor. Literacy, mathematics education, special education.

Jason Silverman, PhD (Vanderbilt University.) Director of the Program in Mathematical Learning and Teaching. Assistant Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers’ ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

David A. Urias, PhD (University of Virginia). Assistant Professor. International education, educational assessment, the influence of corporate philanthropy on higher education.

Sheila Vaidya, PhD (Temple University) Associate Director of Research and Outreach Programs. Associate Professor. Educational psychology, school psychology, research design.

Charles A. Williams, PhD (Temple University). Associate Teaching Professor. Prevention of school-aged violence.

Interdepartmental Faculty

Barbara Jean Hoekje, PhD (University of Pennsylvania) Director of English Language Center. Associate Professor. Sociolinguistic theory, discourse analysis, applied linguistics (language teaching, learning, and testing).

Fredricka K. Reisman, PhD (Syracuse University) Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

Educational Administration

Special Education Leadership Concentration

The Special Education Leadership concentration within the MS in Educational Administration leads to the Supervisor of Special Education Certification. The concentration is designed to produce educators who are equipped with the advanced skills, knowledge and competencies they will need to collaboratively lead programs that meet the needs of students at risk and with disabilities in multiple settings. The 46.0 credit program fulfills the requirements for the Pennsylvania Department of Education approved certification and a master’s degree in Educational Leadership.

Candidates are required to complete 300 internship hours for the Supervisor of Special Education Certification. Eligibility for PA Special
Education Leadership certificate requires verification that the candidate has completed five years of satisfactory professional school experience on a state-issued certificate appropriate for the assignment. All courses must be completed with a B or better.

**Admission Requirements**

- Bachelor's degree from a regionally accredited institution
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA)
- Completed Application
- Official Transcripts (from all colleges attended)
- Essay discussing your professional goals and interests in the program
- Two Recommendation Letters – Academic or Professional
- Proof of state-issued special education teacher certificate required

**Degree Requirements**

**Required Core Courses for the MS Program**

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<tr>
<td>EDEX 721</td>
<td>Supervisor of Special Education Internship: Special 1.0 Education Leadership</td>
<td>1.0</td>
</tr>
<tr>
<td>EDEX 722</td>
<td>Supervisor of Special Education Internship: Instructional Leadership</td>
<td>1.0</td>
</tr>
<tr>
<td>EDEX 723</td>
<td>Supervisor of Special Education Internship: Collaboration &amp; Personnel</td>
<td>1.0</td>
</tr>
<tr>
<td>EDEX 724</td>
<td>Supervisor of Special Education Internship: Finance &amp; Management</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**MS elective**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits** 46.0

- An MS elective can be any graduate course at Drexel University, as long as the student has attained prior Program Manager/Director approval for taking the course.

**About the Program**

The MS in Global and International Education is designed to prepare students with the skills and knowledge necessary to work effectively within the complex economic, political, cultural, and social contexts that influence education and learning in diverse parts of the world. In addition to being aware of the global trends and issues of diverse approaches to education, students will develop the attitudes necessary to support learners and learning within and beyond mainstream educational systems.

The program prepares students to work effectively with the complex global challenges, trends, and issues influencing education and learning in diverse parts of the world, including the United States.

Today, leaders are needed who are trained with the skills and practical knowledge required to work effectively within the context of global economic, political, cultural, and community influences on education, are aware of global trends and issues in the field of education, recognize the various dimensions of educational interventions and are able to analyze the implications for learners within and beyond mainstreams, and can critique the roles and approaches of international, comparative, and educational research. The program provides these necessary tools, experiences, understandings, and related attitudes.

**Program Objectives**

The mission of the Master of Science in Global and International Education program is to prepare students with the skills, knowledge, and attitudes necessary to work effectively with the complex economic, political, cultural, and social contexts that influence education and learning in diverse parts of the world. In addition to being aware of global trends and issues of diverse approaches to education, students will develop the attitudes necessary to support learners and learning within and beyond mainstream educational systems.

Graduates of this program will be qualified to pursue careers in higher education, ESL programs, education abroad, law firms, international education associations, accreditation agencies, local community international outreach centers, US government, international development or human service agencies, non-governmental agencies, as well as act as administrators, managers, and researchers in national and international organizations, foundations, associations, and corporations.

Graduates of this program will lead their organizations in addressing the dramatic change in society and culture due to globalization and how these influence education.

The program is designed as a part-time cohort model, and can be completed in two years. View the degree requirements for more detailed information about the courses.

**Additional Information**

For more information about this program, contact the Program Manager/ Academic Advisor:

Samantha Mercanti-Anthony
School of Education
Admission Requirements

Admission to this program requires:

- **Bachelor's degree** from a regionally accredited institution
- An undergraduate GPA of 3.0 or higher (graduate degree GPAs will be considered along with the undergraduate GPA).
- Graduates of foreign schools must also have of 550 or higher in the Test of English as a Foreign Language (TOEFL).
- Completed Application Form.
- **Official transcripts** from all universities or colleges and other post-secondary educational institutions (including trade schools) attended. Instead of hard copy transcripts, applicants may supply official electronic transcripts issued by a post-secondary institution directly to Drexel University Online (send to: customerservice@drexel.com).

Applications must supply transcripts regardless of the number of credits earned or the type of school attended. If an applicant does not list all post-secondary institutions on the application and these are listed on transcripts received from other institutions, the application will be delayed until all remaining transcripts have been submitted the remaining transcripts.

Use our Transcript Lookup Tool (http://www.drexel.com/tools/transcript.aspx) to assist contact with previous institutions. If a college or university offers the option to send transcripts in a secure, password-protected electronic format, have the transcript sent to customerservice@drexel.com.

- **Two letters of recommendation** - professional or academic.
  - Drexel University Online now accepts electronic letters of recommendation. Please access the following webpage for instructions regarding their submission: http://www.drexel.edu/apply/recommend. If a recommender prefers to submit an original, hard copy letter of recommendation, please remind the recommender that it must be signed and submitted in a sealed envelope signed across the flap by the recommender.
  - **Personal Essay**
  - **Resume.**

International Students (http://www.drexel.com/online-degrees/education-degrees/ms-global/international.aspx) must submit a TOEFL score of 550 or higher. Students with transcripts from non-US institutions should have such transcripts evaluated by World Education Service (WES). The TOEFL examination is required for some non-citizens. Applicants whose native language is English (who list themselves as born in or citizens of the following countries: American Samoa, Australia, Bahamas, Barbados, Belize, Bermuda, Botswana, British West Indies, Brunei Darussalam, Canada, England, Ghana, Guam, Ireland, Jamaica, Lesotho, Liberia, Malawi, Malta, Mauritius, New Zealand, Papua New Guinea, Puerto Rico, Scotland, Sierra Leone, South Africa, Swaziland, Tanzania, Trinidad/Tobago, Uganda, Virgin Islands, Wales, Zimbabwe) are exempt from the TOEFL. Applicants whose native language is not English are exempt from the TOEFL if the applicant completed 4 years of high school in the United States or completed English 101 and English 102 with a grade of C or better from a US domestic accredited institution.

Applicants who received an undergraduate or graduate degree from an academic institution located in the US, UK or Canada are also exempt from the TOEFL.

Please refer to Drexel Online's Master of Science in Global & International Education Admissions (http://www.drexel.com/online-degrees/education-degrees/ms-global/admissions.aspx) page for additional information.

Degree Requirements

A Master of Science in Global and International Education is a part-time online program. Students complete six core courses, four primary concentration courses, three secondary concentration courses, an elective and a capstone course.

### Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDHE 680</td>
<td>Foundations of Evaluation</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 500</td>
<td>Introduction to Global, International &amp; Comparative Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 504</td>
<td>History and Theory of Comparative Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 510</td>
<td>Culture, Society &amp; Education in Comparative Perspective</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 512</td>
<td>Globalization and Educational Change</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 520</td>
<td>Political Economy of Education Reform</td>
<td>3.0</td>
</tr>
</tbody>
</table>

### Primary Concentration Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDGI 506</td>
<td>Comparative Higher Education Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 508</td>
<td>Understanding Research in International &amp; Comparative Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 514</td>
<td>Education and National Development</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 518</td>
<td>Analysis of Policy Issues in Global &amp; International Education</td>
<td>3.0</td>
</tr>
</tbody>
</table>

### Capstone Requirement

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDGI 715</td>
<td>Co-op with Portfolio</td>
<td>1.5</td>
</tr>
<tr>
<td>EDGI 716</td>
<td>GIE Co-op Experience with Seminar</td>
<td>4.5</td>
</tr>
</tbody>
</table>

**Select one of the following Secondary Concentrations:**

- **Secondary Peace Education Concentration**
  - EDGI 530 Peace Education
  - EDGI 532 International Organizations in International Education
  - EDGI 534 Conflict Resolution in an International Context

- **Secondary Higher Education Concentration**
  - Select 3 of the following Higher Education courses:
    - EDHE 500 Foundations of Higher Education
    - EDHE 510 Governance, Management & Administration in Higher Education
    - EDHE 520 Student Development & Customer Service Management
    - EDHE 530 Higher Education Law

- **Secondary E-Learning Leadership Concentration**
  - Select 3 of the following E-Learning Leadership courses:
    - ELL 501 The Purpose and Business of E-Learning
    - ELL 502 E-Learning Technologies
    - ELL 503 Teaching and Learning Issues in E-Learning
    - ELL 504 Learning Technologies & Disabilities
    - ELL 604 Design & Delivery of E-Learning I

sm853@drexel.edu

For additional information, also visit the School of Education's MS in Global and International Education (http://drexel.edu/soe/academics/graduate/global-international-education) webpage or the Drexel Online (http://www.drexel.com/online-degrees/education-degrees/ms-global) webpage.

Website: [http://www.drexel.com](http://www.drexel.com)
**Global and International Education**

样例选修课程

学生可以从相关研究领域中选择课程作为额外选修，包括但不限于商业管理、外语、妇女研究或科学/技术/社会。

EDGI 600  研究海外经验
EDGI 610 国际生态旅游与教育

**Total Credits** 45.0

* 作为第二专业选修，学生可以创建一个来自其他德雷塞尔大学部门/程序的定制研究领域，如国际商务管理、外国语言、妇女研究，或科学/技术/社会。

** 为了完成德雷赛尔教育政策证书，学生需要完成2门额外的3学分课程：EDPO 628和EDPO 640。

**Education Faculty**

W. Edward Bureau, PhD (University of Pennsylvania)  哈里斯堡EdD, 全国教育学系主任。负责教育政策和发展，领导、监督，以及容量发展。

Holly Carpenter, PhD (Arizona State University)  辅助临床教授。高等教育政策发展及实施，社区大学/大学/技术/社会。

José Luis Chávez, EdD (University of Southern California) 程序协调员，高等教育项目中心。设计新课程，领导及管理。

Ellen Clay, PhD (University of Southwestern Louisiana) 辅助教授。专业发展机会，数学及数学思维。

Rebecca Clothey, PhD (University of Pittsburgh) 高等教育项目主任。辅助教授。比较和国际教育，教育学，语言艺术，学生教学。

Marion Dugan, EdD (University of Pennsylvania) 辅助教授。高等教育政策概念，问题及应用。

Dominic F. Gullo, PhD (Indiana University) 教授。研究早期学校经验对儿童成就及社会适应的影响。

Francis Harvey, EdD (Harvard University)  负责教育，社会-文化学习，远程教育。

Elizabeth Haslam, PhD (University of Pennsylvania) 辅助教授。教育领域协调员，教学设计，质性评价，写作及课程。

Jennifer Katz-Buonincontro, MFA, PhD (University of Oregon) 辅助教授。教育学。

Kristine Lewis, PhD (Temple University)  教授。非洲裔学生的体验，白人为主的大学，交流，学院及大学，学生成长。

William Lynch, PhD (University of Maryland)  哈里斯堡EdD项目主任。教授。课程及教育领导，教育学，远程学习政策发展，成人教育。

Sonya Martin, PhD (Case Western Reserve University) 辅助教授。科学/技术/社会。

Michel Miller, PhD (University of Miami, Florida) 辅助教授。特别教育。

Stephen C. Ehrmann  协助临床教授。学习技术，学习科学，评估，评价，及专业发展策略，帮助教育者 visibly improve programmatic outcomes.

Salvatore V. Falletta, EdD (North Carolina State University)  人力资源发展计划主任。人力资源管理专家。人力资源智能（i.e., HR research and analytics practices); HRD assessment, measurement, and evaluation models and taxonomies; organizational diagnostic models; web-based employee and organizational survey methods, and computational modeling.

Arouitis N. Foster, PhD (Michigan State University)  辅助教授。教育心理学，教育技术，特别是以下领域：动机；技术性/教育性内容知识（TPACK）；沉浸式交互式数字环境（模拟，游戏，虚拟现实）。

Kathy Geller, PhD (Fielding Graduate University)  协助临床教授。教育领导及管理。

Rajasi Ghosh, PhD (University of Louisville, Kentucky)  教授。教育领导，学生发展，职场不文明，职场学习及发展。

John M. Gould, PhD (University of Pittsburgh) 哈里斯堡EdD  教育领导及变革项目主任。社会-文化学习，远程教育。

Mary Jo Grdina, PhD (Case Western Reserve University)  协助教授。本科研究，教育学，课程设计。

Dominic F. Gullo, PhD (Indiana University) 教授。研究早期学校经验对儿童的成就及社会适应的影响。

Francis Harvey, EdD (Harvard University)  负责教育，社会-文化学习，远程教育。

Elizabeth Haslam, PhD (University of Pennsylvania) 辅助教授。教育领域协调员，教学设计，质性评价，写作及课程。

Jennifer Katz-Buonincontro, MFA, PhD (University of Oregon)  教授。教育领导。

Kristine Lewis, PhD (Temple University)  教授。非洲裔学生的体验，白人为主的大学，交流，学院及大学，学生成长。

William Lynch, PhD (University of Maryland) 哈里斯堡EdD 项目主任。教授。课程及教育领导，教育学，远程学习政策发展，成人教育。

Sonya Martin, PhD (Case Western Reserve University)  教授。科学/技术/社会。

Michel Miller, PhD (University of Miami, Florida)  协助教授。特别教育。
Sarah P. Reynolds, EdD (Saint Joseph's University) Program Director. Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Ellen B. Scales, PhD (Pennsylvania State University). Auxiliary Assistant Professor. Literacy, mathematics education, special education.

Jason Silverman, PhD (Vanderbilt University) Director of the Program in Mathematical Learning and Teaching. Assistant Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers' ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

David A. Urias, PhD (University of Virginia). Assistant Professor. International education, educational assessment, the influence of corporate philanthropy on higher education.

Sheila Vaidya, PhD (Temple University) Associate Director of Research and Outreach Programs. Associate Professor. Educational psychology, school psychology, research design.

Charles A. Williams, PhD (Temple University). Associate Teaching Professor. Prevention of school-aged violence.

Interdepartmental Faculty

Barbara Jean Hoekje, PhD (University of Pennsylvania) Director of English Language Center. Associate Professor. Sociolinguistic theory, discourse analysis, applied linguistics (language teaching, learning, and testing).

Fredricka K. Reisman, PhD (Syracuse University) Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

Higher Education

Major: Higher Education
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 13.0406
Standard Occupational Classification (SOC) code: 11-9033

About the Program

The MS in Higher Education program is designed specifically to prepare highly skilled and knowledgeable practitioners for administrative and management careers in higher education in the United States and abroad. Graduates will be qualified to pursue careers as professionals in university and college offices as well as careers in national and international organizations, foundations, associations, and corporations.

Program Objectives

Students graduating with an MS in Higher Education will possess outstanding leadership, organizational, interpersonal and advocacy skills, including the ability to communicate effectively with internal and external groups. Students will be provided with in-depth knowledge regarding both public and private (non-profit and for-profit) institutions, as well as small and large institutions and multi-campus institutions.

About the Curriculum

The curriculum incorporates an interdisciplinary approach, with courses offered through the School of Education and The LeBow College of Business. The program integrates leading learning strategies and instructional technologies into the course delivery. Courses introduce students to best practices, current research, software applications and database management systems. Students demonstrate knowledge and skills through both individual and group projects.

This program is 45.0 credits and consists of 15 courses: 6 core courses, 4 primary concentration courses, 3 elective courses or secondary concentration courses, and 2 capstone courses (co-op with portfolio I and II).

Primary concentration areas include:

- administration and organizational management

Secondary areas of concentration include:

- academic development, technology and instruction
- community college administration and leadership
- enrollment management
- financial management in higher education
- institutional advancement
- institutional research and planning
- student development and affairs

The program is designed as a part-time cohort model, and can be completed in two years.

Additional Information

For additional information, visit Drexel University's Higher Education, Administration and Leadership (http://drexel.edu/soe/academics/graduate/higher-education) page.

Admission Requirements

Applicants for the program will follow the university standards for admission to graduate study. In addition, the admissions committee will evaluate the applicant's potential and commitment to succeed in graduate study in higher education and at least one of the two program delivery formats. The applicant's potential to contribute to the overall quality of the program of study will also be considered.

Prospective students are required to submit the following:

- Completed Application Form
- Transcripts (must be provided for every institution attended)
- Referrals (two letters are required)
- Personal Essay

Prospective students must apply through Drexel Online (http://www.drexel.com) using the online application (http://www.drexel.com/Fields_of_Study/education/MSHE/apply.asp). Additional information about how to apply is available on the Graduate Admissions at Drexel University (http://www.drexel.edu/grad/programs/edu/higher-education) website.
Degree Requirements

This Master of Science in Higher Education program consists of 14 courses: 6 core courses, 4 primary concentration courses, 3 elective courses or secondary concentration courses, and 1 capstone course (co-op with portfolio).

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDHE 500</td>
<td>Foundations of Higher Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 510</td>
<td>Governance, Management &amp; Administration in Higher Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 520</td>
<td>Student Development &amp; Customer Service Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 530</td>
<td>Higher Education Law</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 602</td>
<td>Managing Campus Operations</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 714</td>
<td>Introduction to Research Methods</td>
<td>3.0</td>
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</table>

Capstone

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDHE 715</td>
<td>Higher Education Co-op I</td>
<td>1.5</td>
</tr>
<tr>
<td>EDHE 716</td>
<td>Higher Education Co-op II</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Primary Concentration

Students complete the four required courses for the primary concentration:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDHE 540</td>
<td>Outcomes, Assessments &amp; Continuous Improvement</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 601</td>
<td>Strategic Planning &amp; Evaluation</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 606</td>
<td>Higher Education Career Development</td>
<td>3.0</td>
</tr>
<tr>
<td>ORGB 631</td>
<td>Leading Effective Organizations</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Electives or Secondary Concentration (See Below)

Students select three of the following (or offerings within the School of Education) or three courses within the secondary concentrations offered. Courses within a student's primary concentration do not count as electives.

Electives or Secondary Concentration

Secondary Concentration in Adult Education

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDAE 601</td>
<td>Foundations of Adult Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDAE 602</td>
<td>Adult Learning and Development</td>
<td>3.0</td>
</tr>
<tr>
<td>EDAE 603</td>
<td>Program Planning: Assessment &amp; Evaluation of Adult Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDAE 604</td>
<td>Instructional Design and Delivery Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>EDAE 605</td>
<td>Instructional Skills for Teaching Adults Online</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Secondary Concentration in Global and International Education

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDGI 500</td>
<td>Introduction to Global, International &amp; Comparative Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 506</td>
<td>Comparative Higher Education Systems</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 508</td>
<td>Understanding Research in International &amp; Comparative Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 510</td>
<td>Culture, Society &amp; Education in Comparative Perspective</td>
<td>3.0</td>
</tr>
<tr>
<td>EDGI 512</td>
<td>Globalization and Educational Change</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Secondary Concentration in Higher Education Educational Policy

Required

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPO 620</td>
<td>Education Policy: Concepts, Issues, and Applications</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Select two of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDPO 624</td>
<td>Shaping of American Education Policy: Global Forces</td>
<td>3.0</td>
</tr>
<tr>
<td>EDPO 632</td>
<td>Ethics in Educational Policy Making</td>
<td>3.0</td>
</tr>
<tr>
<td>EDPO 636</td>
<td>Access &amp; Equity in Educational Policy Making</td>
<td>3.0</td>
</tr>
<tr>
<td>EDPO 640</td>
<td>Educational Policy-Making Tactics &amp; Influence</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Secondary Concentration in Community College Administration and Leadership

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDHE 634</td>
<td>Proposal Writing &amp; Sponsored Project Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 664</td>
<td>Strategies for Educational Success</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 668</td>
<td>Transformational Leadership</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 669</td>
<td>Diversity in Higher Education</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Secondary Concentration in Institutional Development and University Relations

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDHE 610</td>
<td>Institutional Advancement</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 614</td>
<td>Alumni Relations</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 616</td>
<td>Institutional Communications, Marketing &amp; Public Relations</td>
<td>3.0</td>
</tr>
<tr>
<td>AADM 650</td>
<td>Fund Development for the Arts</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Secondary Concentration in Financial Management

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>BUSN 501</td>
<td>Measuring and Maximizing Financial Performance</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 602</td>
<td>Managing Campus Operations</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 624</td>
<td>Capital Financing, Business Development &amp; Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 626</td>
<td>Public-Private Funding and Legal Issues</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Secondary Concentration in Institutional Research

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDHE 640</td>
<td>Foundations of Institutional Research</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 644</td>
<td>Student Assessments &amp; Academic Program Evaluation</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 646</td>
<td>Survey Tools, Statistical Software &amp; Effective Reporting</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 680</td>
<td>Foundations of Evaluation</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 803</td>
<td>Educational Research Design I</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Secondary Concentration in Enrollment Management

Select three of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDHE 650</td>
<td>Introduction to Enrollment Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 652</td>
<td>Enrollment Marketing, Recruitment &amp; Retention</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 654</td>
<td>Financial Aid &amp; Enrollment Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EDHE 656</td>
<td>Enrollment Management Database Systems &amp; Management</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Secondary Concentration in Learning Technologies and Instructional Design

Select 3 of the following:

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLT 536</td>
<td>Learning Sciences and Instructional Design</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 537</td>
<td>Technologies for Performance Support</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 550</td>
<td>Introduction to Instructional Design</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits 45.0
ELL 502  E-Learning Technologies  3.0
ELL 504  Learning Technologies & Disabilities  3.0

Secondary Concentration in Student Development and Affairs
Select three of the following:
EDHE 652  Enrollment Marketing, Recruitment & Retention  3.0
EDHE 662  Critical Issues in Student Affairs  3.0
EDHE 663  Safety and Crisis Management  3.0
EDHE 664  Strategies for Educational Success  3.0
EDHE 669  Diversity in Higher Education  3.0

* If students have completed EDPO 632 as part of the primary concentration, it may not be used for the secondary concentration. In this case, students must select another EDPO course from the list.

Education Faculty

W. Edward Bureau, PhD (University of Pennsylvania) Director of the Sacramento EdD Clinical Associate Professor. Leadership, supervision, and capacity development.

Holly Carpenter, PhD (Arizona State University). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

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Sheila Vaidya, PhD (Temple University) Associate Director of Research and Outreach Programs. Associate Professor. Educational psychology, school psychology, research design.
Human Resource Development

Major: Human Resource Development
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 52.1005
Standard Occupational Classification (SOC) code: 15-1151

About the Program

The MS in Human Resource Development program, with its strong emphasis on learning theory, is designed to prepare students with the competencies for success in promoting individual and organizational learning world wide. The online curriculum is both practice-oriented and research-based. Drexel’s program is unique in the inclusion of a substantial co-op/capstone experience.

Human resource development refers to the principles, methods, and techniques for assessing and responding to the learning and development needs of employees and their organizations. The Master of Science in Human Resource Development prepares students to have a positive direct and indirect influence on the future of human resource development in its many forms. The program is designed to prepare graduates for strategic roles in promoting employee and organizational learning in various national and multi-national organizations, as well as to promote the use and integration of technology to support organizational learning.

The MS degree in Human Resource Development incorporates an interdisciplinary curriculum. Students may choose an area of concentration in either strategic human resources, evaluation and return on investment, instructional systems design and e-learning, or project management. The program integrates leading learning strategies and instructional technologies into course delivery. Courses expose students to best practices, current research, software applications, and database management systems. Students demonstrate their knowledge and skill acquisition through individual and group projects.

For additional information, contact the School of Education (http://www.drexel.edu/soe) or view the master’s degrees online on the Drexel Online (http://www.drexel.com) web site.

Admission Requirements

Applicants for the program will follow the university standards for admission to graduate study. Prospective students must have earned a bachelor’s degree from an accredited institution and have an undergraduate GPA of 3.0 or higher to be considered for admission (graduate degree GPAs will be considered along with the undergraduate GPA). In addition, prospective students are required to submit the following:

- Completed Application Form, including official transcripts from all universities or colleges attended
- Two letters of recommendation
- Personal essay
- Resume
- Application fee

The admissions committee will evaluate the applicant’s potential and commitment to succeed in graduate study in the online environment. The applicant’s potential to contribute to the overall quality of the program of study will also be considered.

Interviews, in person or by phone, will be conducted by the admissions committee with those applicants who meet Graduate Admission’s standard admissions criteria.

Decisions will be made using dates corresponding to the regular university schedule for rolling admissions in Graduate Admissions.

For additional information, contact the School of Education (http://www.drexel.edu/soe) or view the master’s degrees online on the Drexel University Online (http://www.drexel.com) web site.

Find additional details about how to apply on the Graduate Admissions at Drexel University (http://www.drexel.edu/grad/programs/edu/human-resource-development) website.

Degree Requirements

The program requires 45.0 credit hours, consisting of 30.0 hours of core coursework and a 6.0 credit capstone course that includes a co-op project and results in the submission of a professional portfolio. In addition, students complete one of the following 9.0 credit concentrations:

- Strategic human resources
- Evaluation and return on investment (ROI)
- Instructional systems design (ISD) and e-learning
- Project management

Core Requirements

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EHRD 500</td>
<td>Foundations of Human Resources Development</td>
<td>3.0</td>
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<tr>
<td>EHRD 600</td>
<td>Organizational Consulting</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 601</td>
<td>Leading and Evaluating Change</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 602</td>
<td>Coaching and Mentoring for Sustainable Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 604</td>
<td>Development of Human Resources</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 606</td>
<td>Human and Organizational Performance</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 607</td>
<td>Global Human Resource Development</td>
<td>3.0</td>
</tr>
<tr>
<td>EHRD 609</td>
<td>Training and Development</td>
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<tr>
<td>EDHE 660</td>
<td>Principles of Adult Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 804</td>
<td>Program Evaluation in Organizations</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Capstone Requirements

- Project management
- Evaluation and return on investment (ROI)
- Instructional systems design (ISD) and e-learning
EHRD 715  Capstone Co-op with Portfolio I  1.5
EHRD 716  Capstone Co-op with Portfolio II  4.5

**Concentration Options**

Students must select one concentration and complete all 9.0 credits of the required courses.

**Strategic Human Resources Concentration Courses:**
- EHRD 605  Organizational Learning & Strategy
- EHRD 610  Strategic Competencies for HRD Leaders
- ORGB 631  Leading Effective Organizations

**Evaluation & Return on Investment (ROI) Concentration Courses:**
- EDHE 682  The Evaluation Process
- EDHE 684  Evaluation and Assessment in Practice
- EHRD 608  Evaluating the Value & Impact of Human Resource Development Interventions

**Instructional Design & E-Learning Concentration Courses:**
- EDLT 550  Introduction to Instructional Design
- ELL 501  The Purpose and Business of E-Learning
- ELL 502  E-Learning Technologies

**Project Management Concentration Courses:**
- PROJ 501  Introduction to Project Management
- PROJ 502  Project Planning & Scheduling
- PROJ 603  Project Leadership & Teamwork

**Total Credits**  45.0

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Sheila Vaidya, PhD (Temple University) Associate Director of Research and Outreach Programs. Associate Professor. Educational psychology, school psychology, research design.

Charles A. Williams, PhD (Temple University). Associate Teaching Professor. Prevention of school-aged violence.

Interdepartmental Faculty

Barbara Jean Hoekje, PhD (University of Pennsylvania) Director of English Language Center. Associate Professor. Sociolinguistic theory, discourse analysis, applied linguistics (language teaching, learning, and testing).

Fredricka K. Reisman, PhD (Syracuse University) Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

Learning Technologies

Major: Learning Technologies
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 13.0501
Standard Occupational Classification (SOC) code: 25-9031

About the Program

Master of Science Options

• MS degree with Instructional Technology Specialist, Game Based Learning, Instructional Design, or E-Learning Leadership concentration: 45.0 quarter credits
• MS degree with Instructional Technology Specialist PA Certification (with previous teacher certification): 45.0 quarter credits
• MS degree with Instructional Technology Specialist PA Certification (without previous teaching certification): 49.5 quarter credits

Scope of the Program

The School of Education offers an MS in Learning Technologies program to prepare graduate students to meet the challenges schools, educational and corporate organizations face related to technology learning needs. Students can select an instructional technologies specialist concentration, a certificate concentration that prepares for the PA Certification in Instructional Technologies Specialist, or the following concentrations:

• E-Learning Leadership (p. 380)
• Instructional Design (p. 380)
• Instructional Technology Specialist

• Learning in Game-based Environments

The MS in Science and Learning Technologies program provides multiple field experiences, extensive skill development in coaching and mentoring, and a yearlong internship for hands-on experiences in various settings. Each student will develop a unique plan of study in cooperation with a School of Education academic advisor. Students are expected to maintain a continuous registration and will be encouraged to take two courses per term until completion of their program of study.

Courses are offered in an online format. The program also features occasional on-campus events and an annual conference for presentation of program participant research papers and projects, as well as invited keynote speakers, workshops and poster sessions.

Additional Information

For additional information about this program, contact the Program Manager:

Samantha Mercanti-Anthony
Program Manager
School of Education
sm853@drexel.edu
215.895.6894

Admission Requirements

Each candidate to the MS in Science and Learning Technologies will submit the following application materials:

• Completed application form
• Appropriate application fee
• Transcripts (must be provided for every institution attended)
• Personal essay, providing commitment to program’s unique features
• Professional resume

Admission to the MS in Learning Technologies program will follow the University standards for admission to graduate study including the receipt of a Bachelor’s degree from an accredited college or university with an earned GPA of 3.0 on a 4.0 scale.

Undergraduates who meet the rigorous requirements for participation in an MS program also may be considered. Ideally, a successful candidate will possess a public school teaching certificate or, in the case of an undergraduate pursuing the BS/MS track, complete teacher certification requirement in conjunction with the MS degree. For additional information, contact the School of Education. (http://www.drexel.edu/soe)

Information about how to apply is available on the Graduate Admissions at Drexel University (http://www.drexel.edu/grad/apply/overview) website.

Degree Requirements

Depending on their goals and interests, students completing the MS in Learning Technologies choose either the Instructional Technology Specialist concentration, the Instructional Technology Specialist PA Certification option, or the Learning in Game-Based Environments concentration.

Required Courses
Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credit Hours</th>
</tr>
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<tbody>
<tr>
<td>EDAM 528</td>
<td>Research Methodology for Action Research</td>
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</tr>
<tr>
<td>EDLT 536</td>
<td>Learning Sciences and Instructional Design</td>
<td>3.0</td>
</tr>
</tbody>
</table>
The Instructional Technology Specialist Concentration program is designed for students interested in specializing in the area of instructional technology while not choosing to pursue PA Specialist Certification.

**Concentration Courses**

**EDLT 511** Computer Skills for Teachers 3.0
**EDLT 532** Designing Virtual Communities for Staff Development - Non-Field Experience 3.0
**EDLT 534** Developing Educational Leaders Using Technology 3.0
**EDLT 535** Researching & Evaluating Instructional Technology 3.0
**INFO 520** Social Context of Information Professions 3.0
**INFO 640** Managing Information Organizations 3.0

Total Credits 18.0

**Instructional Technology Specialist Certificate Concentration**

**28.5 - 34.5 Credits**

The Instructional Technology Specialist Certificate Concentration was designed to address the dramatically increasing need in public education for certified Instructional Technology Specialists at every level of K-12 schooling.

Students pursuing the Instructional Technology Specialist PA Certification require a “B” or better in all certification coursework. Applicants for Instructional Technology Specialist Certification should ideally possess valid Pennsylvania Instructional I or II Teaching Certification. (Visit the School of Education (http://drexel.edu/soe) for additional information.) If a student seeks the Instructional Technology Specialist PA Certification without a previous held teaching certificate, he or she will need to complete EDUC 522 and EDUC 525 as reflected in the Core Course List, above.

**Concentration Courses**

**EDLT 533** Designing Virtual Communities 3.0
**EDLT 534** Developing Educational Leaders Using Technology 3.0
**EDLT 535** Researching & Evaluating Instructional Technology 3.0
**EDEX 542** Fundamentals of Special Education 3.0
**EDEX 544** The Inclusive Classroom 3.0
**EDEX 552** Integrating Technology for Learning & Achievement 4.5
**EDUC 565** Foundations in Instructing English Language Learners 3.0
**INFO 520** Social Context of Information Professions 3.0
**INFO 640** Managing Information Organizations 3.0

Total Credits 28.5-34.5

**E-Learning Leadership Concentration**

**18.0 Credits**

The E-Learning Leadership concentration provides an in-depth understanding of online and distance learning theories.

**ELL 501** The Purpose and Business of E-Learning 3.0
**ELL 502** E-Learning Technologies 3.0
**ELL 503** Teaching and Learning Issues in E-Learning 3.0
**ELL 504** Learning Technologies & Disabilities 3.0
**ELL 604** Design & Delivery of E-Learning I 3.0
**ELL 605** Design & Delivery of E-Learning II 3.0

Total Credits 18.0

**Learning in Game-Based Environments Concentration**

**18.0 Credits**

The Learning in Game-based Environments Concentration prepares graduates to effectively use educational games in and out of the classroom and training center, provides an overview of game development processes, enables participants to build basic games, and most importantly, examines how to assess and evaluate the learning experience as it relates to educational games.
<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDLT 541</td>
<td>Foundations of Game-Based Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 542</td>
<td>Research in Motivation &amp; Game-based Learning</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 543</td>
<td>Play &amp; Learning in a Participatory Culture</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 544</td>
<td>Integrating Games &amp; Pedagogical Content Knowledge</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 545</td>
<td>Design &amp; Development of Learning Games I</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 546</td>
<td>Searching &amp; Evaluating Instructional Technology</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Total Credits: 18.0**

### Instructional Design Concentration

This concentration is designed to prepare teachers, instructors, practitioners and others to use instructional design for K-20 education, adult education, and workplace training that addresses the needs of the millennial learner and collaborative networked communities.

#### Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLT 550</td>
<td>Introduction to Instructional Design</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 554</td>
<td>Learning with Social Media and Mobiles</td>
<td>3.0</td>
</tr>
<tr>
<td>ELL 502</td>
<td>E-Learning Technologies</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLT 811</td>
<td>Designing and Developing Multimedia Applications For Learning</td>
<td>3.0</td>
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Select two electives from the following: 6.0

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>EDUC 525</td>
<td>Multi-Media Instructional Design</td>
<td></td>
</tr>
<tr>
<td>EDLT 533</td>
<td>Designing Virtual Communities</td>
<td></td>
</tr>
<tr>
<td>EDLT 541</td>
<td>Foundations of Game-Based Learning</td>
<td></td>
</tr>
<tr>
<td>EDLT 542</td>
<td>Play &amp; Learning in a Participatory Culture</td>
<td></td>
</tr>
</tbody>
</table>

**Total Credits: 18.0**

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Stephen C. Ehrmann Associate Clinical Professor. Learning technologies, learning science, assessment, evaluation, and professional development strategies, used to help educators make visible improvements in programmatic learning outcomes.

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Kathy Geller, PhD (Fielding Graduate University). Assistant Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (University of Louisville, Kentucky). Assistant Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

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William Lynch, PhD (University of Maryland) Dean, Goodwin College of Professional Studies. Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.

Sonya Martin, PhD (Curtin University, Science and Mathematics Education Centre, Perth, Australia). Assistant Professor.

Michel Miller, PhD (University of Miami, Florida). Auxiliary Assistant Professor. Special education.
Sarah P. Reynolds, EdD (Saint Joseph’s University) Program Director. Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

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Fredricka K. Reisman, PhD (Syracuse University) Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

Mathematics Learning & Teaching

Major: Mathematics Learning and Teaching
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 13-1311
Standard Occupational Classification (SOC) code: 25-2022; 25-2031

About the Program

The MS in Mathematics Learning and Teaching is designed for current middle and high school mathematics teachers as well as mathematically inclined elementary teachers. The program is intended to support teachers in teaching mathematics where students learn with understanding, including supporting students in reasoning through the variety of complex mathematical situations that they encounter in the school mathematics curriculum. The Mathematics Learning and Teaching program includes courses with explicit focus on the use of technology in teaching and unpacking, and re-conceptualizing the mathematics of middle and high school curricula. In particular, the program of study involves courses that model best practices in mathematics education, including collaborative problem solving, reflection on practice, and student-centered instruction.

The mathematics education core courses are divided into two sets of courses: introductory (500-level) and advanced (600-level) courses. The introductory courses emphasize content-based and informed pedagogy, representation and communication, connections between multiple representations and multiple solution methods. The advanced courses emphasize common student conceptions, misconceptions and difficulties, diagnosing student thinking, addressing particular students’ needs effectively, scaling “individualized instruction,” and collaborative instructional design and analysis.

Currently, all courses in this program are offered in an online format.

Building on the existing offerings of this program, a concentration in Math Leadership and Coaching is available and will enable current mathematics teachers and leaders to apply for State-Approved Endorsements in Mathematics Coaching.

For additional information about this program, contact the School of Education (http://www.drexel.edu/soe).

Admission Requirements

Each candidate will submit the following application materials:

- Completed application form
- Appropriate application fee
- Transcripts (must be provided for every institution attended)
- Personal essay, providing commitment to program’s unique features
- Professional resume

Admission to the MS in Mathematics Learning & Teaching program will follow the University standards for admission to graduate study including the receipt of a Bachelor’s degree from an accredited college or university with an earned GPA of 3.0 on a 4.0 scale.

The Mathematics Learning and Teaching (MLT) program is built around the importance of the integration of research and practice and the importance of connecting school teaching practices with university coursework. As a result, there will be a fieldwork component for some courses. These courses require university students to interact with school-aged students, document their activity (ideally with video-recordings), and bring the results of their work back to the university class for collective analysis and reflection. MS and certificate students who are not current classroom teachers will need to obtain the appropriate Child Abuse and Criminal Record clearances for their state to work with school-aged students in schools during the school day. Such program candidates are also advised to talk with area school administrators in advance of entering one of the MLT programs to obtain the process for arranging the fieldwork components of the MLT courses.

Additional requirements for the MS in Mathematics Learning and Teaching program include:

- Completion of at least two semesters (or three quarters) of university calculus and at least one university mathematics course beyond university calculus. This additional course must be offered by the mathematics department and cannot include courses on the fundamentals of mathematics, college algebra, or mathematics for elementary school teachers. Exceptions to this requirement will be considered on an individual basis by the program director or the program admissions committee.
- All students must provide evidence of a current teaching position or must secure a site for field placement and complete the Child Abuse
and Criminal Record Clearance by the end of the winter term in the first year in the program.

For additional information, contact the School of Education (http://www.drexel.edu/soe). Additional information about how to apply is available on the Graduate Admissions at Drexel University (http://www.drexel.edu/grad/programs/edu/mathematics-learning-and-teaching) website.

**Degree Requirements**

**Education Core Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 522</td>
<td>Evaluation of Instruction</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 524</td>
<td>Current Research in Curriculum &amp; Instruction</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 525</td>
<td>Multi-Media Instructional Design</td>
<td>3.0</td>
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</table>

**Mathematics Education Core Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>MTED 501</td>
<td>Proportional and Algebraic Reasoning</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 502</td>
<td>Geometry &amp; Spatial Reasoning</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 503</td>
<td>Data Analysis and Probabilistic &amp; Statistical Reasoning</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 511</td>
<td>Functions through the Curriculum</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 601</td>
<td>Diagnosing Student Mathematical Thinking</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 611</td>
<td>Virtual Field Experience I - Online Mentoring</td>
<td>1.5</td>
</tr>
<tr>
<td>MTED 612</td>
<td>Virtual Field Experience II - Online Mentoring</td>
<td>1.5</td>
</tr>
<tr>
<td>MTED 621</td>
<td>Collaborative Instructional Design &amp; Analysis I</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 622</td>
<td>Collaborative Instructional Design &amp; Analysis II</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 651</td>
<td>Problem Solving Strategies</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 690</td>
<td>Current Research in Mathematics Learning &amp; Teaching</td>
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**Electives**

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<td></td>
<td></td>
<td>6.0</td>
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**Total Credits**

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Building on the existing offerings of the Mathematics Learning and Teaching Program, this concentration will enable current mathematics teachers and leaders to apply for State-Approved Endorsements in Mathematics Coaching. The program is designed to address the needs of math coaches and leaders for all levels of pre-K-12 education. However, the program’s flexible design will allow for students to specialize in pre-K-12, pre-K-8 or 6-12 mathematics coaching and leadership through appropriate selection of Mathematics Education Core courses.

The tables below shows the courses required for this concentration as well as an example of how they fit into the MS Mathematics Learning & Teaching program.

**Mathematics Coaching and Leadership Concentration Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MTED 642</td>
<td>Mathematics Coaching and Leadership</td>
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<tr>
<td>MTED 643</td>
<td>Practicum in Mathematics Coaching and Leadership</td>
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</tr>
<tr>
<td>EDAM 524</td>
<td>Mentoring and Collaborative Leadership</td>
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**Total Credits**

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**Term 1**

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<tr>
<td>EDUC 522</td>
<td>Evaluation of Instruction</td>
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<tr>
<td>MTED 503</td>
<td>Data Analysis and Probabilistic Statistical Reasoning</td>
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**Term Credits**

<table>
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<tr>
<th>Credits</th>
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<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>MTED 502</td>
<td>Geometry Spatial Reasoning</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 601</td>
<td>Diagnosing Student Mathematical Thinking</td>
<td>3.0</td>
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**Term Credits**

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**Term 3**

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<th>Course</th>
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<tbody>
<tr>
<td>EDUC 524</td>
<td>Current Research in Curriculum Instruction</td>
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</tr>
<tr>
<td>MTED 501</td>
<td>Proportional and Algebraic Reasoning</td>
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**Term Credits**

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**Term 4**

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<tr>
<td>MTED 511</td>
<td>Functions through the Curriculum</td>
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<tr>
<td>EDAM 524</td>
<td>Mentoring and Collaborative Leadership</td>
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**Term Credits**

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**Term 5**

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<th>Course</th>
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<tbody>
<tr>
<td>MTED 651</td>
<td>Problem Solving Strategies</td>
<td>3.0</td>
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<tr>
<td>MTED 690</td>
<td>Current Research in Mathematics Learning &amp; Teaching</td>
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**Term Credits**

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**Term 6**

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<tr>
<td>MTED 611</td>
<td>Virtual Field Experience I - Online Mentoring</td>
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<tr>
<td>MTED 621</td>
<td>Collaborative Instructional Design Analysis I</td>
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**Term Credits**

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**Term 7**

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<tbody>
<tr>
<td>MTED 612</td>
<td>Virtual Field Experience II - Online Mentoring</td>
<td>1.5</td>
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<td>MTED 622</td>
<td>Collaborative Instructional Design Analysis II</td>
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**Term Credits**

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<tr>
<th>Credits</th>
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<tbody>
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**Term 8**

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<tbody>
<tr>
<td>EDUC 525</td>
<td>Multi-Media Instructional Design</td>
<td>3.0</td>
</tr>
<tr>
<td>MTED 642</td>
<td>Mathematics Coaching and Leadership</td>
<td>3.0</td>
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**Term Credits**

<table>
<thead>
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<tr>
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</tbody>
</table>

**Total Credit:** 47.0

**Education Faculty**

W. Edward Bureau, PhD (University of Pennsylvania) Director of the Sacramento EdD. Clinical Associate Professor. Leadership, supervision, and capacity development.

Holly Carpenter, PhD (Arizona State University). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD (University of Southern California.) Program Coordinator for the MS in Higher Education Program at the Center for Graduate Studies in Sacramento. Clinical Professor. Higher education leadership and administration.

Ellen Clay, PhD (University of Southwestern Louisiana). Auxiliary Assistant Professor. Professional development opportunities for teachers in the area of mathematics and mathematical thinking.

Rebecca Clothey, PhD (University of Pittsburgh) Director, Higher Education Program. Auxiliary Assistant Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.
Marion Dugan, EdD (University of Pennsylvania). Auxiliary Associate Professor. Language arts, student teaching.

Stephen C. Ehrmann Associate Clinical Professor. Learning technologies, learning science, assessment, evaluation, and professional development strategies, used to help educators make visible improvements in programmatic learning outcomes.

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Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

**Special Education**

Major: Special Education

Degree Awarded: Master of Science (MS)

Calendar Type: Quarter

Total Credit Hours: 49.5

Classification of Instructional Programs (CIP) code: 13.0402

Standard Occupational Classification (SOC) code: 11-9039; 25-2053; 2054; 2059

**About the Program**

The Master of Science in Special Education program is intended for those interested in gaining greater skills and expertise in the area of Special Education and/or a teaching certificate in the area of special education. Candidates seeking PA special education certification must have an active PA Instructional I or II teaching certificate in the appropriate area.

The Master of Science in Special Education seeks to produce professionals who are equipped with the fundamental skills, knowledge, and competencies they will need to meet the needs of students at risk for and with disabilities in multiple settings. The program is a flexible, part-
time graduate program consisting of 49.5 credits: 31.5 credits in Core Special Education Certification courses, 12.0 credits in concentration courses, and 6.0 credits in research. The program culminates with each potential graduate completing an action research project and presentation within his or her area of concentration.

**Available Concentrations**

**Autism Spectrum Disorders**
Within the past decade, the number of children diagnosed with Autism or Asperger’s Syndrome has increased drastically. Consequently, the need for professionals trained in this specialized area has significantly increased. This concentration is designed for those who seek additional expertise in this critical need area. It will provide knowledge and skills for working with both students with Autism and Asperger’s Syndrome as well as effective teaching methods, interventions, and supports. Students who have an active PA Instructional I or Instructional II teaching certificate are eligible to apply for the PA Autism Spectrum Disorders endorsement upon completion of EDEX 551 and the concentration courses.

**Collaborative Special Education Law and Process**
Meeting the needs of children with disabilities through school-family-community collaboration is an ambitious goal of educational policy in the United States. An implementing objective is to develop highly qualified special education teachers and administrators in schools and the community, as well as to offer special education collaborative knowledge and practical skills training to parents and advocates, whose cooperative partnership is imperative to support the provisions for the successful learning of all students as incorporated and mandated in legislation such as No Child Left Behind (NCLB) and the Individuals with Disabilities Education Improvement Act of 2004 (IDEA).

**Multisensory Reading Instruction Level I**
It is estimated that up to 20% of school age children experience difficulty with some aspect of literacy. This course sequence gives teachers the necessary skills to provide direct instruction in a multisensory phonetic-based program to students with decoding deficits. With successful completion of the coursework, students are eligible for WILSON® Level 1 Certification. The Wilson Reading System® is recognized nationwide and is a highly desirable certification to have in Special Education.

**Technologies for Special Education**
Best practices in the education of students with disabilities requires educational professionals to be proficient with a wide range of technologies. This concentration is designed for those seeking additional expertise in the area of educational technologies and assistive technology that can be used to create accessible learning opportunities and increased outcomes for students with disabilities.

**Customized Concentration**
Students who already possess a special education certification or who are not interested in obtaining a special education certification but want to enhance their skills in specific special education topic areas may choose to take two of the concentrations (24.0 credits) and 19.5 credits of their choosing from the special education certification core in addition to completing the research courses.

**Additional Information**
For more information about this program, contact the program manager:

Owen Schugsta
School of Education
Drexel University
215.895.1690

ocs23@drexel.edu

**Admission Requirements**
Applicants for the program will follow the university standards for admission to graduate study. Prospective students must have earned a bachelor’s degree from an accredited institution and have an undergraduate GPA of 3.0 or higher to be considered for admission (graduate degree GPAs will be considered along with the undergraduate GPA). In addition, prospective students are required to submit the following:

- Completed Application Form including official transcripts from all universities or colleges attended
- Two letters of recommendation
- Personal essay
- Application fee

The admissions committee will evaluate the applicant’s potential and commitment to succeed in graduate study in the online environment. The applicant’s potential to contribute to the overall quality of the program of study will also be considered.

Interviews, in person or by phone, will be conducted by the admissions committee with those applicants who meet Graduate Admission’s standard admissions criteria.

Decisions will be made using dates corresponding to the regular university schedule for rolling admissions in Graduate Admissions.

For more information about this program, contact the program manager:

Owen Schugsta
School of Education
Drexel University
215.895.1690
ocs23@drexel.edu

**Degree Requirements**
The Master of Science in Special Education requires 49.5 credits consisting of 31.5 credits in core special education certification courses, 12.0 credits in concentration courses, and 6.0 credits in research. For a certification in special education, students must have completed 9 prerequisite credits in special education accommodations to apply for certification in Pennsylvania.

A field component is required in most courses.

**Pre-Requisite Courses**
Students must have the following courses in order to apply for a certification in special education. All students entering this master’s program from an approved PA certification program after 2011 should have had these core courses in their initial certification program. If a student does not have these courses, they must complete them with a minimum grade of “B” in addition to the core certification offerings.

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDEX 542</td>
<td>Fundamentals of Special Education</td>
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</tr>
<tr>
<td>EDEX 544</td>
<td>The Inclusive Classroom</td>
<td>3.0</td>
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</table>

One of the following, depending on whether pursuing the PreK-8 or 7-12 certification concentration:
Required Courses: MS in Special Education Program

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDEX 548</td>
<td>Emotional and Behavioral Support of Individuals</td>
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<td>EDEX 549</td>
<td>Teaching Individuals with High Incident Disabilities</td>
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<td>EDEX 550</td>
<td>Teaching Individuals with Low Incident Disabilities</td>
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<tr>
<td>EDEX 551</td>
<td>Teaching Students with Autism Spectrum Disorder</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 552</td>
<td>Integrating Technology for Learning &amp; Achievement</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Students complete a sequence of two courses specific to either the PreK-8 or the 7-12 certification concentration from the following: 9.0

- EDEX 547 & EDEX 553
  Special Education Processes PreK-8 and Special Education Practicum PreK-8
- OR
  EDEX 567 & EDEX 563
  Special Education Processes 7-12 and Special Education Practicum 7-12

Capstone Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDEX 610</td>
<td>Action Research for Special Education Teachers I</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 611</td>
<td>Action Research for Special Education Teachers II</td>
<td>1.5</td>
</tr>
</tbody>
</table>

Concentration Courses

Students complete courses from one of the concentrations listed below. 12.0

- Autism Spectrum Disorders Concentration
  - EDEX 556 Characteristics & Methods: Autism
  - EDEX 558 Characteristics & Methods: High Functioning Autism
  - EDEX 560 Communication & Language Interventions: Autism Spectrum Disorders
  - EDEX 562 Behavior & Sensory Support: Autism Spectrum Disorders

- Technologies for Special Education
  - EDEX 570 Integrating Assistive Technology for Individuals with High Incident Disabilities
  - EDEX 572 Integrating Assistive Technology for Individuals with Low Incident Disabilities
  - EDLT 535 Researching & Evaluating Instructional Technology
  - ELL 504 Learning Technologies & Disabilities

- Collaborative Special Education Law & Process
  - EDEX 710 School Law & Policy in Special Education
  - EDEX 600 Family, School and Community Engagement in Special Education
  - EDEX 601 Special Education Advocacy
  - EDEX 602 Special Education Dispute Resolution and Skills Training

- Multisensory Reading Instruction Level I
  - EDLS 620 Applied Methods in Multisensory Reading Instruction
  - EDLS 621 Multisensory Reading Instruction K/1

EDLS 622 Basic Word Study I
EDLS 623 Basic Word Study II
EDLS 624 Multisensory Practicum I
EDLS 625 Multisensory Practicum II
EDLS 626 Multisensory Practicum III

Total Credits 12.0

- The multisensory reading instruction courses fulfill certain requirements (but not all) for the Wilson Language Level I certification.

Education Faculty

W. Edward Bureau, PhD (University of Pennsylvania) Director of the Sacramento EdD. Clinical Associate Professor. Leadership, supervision, and capacity development.

Holly Carpenter, PhD (Arizona State University). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD (University of Southern California.) Program Coordinator for the MS in Higher Education Program at the Center for Graduate Studies in Sacramento. Clinical Professor. Higher education leadership and administration.

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Marion Dugan, EdD (University of Pennsylvania). Auxiliary Associate Professor. Language arts, student teaching.

Stephen C. Ehrmann Associate Clinical Professor. Learning technologies, learning science, assessment, evaluation, and professional development strategies, used to help educators make visible improvements in programmatic learning outcomes.

Salvatore V. Falletta, EdD (North Carolina State University) Director of the Human Resource Development (HRD) program at Drexel University. Associate Clinical Professor. Human Resource intelligence (i.e., HR research and analytics practices); HRD assessment, measurement, and evaluation models and taxonomies; organizational diagnostic models; web-based employee and organizational survey methods, and computational modeling.

Aroutis N. Foster, PhD (Michigan State University). Assistant Professor. Educational psychology and educational technology, especially the following: Motivation; Technological Pedagogical Content Knowledge (TPACK); Immersive Interactive Digital Environments (simulation, games, virtual realities).

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Rajashi Ghosh, PhD (University of Louisville, Kentucky). Assistant Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.
Interdepartmental Faculty

Barbara Jean Hoekje, PhD (University of Pennsylvania) Director of English Language Center. Associate Professor. Sociolinguistic theory, discourse analysis, applied linguistics (language teaching, learning, and testing).

Fredricka K. Reisman, PhD (Syracuse University) Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

Teaching, Learning and Curriculum

Major: Teaching, Learning, and Curriculum
Degree Awarded: Master of Science (MS)
Calendar Type: Quarter
Total Credit Hours: 45.0
Classification of Instructional Programs (CIP) code: 13.1399
Standard Occupational Classification (SOC) code: 11-9039

About the Program

The MS in Teaching, Learning, and Curriculum program provides two options: (Track I) earning a master's degree while completing initial certification to become a classroom teacher; or (Track II) earning a master's degree to enhance an existing career as a classroom teacher. Students in Track II select an area of concentration from among a variety of options, providing an opportunity for intensive study in teaching, learning, and curriculum; educational leadership; international education; instructional technology; or higher education. Students may also customize their own concentration based on their interests and professional needs.

Track I: Initial Pennsylvania Teacher Certification

This track incorporates current research on teaching and provides in-depth preparation in pedagogy, curriculum development, teaching students with special needs, implications of learner and task characteristics for instructional design, scaffolding instruction for diverse learners, the latest techniques in evaluation of instruction, and use of interactive technology in instruction. The student is provided opportunities to synthesize theoretical and practical knowledge through field study.

Successful completion of the core pedagogy courses, subject area content courses and state licensure exams allows for recommendation for PA Instructional I certification.

Track II: Advanced Studies in Teaching, Learning and Curriculum

This track is designed to provide students with advanced teaching knowledge and skills well beyond that required for initial Pennsylvania certification. Graduates will be prepared to function in a variety of roles as instructors, instructional leaders or researchers in local, state, national and international organizations, foundations, associations, corporations.
and private educational institutions. The program also provides a strong foundation for doctoral level studies.

Program Goals
Graduates of the MS in Teaching, Learning and Curriculum will:

- Possess advanced knowledge related to effective instruction in a variety of educational settings.
- Demonstrate skills in developing, analyzing, implementing, and evaluating existing and new instructional strategies and practices in a variety of educational institutions/organizations.
- Exhibit outstanding leadership, organizational, cross cultural, interpersonal and advocacy skills including the ability to communicate effectively with internal and external groups.
- Have in-depth knowledge of both public and private (non-profit and for-profit) institutions as well as small and large institutions.

Admission Requirements
Admission to the MS in Teaching, Learning and Curriculum will follow the University standards for admission to graduate study including receipt of a bachelor’s degree from an accredited college or university with an earned GPA of 3.0 on a 4.0 scale. Undergraduates who meet the rigorous requirements for participation in a Bachelor’s and Master Dual Degree Program may also be considered. Ideally, a successful candidate will possess a public school teaching certificate or, in the case of an undergraduate pursuing the BS/MS track, complete teacher certification requirement in conjunction with the MS degree.

Prospective students can learn about specific admission requirements by visiting the Graduate Admissions at Drexel University (http://www.drexel.edu/grad/programs/edu/teaching-learning-and-curriculum) website.

Degree Requirements

Track I: Initial Pennsylvania Teacher Certification
A minimum of 45.0 credits is required for students with or without prior certification for the Master of Science degree.

Core Courses
Completion of the following 33.0 (secondary certification) credits or 42.0 (PreK-4) credits of core pedagogy courses allows for recommendation for PA Instructional I certification. View the requirements on the Post-Baccalaureate Teaching Certificate: Elementary Pre-K-4 and Secondary Concentrations (p. 398) page for additional information on requirements for specialization in subject areas.

Secondary Education Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDEX 542</td>
<td>Fundamentals of Special Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 544</td>
<td>The Inclusive Classroom</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 566</td>
<td>Literacy and Content Skill Development 7-12</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 514</td>
<td>Science Teaching Methods</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 515</td>
<td>Adolescent Learners in Secondary Schools</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 520</td>
<td>Professional Studies in Instruction</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 522</td>
<td>Evaluation of Instruction</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 525</td>
<td>Multi-Media Instructional Design</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 540</td>
<td>Field Experience</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 558</td>
<td>Reading in the Content Areas</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Elementary Education Core Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EDPO 620</td>
<td>Education Policy: Concepts, Issues, and Applications</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 705</td>
<td>School Law and Politics</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 804</td>
<td>Program Evaluation in Organizations</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Track II: Advanced Studies in Teaching, Learning and Curriculum
Students will complete a total of 45 credit hours consisting of seven core courses, two research courses, and six concentration courses in an approved area.

Core Courses

<table>
<thead>
<tr>
<th>Course</th>
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<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>EDUC 530</td>
<td>Advanced Techniques in Instruction &amp; Assessment</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 700</td>
<td>Classroom Research for Teachers I</td>
<td>4.5</td>
</tr>
<tr>
<td>EDUC 701</td>
<td>Classroom Research for Teachers II</td>
<td>1.5</td>
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Research Courses

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<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 609</td>
<td>Language &amp; Culture in Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 714</td>
<td>Instructional and Curriculum Leadership</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 813</td>
<td>Educational Issues Seminar</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits

45.0
* Students choose from the following concentration options with the approval of a graduate academic advisor and the program director:

- Educational Administration
- Global and International
- Instructional Technology
- Higher Education
- Customized Concentration (including other Drexel academic departments) e.g., ESL Program Specialist, Autism Spectrum Disorders, Educational Policy, Evaluation and Assessment

Education Faculty

W. Edward Bureau, PhD (University of Pennsylvania) Director of the Sacramento EdD. Clinical Associate Professor. Leadership, supervision, and capacity development.

Holly Carpenter, PhD (Arizona State University). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

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Marion Dugan, EdD (University of Pennsylvania). Auxiliary Associate Professor. Language arts, student teaching.

Stephen C. Ehrmann Associate Clinical Professor. Learning technologies, learning science, assessment, evaluation, and professional development strategies, used to help educators make visible improvements in programmatic learning outcomes.

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Kathy Geller, PhD (Fielding Graduate University). Assistant Clinical Professor. Educational leadership and management.

Rajashi Ghosh, PhD (University of Louisville, Kentucky). Assistant Professor. Mentoring and leader development, workplace Incivility, workplace learning and development.

John M. Gould, PhD (University of Pittsburgh) Harrisburg EdD Educational Leadership & Change Program. Associate Clinical Professor. Change leadership, curriculum re-design, the impact of technology on learning.

Mary Jo Grdina, PhD (Case Western Reserve University). Auxiliary Assistant Professor. Undergraduate studies, science education, curriculum design.

Dominic F. Gullo, PhD (Indiana University). Professor. Studying the relative and long-range effects of early schooling experiences in prekindergarten and kindergarten on children’s achievement and social adaptation to school routine.


Elizabeth Haslam, PhD (University of Pennsylvania). Auxiliary Associate Professor. Educational field coordinator, instructional design, qualitative evaluation, writing across the curriculum.

Jennifer Katz-Buonincontro, MFA, PhD (University of Oregon). Assistant Professor. Educational administration.

Kristine Lewis, PhD (Temple University). Assistant Professor. Experiences of students of African descent at predominantly white colleges and universities, college access and college student development, youth civic engagement in urban school reform, qualitative research and evaluation.

William Lynch, PhD (University of Maryland) Dean, Goodwin College of Professional Studies. Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.

Sonya Martin, PhD (Curtin University, Science and Mathematics Education Centre, Perth, Australia). Assistant Professor.

Michel Miller, PhD (University of Miami, Florida). Auxiliary Assistant Professor. Special education.

Sarah P. Reynolds, EdD (Saint Joseph’s University) Program Director. Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Ellen B. Scales, PhD (Pennsylvania State University). Auxiliary Assistant Professor. Literacy, mathematics education, special education.

Jason Silverman, PhD (Vanderbilt University) Director of the Program in Mathematical Learning and Teaching. Assistant Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers’ ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

David A. Urias, PhD (University of Virginia). Assistant Professor. International education, educational assessment, the influence of corporate philanthropy on higher education.

Sheila Vaidya, PhD (Temple University) Associate Director of Research and Outreach Programs. Associate Professor. Educational psychology, school psychology, research design.

Charles A. Williams, PhD (Temple University). Associate Teaching Professor. Prevention of school-aged violence.

Interdepartmental Faculty

Barbara Jean Hoekje, PhD (University of Pennsylvania) Director of English Language Center. Associate Professor. Sociolinguistic theory,
discourse analysis, applied linguistics (language teaching, learning, and testing).

Fredricka K. Reisman, PhD (Syracuse University). Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

**Multisensory Reading Instruction**

**Level 1**

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 12.0
Instructional Delivery: Campus, Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13-1315
Standard Occupational Classification (SOC) Code: 25-2022

Students completing this certificate would be become eligible to be certified Wilson Language Level 1 instructors by the Wilson Language Corporation.

The EDLS 621 course will enable teachers to implement a tier 1 and tier 2 Response to Intervention reading program for all students in grades K-1. The two other courses, EDLS 622 Basic Word Study I and EDLS 623 Basic Word Study II, will inform and instruct students on how to teach phonetics, including the six syllable types and the rules of the English language. Three additional practicum courses are offered for students to practice the techniques and theories taught in the courses. The practicums involve tutoring a student for 60 hours.

**Admission Requirements**

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.
- International Students must submit a TOEFL score indicating a minimum of 600 (paper exam) or 250 (CBT exam). For more information, view the International Students page.

**Program Requirements**

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDLS 620</td>
<td>1.0</td>
</tr>
<tr>
<td>EDLS 621</td>
<td>2.0</td>
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<tr>
<td>EDLS 622</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLS 623</td>
<td>3.0</td>
</tr>
<tr>
<td>EDLS 624</td>
<td>1.0</td>
</tr>
<tr>
<td>EDLS 625</td>
<td>1.0</td>
</tr>
<tr>
<td>EDLS 626</td>
<td>1.0</td>
</tr>
</tbody>
</table>

**Total Credits** 12.0

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**PhD in Educational Leadership Development and Learning Technologies**

Major: Educational Leadership Development and Learning Technologies
Degree Awarded: Doctor of Philosophy
Calendar Type: Quarter
Total Credit Hours: 74.0
Classification of Instructional Programs (CIP) code: 13.9999
Standard Occupational Classification (SOC) code: 25-1199

**About the Program**

**Vision**

The PhD program in Educational Leadership Development and Learning Technologies is designed for those who aspire to be education researchers, university faculty or research analysts. The program is designed so that students will have the skills, knowledge and experience to be leaders and stewards of the field. Graduates from this program develop research and critical thinking abilities directed toward the creation of new knowledge, integration and original application and/or teaching of existing knowledge and scholarly inquiry in their field of study.

Applicants to this program are expected to have high aptitude for research and inquiry in the field of education. They will express career interest in topics into which the faculty of the school are actively inquiring and researching. The assumption is that the most effective training for the PhD stems from collaborative research and inquiry into topics of mutual interest by an able student and faculty scholars and researchers. The major emphasis of the program consists of the individual students and faculty members(s) jointly researching and inquiring into an area of study to conduct scholarly research.

In addition, two areas of concentration are available:

- **Leadership**
  Designed to introduce student to leadership characteristics, styles, and profiles along with the dynamics of the process of change in educational organizations. Students also systematically learn techniques to promote creative thinking, innovation, and change for educational leaders, as well as how to design effective program evaluations.

- **Science, Technology, Engineering, and Mathematics (STEM)**
  Designed to prepare students to become members of the STEM education community, through both reading, discussing, analyzing and criticizing important research from the science, technology, education, and mathematics education literature, synthesizing this work around common themes, and drawing practical conclusions within the students area of interest as well within the broader area of STEM education.

**Mission**

The emphasis of the program is philosophical underpinning and theory-driven research. In addition to study in educational leadership, policy and
Admission Requirements

The ideal candidate will have a research-oriented master's degree in an area relevant to their desired specialization, a GPA of 3.25 (ideally 3.5 on a 4.0 scale) and competitive Graduate Record Exam (GRE) scores on each of the sub-tests: Verbal, Quantitative and Analytical.

All applicants are required to submit the following materials.

- Graduate School Application
- Official transcripts from all undergraduate and graduate study
- Official copies of GRE score reports sent directly to the Office of Graduate Admissions. International applicants who have not studied in the US, and whose first language is not English, are required to take the TOEFL and score 100 or higher (highest score is 120).
- Resume or curriculum vitae
- A statement of career goals, including specific research and scholarly interests. The applicant should be sure to indicate how their interests coincide with those of particular School of Education faculty members. (Visit our website for a list of current faculty research interests.)
- Three letters of reference from people familiar with prior academic performance
- Copies of students' scholarly writing, including published papers and theses or term papers

The School of Education admissions committee will review each application and, prior to acceptance, an interview may be required.

Additional Information

Admission Requirements

The School of Education admissions committee will review each applicant and, prior to acceptance, an interview may be required.

Cohort and Delivery Format

This program will be limited to a cohort of full-time students for whom full funding is available and who will be fully embraced as members of the School of Education. The program will be delivered on-campus and will be situated in the framework of collaborative, transformational learning and knowledge generation. Small seminars, independent projects and practicum opportunities are designed for an individualized program.

Additional Information

For more information about this program, contact the program manager:

Jemina Williams
jtb84@drexel.edu
215-895-1965

Or visit the School of Education's Graduate Program (https://webedit.drexel.edu/soe/academics/graduate) website.

Degree Requirements

The PhD program of study involves formal coursework and informal experiences. The total minimum credits for the PhD degree is 74.0 credits, distributed among the following areas:

- Breadth and depth in education and educational research (12.0 credits)
- Research core (20.0 credits)
- Content concentration (27.0 credits)
- Mentored research experiences (6.0 credits)
- Dissertation research (9.0 credits minimum)

Research preparation is the foundation of the PhD program. Students begin research activities during the first year of the program, and continue to develop their skills by conducting various research projects with School of Education faculty, presenting research findings at conferences and writing research papers, culminating with the dissertation work. Thus, the program is designed to immerse the student in educational content, inquiry and methodology, so as to ask critical questions and design procedures to conduct research.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 750</td>
<td>Critical Issues in Education Seminar (3-credit course taken 3 times)</td>
<td>9.0</td>
</tr>
<tr>
<td>Elective</td>
<td></td>
<td>3.0</td>
</tr>
<tr>
<td>Research Core Courses</td>
<td></td>
<td>20.0</td>
</tr>
<tr>
<td>EDUC 803</td>
<td>Educational Research Design I</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 809</td>
<td>Introduction to Data Collection and Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 810</td>
<td>Educational Research Design II</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 815</td>
<td>Writing for Research, Publication and Funding in Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 835</td>
<td>Quantitative Research Methods and Data Analysis</td>
<td>4.0</td>
</tr>
<tr>
<td>EDUC 836</td>
<td>Qualitative Research Methods and Data Analysis</td>
<td>4.0</td>
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<tr>
<td>Concentration Courses</td>
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</tr>
<tr>
<td>EDUC 800</td>
<td>Educational Leadership &amp; Change</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 801</td>
<td>Creative Strategies For Educational Leaders</td>
<td>3.0</td>
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</table>

Additional information about how to apply is available on the Graduate Admissions at Drexel University (http://www.drexel.edu/grad/programs/edu/educational-leadership-development-and-learning-technologies) site.
EDUC 804  Program Evaluation in Organizations  3.0
(p. 391)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>EDUC 840</td>
<td>Theories of Individual Cognition in STEM Education</td>
<td>3.0</td>
</tr>
<tr>
<td>(p. 391)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDUC 842</td>
<td>Social Foundation and Group Cognition in STEM Education</td>
<td>3.0</td>
</tr>
<tr>
<td>(p. 391)</td>
<td></td>
<td></td>
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<tr>
<td>EDUC 844</td>
<td>Creativity and Innovation in STEM Education</td>
<td>3.0</td>
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<td>(p. 391)</td>
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</table>

STEM Education Concentration: 27.0

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>EDUC 800</td>
<td>Doctoral Seminar (1-credit seminar taken 3 times)</td>
<td>9.0</td>
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<tr>
<td>(p. 391)</td>
<td></td>
<td></td>
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<tr>
<td>EDUC 998</td>
<td>PhD Dissertation (2-credits, 3 terms)</td>
<td>6.0</td>
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<td>(p. 391)</td>
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</tbody>
</table>

Guided Research Experience 6.0

EDUC 799  Independent Study: Learning through Problem-Based Research (course may be repeated for credit)  1.0-3.0
(p. 391)

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
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<tbody>
<tr>
<td>EDUC 840</td>
<td>Theories of Individual Cognition in STEM Education</td>
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<td>Social Foundation and Group Cognition in STEM Education</td>
<td>3.0</td>
</tr>
<tr>
<td>(p. 391)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>EDUC 844</td>
<td>Creativity and Innovation in STEM Education</td>
<td>3.0</td>
</tr>
<tr>
<td>(p. 391)</td>
<td></td>
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</tr>
</tbody>
</table>

Required Doctoral Seminar and Dissertation †  9.0

EDUC 800  Doctoral Seminar (1-credit seminar taken 3 times)  9.0
(p. 391)

EDUC 998  PhD Dissertation (2-credits, 3 terms)  6.0
(p. 391)

Total Credits 74.0

* These courses are chosen in consultation with the student’s faculty advisor. For the concentration in leadership, options students may choose include EDUC 804, EDUC 807, and/or EDUC 813.

** Electives outside of the School of Education are selected in consultation with the student’s faculty advisor.

† 9.0 credits is the minimum to meet graduation requirements. Additional credits may be taken if required.

---

Education Faculty

W. Edward Bureau, PhD (University of Pennsylvania) Director of the Sacramento EdD. Clinical Associate Professor. Leadership, supervision, and capacity development.

Holly Carpenter, PhD (Arizona State University). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD (University of Southern California.) Program Coordinator for the MS in Higher Education Program at the Center for Graduate Studies in Sacramento. Clinical Professor. Higher education leadership and administration.

Ellen Clay, PhD (University of Southwestern Louisiana). Auxiliary Assistant Professor. Professional development opportunities for teachers in the area of mathematics and mathematical thinking.

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Stephen C. Ehrmann Associate Clinical Professor. Learning technologies, learning science, assessment, evaluation, and professional development strategies, used to help educators make visible improvements in programmatic learning outcomes.

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William Lynch, PhD (University of Maryland) Dean, Goodwin College of Professional Studies. Professor. Curriculum and educational leadership, educational technology, distance learning policy development, higher and adult education.
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Michel Miller, PhD (University of Miami, Florida). Auxiliary Assistant Professor. Special education.

Sarah P. Reynolds, EdD (Saint Joseph’s University) Program Director. Associate Clinical Professor. Emphasis in cross-cultural, language and academic development.

Ellen B. Scales, PhD (Pennsylvania State University). Auxiliary Assistant Professor. Literacy, mathematics education, special education.

Jason Silverman, PhD (Vanderbilt University) Director of the Program in Mathematical Learning and Teaching. Assistant Professor. Teaching and learning of advanced mathematical ideas (algebra and calculus); improving teachers’ ability to orchestrate and sustain inquiry-based and discussion-based instruction; technology in mathematics education.

David A. Urias, PhD (University of Virginia). Assistant Professor. International education, educational assessment, the influence of corporate philanthropy on higher education.

Sheila Vaidya, PhD (Temple University) Associate Director of Research and Outreach Programs. Associate Professor. Educational psychology, school psychology, research design.

Charles A. Williams, PhD (Temple University). Associate Teaching Professor. Prevention of school-aged violence.

Interdepartmental Faculty

Barbara Jean Hoekje, PhD (University of Pennsylvania) Director of English Language Center. Associate Professor. Sociolinguistic theory, discourse analysis, applied linguistics (language teaching, learning, and testing).

Fredricka K. Reisman, PhD (Syracuse University) Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

Post-Bachelor's Certificate in Applied Behavior Analysis

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-baccalaureate
Number of Credits to Completion: 27.0
Instructional Delivery: Campus; Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Programs (CIP) Code: 42.2814
Standard Occupational Classification (SOC) Code: 19-3031

Behavior analysis is a widely accepted and validated scientific approach to the description and investigation of the environmental arrangements that occasion behavior. More than 60 years of research with proven methods and impressive findings has helped develop the technology now called applied behavior analysis. Over the past five decades, behavior analytic clinical and research advances have led to significant contributions in education programming, and mental health and behavioral health therapies.

The post bachelor's certificate in applied behavior analysis is designed to prepare clinical and educational leaders in the field of evidence-based interventions using behavior analytic theory and techniques. Leaders from this program will be highly successful candidates for institutions searching for knowledgeable and skilled behavior analytic consultants, program coordinators, senior clinical directors and interventionists.

Admission Requirements

Students applying to this program should have the following:

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.
- An interview, in person or by phone, will be conducted by the admissions committee with those applicants who meet Graduate Admission’s standard admissions criteria.

Core Applied Behavior Analysis Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDEX 630</td>
<td>Fundamental Elements of Behavior Change</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 631</td>
<td>Measurement and Experimental Design</td>
<td>4.5</td>
</tr>
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<td>EDEX 632</td>
<td>Behavioral Assessment and Functional Analysis</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 633</td>
<td>Behavioral Interventions</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 634</td>
<td>Consultation, Systems Change and Supervision</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 635</td>
<td>Ethical Considerations and Professional Conduct</td>
<td>4.5</td>
</tr>
</tbody>
</table>

Total Credits 27.0

The Behavior Analyst Certification Board, Inc.® has approved the Core Applied Behavior Analysis course sequence as meeting the coursework requirements for eligibility to take the Board Certified Behavior Analyst Examination®. Applicants will have to meet additional requirements to qualify.

Additional Information

For more information about this program, contact:

Dr. Christina Vorndran
Associate Clinical Professor
Applied Behavior Analysis Program
cmv69@drexel.edu

Special Education 7-12 Post-Bachelor's Certificate

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 27.0
Instructional Delivery: Online, Campus
The special education 7-12 certification program seeks to produce professionals who are equipped with the fundamental skills, knowledge, and competencies necessary to meet the needs of students at risk for school failure and students with disabilities in multiple settings.

This certificate program focuses on students at the secondary level. The special education 7-12 certification program is intended for those interested in gaining greater skills and expertise in the area of secondary special education and a teaching certificate in the area of secondary special education. Candidates seeking PA special education 7-12 certification must have an active PA Instructional I or Instructional II teaching certificate in a required area.

The program is a part-time graduate program consisting of 27.0 credits in core special education 7-12 certification courses. For students that have not completed the prerequisite courses, the program will require 36.0 credits; 27.0 credits in core special education 7-12 certification courses and 9.0 credits in prerequisite courses.

The program is designed for currently certified teachers who wish to obtain special education 7-12 certification in Pennsylvania. Out-of-state teachers may also earn their PA special education 7-12 certification if they transfer their current teacher certification to PA.

### Admission Requirements

Students applying to this program should have the following:

- Bachelor's degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.

### Program Requirements

**Pre-requisites for Special Education 7-12 Certification**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDEX 542</td>
<td>Fundamentals of Special Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 544</td>
<td>The Inclusive Classroom</td>
<td>3.0</td>
</tr>
</tbody>
</table>

**Required Courses: 7-12 Special Education Certification Concentration**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDEX 548</td>
<td>Emotional and Behavioral Support of Individuals with Disabilities</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 549</td>
<td>Teaching Individuals with High Incident Disabilities</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 550</td>
<td>Teaching Individuals with Low Incident Disabilities</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 551</td>
<td>Teaching Students with Autism Spectrum Disorder</td>
<td>4.5</td>
</tr>
<tr>
<td>EDEX 552</td>
<td>Integrating Technology for Learning &amp; Achievement</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 563</td>
<td>Special Education Practicum 7-12</td>
<td>4.5</td>
</tr>
</tbody>
</table>

- 9.0 quarter credits total. All students entering this program from an approved PA certification program after 2011 should have had these three courses in their initial certification requirements. If a student does not have these courses, he or she must complete them with a minimum grade of "B" in addition to the required core certification courses.

A field component is required in most courses.

### Additional Information:

For more information about this program, contact the program manager:

Owen Schugsta  
School of Education  
Drexel University  
215.895.1690  
ocs23@drexel.edu

### Post-Bachelor's Certificate in Special Education Leadership

**Certificate Level:** Graduate  
**Admission Requirements:** Bachelor's degree  
**Certificate Type:** Post-Baccalaureate  
**Number of Credits to Completion:** 25.0  
**Instructional Delivery:** Online, Campus  
**Calendar Type:** Quarter  
**Expected Time to Completion:** 2 years  
**Financial Aid Eligibility:** Aid eligible  
**Classification of Instructional Program (CIP) Code:** 13.0402  
**Standard Occupational Classification (SOC) Code:** 11-9039

The Post-Bachelor's Certificate in Special Education Leadership program is designed to produce educators who are equipped with the advanced skills, knowledge, and competencies necessary to lead programs that meet the needs of students at risk for and with disabilities in multiple settings.

The program requires 16.0 credits of special education leadership courses and 9.0 credits of leadership core courses (for a total of 25.0 credits). The courses in the leadership core focus on areas of change, finance, evaluation and assessment, and technology. Students must complete all courses and meet the prerequisite standards established by the PA Dept of Education for recommendation for the PA Supervisor of Special Education certification.

**Admission Requirements**

Students applying to this program should have the following:

- Bachelor’s degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
• An essay describing why the applicant is interested in pursuing graduate study in this field.

Leadership Core Courses
EDAM 522 Evaluation & Assessment Competencies 3.0
EDUC 708 Integration of Technology with School Instruction and Management 3.0
EDUC 710 School Finance and Facilities 3.0

Special Education Leadership Concentration Courses
EDEX 710 School Law & Policy in Special Education 3.0
EDEX 712 Instructional & Curriculum Leadership in Special Education 3.0
EDEX 714 Development, Supervision, & Support: Special Education Leadership 3.0
EDEX 716 Organization & Administration of Special Education 3.0
EDEX 721 Supervisor of Special Education Internship: Special Education Leadership 1.0
EDEX 722 Supervisor of Special Education Internship: Instructional Leadership 1.0
EDEX 723 Supervisor of Special Education Internship: Collaboration & Personnel 1.0
EDEX 724 Supervisor of Special Education Internship: Finance & Management 1.0

Total Credits 25.0

Additional Information:
For more information about this program, contact the program manager:
Owen Schugsta
School of Education
Drexel University
215.895.1690
ocs23@drexel.edu

Post-Bachelor's Teaching Certificate: Elementary Education

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 42.0
Instructional Delivery: Campus
Calendar Type: Quarter
Expected Time to Completion: 3 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.1202
Standard Occupational Classification (SOC) Code: 25-2021

This certificate program is designed for individuals who hold a bachelor's degree and who seek to qualify for Pennsylvania teacher certification at the elementary level. The curriculum is designed for those changing careers as well as those who already serve as temporary, emergency, or substitute teachers and wish to earn a formal teaching credential. Students completing the certification program have the option to continue coursework to earn MS in Teaching, Learning & Curriculum degree. All graduate credits earned in this certificate program may be applied toward the Master's degree in Teaching, Learning and Curriculum (p. 388).

The program will prepare students for a Pennsylvania Instructional I Certificate. Students also have the option of earning the Graduate Intern Teaching Certificate (p. 362) during the course of the program. The PA Graduate Intern Teaching Certificate feature is only available to students who want to teach in Pennsylvania.

For students intending to teach outside of Pennsylvania, through operation of interstate reciprocity agreements, a Pennsylvania teaching certificate may be converted to the analogous teaching certificate in another state. The School recommends prospective students contact their state's Department of Education to find out these transfer procedures before proceeding.

Certification Area
Drexel University’s Pennsylvania Department of Education-approved programs certify students who already hold Bachelor's degrees to be teachers in Elementary Education (PreK-4).

Additional undergraduate courses may be required. Learn more about undergraduate content course requirements for elementary or secondary certification in each subject.

Early Childhood/Elementary (PreK-4) Certification
EDEX 542 Fundamentals of Special Education 3.0
EDEX 544 The Inclusive Classroom 3.0
EDEX 546 Literacy and Content Skill Development PreK-8 3.0
EDUC 506 Assessment of Young Learners 3.0
EDUC 513 Early Childhood Teaching Methods 3.0
EDUC 520 Professional Studies in Early Childhood Education 3.0
EDUC 521 Typical and Atypical Development in Early Childhood Education 3.0
EDUC 525 Multi-Media Instructional Design 3.0
EDUC 529 Early Literacy 3.0
EDUC 539 Expressive Arts 3.0
EDUC 540 Field Experience (Graduate Student Teaching with Seminar) 3.0
EDUC 555 Social Studies Teaching Methods 3.0
EDUC 565 Foundations in Instructing English Language Learners 3.0
MTED 517 Mathematics Methods and Content (PreK-4) 3.0

Total Credits 42.0

Education Faculty
W. Edward Bureau, PhD (University of Pennsylvania) Director of the Sacramento EdD. Clinical Associate Professor. Leadership, supervision, and capacity development.

Holly Carpenter, PhD (Arizona State University). Assistant Clinical Professor. Higher education policy development and implementation, community college/university articulation, and online education.

José Luis Chávez, EdD (University of Southern California.) Program Coordinator for the MS in Higher Education Program at the Center for Graduate Studies in Sacramento. Clinical Professor. Higher education leadership and administration.
Ellen Clay, PhD (University of Southwestern Louisiana). Auxiliary Assistant Professor. Professional development opportunities for teachers in the area of mathematics and mathematical thinking.

Rebecca Clothey, PhD (University of Pittsburgh) Director, Higher Education Program. Auxiliary Assistant Professor. Comparative and international education, education of ethnic and linguistic minorities, sociology of education.

Marion Dugan, EdD (University of Pennsylvania). Auxiliary Associate Professor. Language arts, student teaching.

Stephen C. Ehrmann Associate Clinical Professor. Learning technologies, learning science, assessment, evaluation, and professional development strategies, used to help educators make visible improvements in programmatic learning outcomes.

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Kathy Geller, PhD (Fielding Graduate University). Assistant Clinical Professor. Educational leadership and management.

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Fredricka K. Reisman, PhD (Syracuse University) Director of the Torrance Center for Creativity and Innovation. Professor. Mathematics education, learning mathematics, mathematics pedagogy, teacher education, heuristic diagnostic learning and teaching, theory and research in creativity and applied creativity.

Patricia Henry Russell, MS (Drexel University). Teaching Professor. Probability and statistics.

Special Education PreK-8 Post-Bachelor’s Certificate

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 27.0
Instructional Delivery: Online; Campus
Calendar Type: Quarter
Expected Time to Completion: 3 years
The special education PreK-8 certification program seeks to produce professionals who are equipped with the fundamental skills, knowledge, and competencies necessary to meet the needs of students at risk for school failure and students with disabilities in multiple settings. This certificate program focuses on students from the prekindergarten to middle school levels. The special education PreK-8 certification program is intended for those interested in gaining greater skills and expertise in the area of PreK-8 special education and a teaching certificate in the area of PreK-8 special education. Candidates seeking PA special education PreK-8 certification must have an active PA Instructional I or Instructional II teaching certificate in a required area.

This program is a part-time graduate program consisting of 27.0 credits in core special education PreK-8 certification courses. For students that have not completed the prerequisite courses, the program will require 36.0 credits: 27.0 credits in core special education PreK-8 certification courses and 9 credits in prerequisite courses.

The program is designed for currently certified teachers who wish to obtain special education PreK-8 certification in Pennsylvania. Out of state teachers may also earn their PA special education PreK-8 certification if they transfer their current teacher certification to PA.

The courses cover all required state and federal regulations related to No Child Left Behind (NCLB) and Chapter 49 as well as the PA General Standards for Special Education and the standards outlined by the Council of Exceptional Children (CEC).

**Admission Requirements**

Students applying to this program should have the following:

- Bachelor’s degree from a regionally accredited institution.
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA).
- Completed graduate school application.
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended.
- Two letters of recommendation - professional or academic.
- An essay describing why the applicant is interested in pursuing graduate study in this field.

**Program Requirements**

**Pre-requisites for Certification in Special Education (PreK-8)**

Students must have completed the following courses in order to apply for a Pennsylvania Special Education PreK-8 certification. All students entering the post-bachelor's certificate program after 2011 should have had these core courses in their initial certification program. If a student has not completed the following three courses, they should be taken to apply for special education certification:

- **EDEX 542** Fundamentals of Special Education 3.0
- **EDEX 544** The Inclusive Classroom 3.0
- **EDEX 546** Literacy and Content Skill Development PreK-8 3.0

**Core Certification Courses**

- **EDEX 547** Special Education Processes PreK-8 4.5
- **EDEX 548** Emotional and Behavioral Support of Individuals with Disabilities 4.5
- **EDEX 549** Teaching Individuals with High Incident Disabilities 3.0
- **EDEX 550** Teaching Individuals with Low Incident Disabilities 3.0
- **EDEX 551** Teaching Students with Autism Spectrum Disorder 4.5
- **EDEX 552** Integrating Technology for Learning & Achievement 3.0
- **EDEX 553** Special Education Practicum PreK-8 4.5

**Total Credits**

27.0

A field component is required in each course.

**Additional Information:**

For more information about this program, contact the program manager:

Owen Schugsta
School of Education
Drexel University
215.895.1690
ocs23@drexel.edu

**Post-Bachelor’s Teaching Certificates: Secondary Education**

**Certificate Level:** Graduate

**Admission Requirements:** Bachelor’s degree

**Certificate Type:** Post-Baccalaureate

**Number of Credits to Completion:** 33.0

**Instructional Delivery:** Online, Campus

**Calendar Type:** Quarter

**Expected Time to Completion:** 2 years

**Financial Aid Eligibility:** Aid eligible

**Classification of Instructional Program (CIP) Code:** 13.1205

**Standard Occupational Classification (SOC) Code:** 25-2031

**Expected Time to Completion:** 2 years

**Financial Aid Eligibility:** Aid eligible

**Classification of Instructional Program (CIP) Code:** 13.1001

**Standard Occupational Classification (SOC) Code:** 25-2059

These certificate programs are designed for individuals who hold a bachelor's degree and who seek to qualify for Pennsylvania teacher certification at the secondary level. The curriculum is designed for those changing careers as well as those who already serve as temporary, emergency, or substitute teachers and wish to earn a formal teaching credential. Students completing the certification program have the option to continue coursework to earn MS in Teaching, Learning & Curriculum degree. All graduate credits earned in this certificate program may be applied toward the Master's degree in Teaching, Learning and Curriculum (p. 388).

The program prepares students for a Pennsylvania Instructional I Certificate. Students also have the option of earning the Graduate Intern Teaching Certificate (p. 362) during the course of the program. The PA Graduate Intern Teaching Certificate feature is only available to students who want to teach in Pennsylvania.

For students intending to teach outside of Pennsylvania, through operation of interstate reciprocity agreements, a Pennsylvania teaching certificate may be converted to the analogous teaching certificate in another state. The School recommends prospective students contact their state's Department of Education to find out these transfer procedures before proceeding.
Certification Areas

Drexel University's Pennsylvania Department of Education-approved programs certify students who already hold Bachelor’s degrees to be teachers in Secondary Education (7-12):

- biology
- chemistry
- physics
- earth and space science
- general science
- environmental education
- English
- social studies
- mathematics

Additional undergraduate content courses may be required. Learn more about undergraduate content course requirements for secondary certification in each subject.

**Secondary Biology Certification**
Core Pedagogy Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 514</td>
<td>Science Teaching Methods</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 515</td>
<td>Adolescent Learners in Secondary Schools</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 520</td>
<td>Professional Studies in Instruction</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 522</td>
<td>Evaluation of Instruction</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 525</td>
<td>Multi-Media Instructional Design</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 540</td>
<td>Field Experience</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 542</td>
<td>Fundamentals of Special Education</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 544</td>
<td>The Inclusive Classroom</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 566</td>
<td>Literacy and Content Skill Development 7-12</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 558</td>
<td>Reading in the Content Areas</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 565</td>
<td>Foundations in Instructing English Language Learners</td>
<td>3.0</td>
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</table>

Total Credits: 33.0

**Secondary Chemistry Certification**
Core Pedagogy Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 514</td>
<td>Science Teaching Methods</td>
<td>3.0</td>
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<tr>
<td>EDUC 515</td>
<td>Adolescent Learners in Secondary Schools</td>
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<tr>
<td>EDUC 520</td>
<td>Professional Studies in Instruction</td>
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<td>EDUC 522</td>
<td>Evaluation of Instruction</td>
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<tr>
<td>EDUC 525</td>
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<tr>
<td>EDUC 540</td>
<td>Field Experience</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 542</td>
<td>Fundamentals of Special Education</td>
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<tr>
<td>EDEX 544</td>
<td>The Inclusive Classroom</td>
<td>3.0</td>
</tr>
<tr>
<td>EDEX 566</td>
<td>Literacy and Content Skill Development 7-12</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 558</td>
<td>Reading in the Content Areas</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 565</td>
<td>Foundations in Instructing English Language Learners</td>
<td>3.0</td>
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</tbody>
</table>

Total Credits: 33.0

**Secondary Earth and Space Science Certification**
Core Pedagogy Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Name</th>
<th>Credits</th>
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<tbody>
<tr>
<td>EDUC 514</td>
<td>Science Teaching Methods</td>
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</tr>
<tr>
<td>EDUC 515</td>
<td>Adolescent Learners in Secondary Schools</td>
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Total Credits: 33.0

**Secondary English Certification**
Core Pedagogy Courses

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<tr>
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<th>Course Name</th>
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<tr>
<td>EDUC 515</td>
<td>Adolescent Learners in Secondary Schools</td>
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<tr>
<td>EDUC 520</td>
<td>Professional Studies in Instruction</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 522</td>
<td>Evaluation of Instruction</td>
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<tr>
<td>EDUC 525</td>
<td>Multi-Media Instructional Design</td>
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</tr>
<tr>
<td>EDUC 538</td>
<td>English Teaching Methods</td>
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<tr>
<td>EDUC 540</td>
<td>Field Experience</td>
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<tr>
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</tr>
<tr>
<td>EDUC 558</td>
<td>Reading in the Content Areas</td>
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</tr>
<tr>
<td>EDUC 565</td>
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Total Credits: 33.0

**Environmental Education (K-12) Certification**
Core Pedagogy Courses

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<tr>
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<td>Science Teaching Methods</td>
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<tr>
<td>EDUC 515</td>
<td>Adolescent Learners in Secondary Schools</td>
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<td>EDUC 520</td>
<td>Professional Studies in Instruction</td>
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<td>EDEX 542</td>
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<td>EDUC 558</td>
<td>Reading in the Content Areas</td>
<td>3.0</td>
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<tr>
<td>EDUC 565</td>
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Total Credits: 33.0

**Secondary General Science Certification**
Core Pedagogy Courses

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<tr>
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<td>Science Teaching Methods</td>
<td>3.0</td>
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<tr>
<td>EDUC 515</td>
<td>Adolescent Learners in Secondary Schools</td>
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<td>EDUC 520</td>
<td>Professional Studies in Instruction</td>
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<td>EDUC 522</td>
<td>Evaluation of Instruction</td>
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<td>EDUC 525</td>
<td>Multi-Media Instructional Design</td>
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<td>EDUC 540</td>
<td>Field Experience</td>
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</tr>
<tr>
<td>EDEX 542</td>
<td>Fundamentals of Special Education</td>
<td>3.0</td>
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</table>

Total Credits: 33.0
Reading Specialist Certificate

Certificate Level: Graduate
Admissions Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate Certificate
Number of Credits to Completion: 31.0
Instructional Delivery: Campus
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13.1315
Standard Occupational Classification (SOC) Code: 25-2022; 25-2031

The Reading Specialist Certificate Program was developed in response to the local and national need for training teachers who are skilled literacy instructors no matter what grade or subject they teach, the School of Education’s faculty seeks to create a new stand alone reading certificate program for teachers who already hold have at least an instruction I teaching certificate in PA, and to offer a new reading specialist certificate for inservice teachers who are seeking to become experts as reading teachers and literacy leaders in their classroom, schools, and districts, or ones who want to obtain a dual certification as a Reading Specialist and another content area. Additionally, students in the Reading Specialist Certificate program will obtain a Wilson certificate when they complete the 31-credit program because 3 Wilson reading courses and 3 Wilson practicum courses are a part of the core curriculum for this program.

The Reading Specialist Certificate Program is designed for teachers who already possess an Instructional I certificate in PA or another State who has a desire to become literacy coach, a literacy program/curriculum consultant (for a school, literacy center, etc.), a reading intervention specialist, or to supplement existing knowledge/skills in developing expertise as a reading instructor. The program is designed for teachers who want to obtain another certification as a Reading Specialist. Through reciprocity agreements among the states, graduates can transfer their certification in almost any state across the United States.

Reading Specialist Certificate Requirements:
- EDLS 550 Theories of Reading and Writing 3.0
- EDLS 555 Understanding Literacy through Sociocultural Perspectives 3.0
- EDLS 560 Reading and Writing in the Content Areas (7-12) 3.0
- EDLS 565 Constructing Meaning through Reading and Writing 3.0
- EDLS 570 Literacy and Evaluation 3.0
- EDLS 575 Responding to Children's and Young Adult Literature 3.0
- EDLS 620 Applied Methods in Multisensory Reading Instruction 1.0
- EDLS 622 Basic Word Study I 3.0
- EDLS 623 Basic Word Study II 3.0
- EDLS 624 Multisensory Practicum I 1.0
- EDLS 625 Multisensory Practicum II 1.0
- EDLS 626 Multisensory Practicum III 1.0
- EDLS 650 Designing a Literacy Program 3.0

Total Credits 31.0

STEM Education Certificate

Certificate Level: Graduate
The Certificate in STEM embraces the School of Education's and Universities focus on STEM education. The program creates an opportunity for those individuals who want to gain further understanding of STEM and provides the comprehensive education needed to effectively teach STEM concepts, as well as integrates strategies within the curriculum to effectively enhance student performance in STEM areas. The primary goal for the certificate in STEM Education is to broaden and deepen students’ understanding of STEM education.

Admission Requirements

- Bachelor's degree from a regionally accredited institution
- Two letters of recommendation
- Official transcripts from all universities or colleges and other post-secondary educational institutions (including trade schools) attended
- Completed Application Form
- Undergraduate GPA of 3.0 or higher (graduate GPAs will be considered along with the undergraduate GPA
- An essay describing why you are interested in pursuing graduate study in this field
- International Students must submit a TOEFL score indicating a minimum of 600 (paper exam) or 250 (CBT exam).

Program Requirements

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Total Credits</th>
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<tbody>
<tr>
<td>EDUC 840 Theories of Individual Cognition in STEM Education</td>
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</tr>
<tr>
<td>EDUC 842 Social Foundation and Group Cognition in STEM Education</td>
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</tr>
<tr>
<td>EDUC 844 Creativity and Innovation in STEM Education</td>
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</tr>
<tr>
<td>Capstone course (select one):</td>
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</tr>
<tr>
<td>EDUC 514 Science Teaching Methods</td>
<td>3.0</td>
</tr>
<tr>
<td>or MTED 519 Teaching Secondary Mathematics</td>
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</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td><strong>12.0</strong></td>
</tr>
</tbody>
</table>

School Principal Certificate

Certificate Level: Graduate
Admissions Requirements: Bachelor's
Certificate Type: Graduate
Number of Credits to Completion: 24.0 (if not pursuing MS program); 45.0 (if pursuing MS program)
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 13.0408 / 13.0409
Standard Occupational Classification (SOC) Code: 11-9032

The School Principal Certificate program was designed to produce school leaders who are knowledgeable about current theories and strategies in leadership and change. Components of the program's conceptual bedrock are heuristic diagnostic learning, intelligent use of emotions in interpersonal skills of leadership, creative problem solving, and learning technologies.

Admission Requirements

Applicants come from a variety of undergraduate and graduate backgrounds and typically desire to provide leadership for change as a school principal. The School Principal Certification is available for teachers or counselors who already possess initial teaching certificates and requires a minimum of three years of professional experience to apply for certification. Applicants must meet the general admissions requirements for graduate studies at Drexel University.

Program Requirements

Students will not be recommended for the School Principal Certificate until all course requirements are met, initial teaching certificate has been received, and all required sections of the Praxis Exams have been taken, and three years of satisfactory professional school experience have been completed. Minimum coursework requirements for the School Principal Certificate include 24.0 credits of specific pedagogy as outlined below. These credits may be incorporated into the graduate Teaching, Learning, and Curriculum program or into the electives portion of another approved Drexel master’s degree program. Students must achieve the grade of B or better in each graduate level course needed for certification and receive passing Praxis Exam scores in order to satisfy requirements for the desired certification.

Core Certification Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>EDUC 702</td>
<td>School Leadership &amp; Decision Making</td>
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</tr>
<tr>
<td>EDUC 705</td>
<td>School Law and Politics</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 708</td>
<td>Integration of Technology with School Instruction and Management</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 710</td>
<td>School Finance and Facilities</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 712</td>
<td>School and Community Partnerships and Relations</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 714</td>
<td>Instructional and Curriculum Leadership</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 715</td>
<td>School Principal Internship: Technology</td>
<td>1.5</td>
</tr>
<tr>
<td>EDUC 716</td>
<td>School Principal Internship: Finance</td>
<td>1.5</td>
</tr>
<tr>
<td>EDUC 717</td>
<td>School Principal Internship: Leadership</td>
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<tr>
<td>EDUC 718</td>
<td>School Principal Internship: School and Community Relations</td>
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</tbody>
</table>
Teaching English as a Second Language

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 16.5
Instructional Delivery: Online, Campus
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 13.1401
Standard Occupational Classification (SOC) Code: 25-2031

Teaching English as a second language certification is an add-on certificate available to students that currently possess a Pennsylvania Instructional I or Instructional II teaching certificate. The 16.5 credit ESL certificate program covers the theory and practice of second language education, the structure and sound of English, the design and assessment of ESL course materials, as well as broader issues in intercultural learning. Completion of the program also includes field-based experiences and a capstone action research project, under the guidance of an ESL Program Specialist. It does not require that the instructor speak another language. Credits earned through this program may be applied toward the MS in the Science of Instruction, or the MS in Teaching, Learning and Curriculum (p. 388).

This program satisfies PA State of Education requirements for Program Specialist: ESL endorsement. Interstate agreements generally allow applicability across the US. However, prospective students outside of Pennsylvania are advised to check with their state authorities to determine whether this program is appropriate for their case.

Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Description</th>
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<tr>
<td>LING 560</td>
<td>Introduction to Linguistics</td>
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<tr>
<td>EDUC 602</td>
<td>Language Learning &amp; Teaching</td>
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</tr>
<tr>
<td>EDUC 604</td>
<td>Structure and Sound System of English</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 606</td>
<td>Design and Assessment</td>
<td>3.0</td>
</tr>
<tr>
<td>EDUC 608</td>
<td>The Intercultural Learner</td>
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</table>

Total Credits: 16.5
The School of Public Health

About the School
The Dornsife School of Public Health promotes the health of communities through an integrated program of education, research, service and practice. The School is committed to identifying societal conditions required for people to be healthy, and to advancing practices that improve the health of vulnerable populations. The School enhances the health of communities by creating partnerships based on community values, strengths and assets. Its curriculum, stresses the importance of understanding and addressing the connection between human rights and health status.

The mission of the Dornsife School of Public Health (http://publichealth.drexel.edu) is to promote health and quality of life through graduate education, applied research, and community service in the prevention and control of disease, injury, and disability. The curriculum combines knowledge of the disciplines of public health and practical applications of that knowledge. By working collaboratively with community groups, agencies, and populations, professionals are prepared to effectively address today’s most pressing public health problems.

Preparation and Partnership
The School believes that professionals can best meet the needs of today and tomorrow with expertise in the integration and practical application of all disciplines of public health. The School of Public Health's educational and research programs are built upon partnerships with communities and the organizations that serve them.

The School prepares professionals to assess population health; to ensure appropriate services through programmatic, economic, and organizational interventions; and to develop and evaluate policy interventions.

Majors
- Biostatistics (MS, MPH) (p. 403)
- Community Health and Prevention (MPH, DrPH) (p. 409)
- Epidemiology (MS, MPH, PhD, MD/MPH) (p. 422)
- Environmental and Occupational Health (MPH) (p. 418)
- Health Management and Policy (MPH) (p. 431)
- Health Policy and Social Justice (DrPH) (p. 414)
- Public Health (MPH) (p. 434)
- Public Health - Executive Program (MPH) (p. 427)

Certificates
- Epidemiology and Biostatistics (p. 408)
- Global Health (p. 408)
- Lesbian, Gay, Bisexual and Transgender Health (LGBT) (p. 409)

Biostatistics
Major: Public Health
Degree Awarded: Master of Science (MS) or Master of Public Health (MPH)
Calendar Type: Quarter

Total Credit Hours: 58.0 (MS); 64.0 (MPH)
Classification of Instructional Programs (CIP) code: 26.1102
Standard Occupational Classification (SOC) code: 15-2041

About the Programs

Master of Science
Biostatistics applies statistical, mathematical and computational techniques to scientific research in health-related fields, including medicine, epidemiology, and public health. Biostatistics has been an integral and indispensable tool in improving health and reducing illness. Biostatisticians play essential roles in designing studies and analyzing research data. Graduates with degrees in biostatistics are employed in public health research and service organizations, university research groups, hospitals, pharmaceutical companies, health-related industries and government. The demand for biostatisticians in the job market has been consistently strong. New high throughput technologies such as gene microarray are generating an unprecedented amount of data and present exciting new opportunities for biostatisticians with strong computational skills.

The goal of Drexel University’s MS Program in Biostatistics is to provide students with a thorough understanding of biostatistical methods, strong computational skills, and the ability to apply this knowledge to research focusing on health related problems. The program prepares students for handling the quantitative and computational aspects of a research project, ranging from study design, data collection and management, developing analysis plans, and conducting analyses and reporting findings. The MS in Biostatistics program includes course work in statistical theory and methods, computing and data management, epidemiology, and general public health topics. Incorporated into the second year is a quarter-long practicum experience working on a real academic, government, or industry project in a sponsoring organization setting. The practicum-based research project will involve the application of biostatistical analysis to a problem of significance to the sponsoring academic, government or industry organization with joint oversight provided by a Department faculty member and an on-site PhD level biostatistician.

Upon graduation MS students will attain competencies in the following three areas: general public health knowledge, biostatistics knowledge, data management and computing skills.

For additional information about the program, visit The Dornsife School of Public Health (http://publichealth.drexel.edu) web site.

Master of Public Health
The Master of Public Health program is intended for individuals interested in careers as community educators; population health planners; policy analysts, evaluators, researchers; and managers of health service delivery organizations and systems, managed-care programs, and other population-based organizations.

The 64.0 quarter-credit program is interdisciplinary and requires students to complete a community-based master's project. It prepares students to enter an array of fields related to public health or a range of doctoral programs. Drexel University’s Master of Public Health (MPH) program provides practical skills and experience, with a unique focus on relevant community issues, challenges, and priorities.

Program Highlights
The first year of the program covers the five core disciplines offered within the context of culture and community. These include environmental and
occupational health; health care systems organization, management, and policy; social and behavioral sciences for population health; epidemiology; biostatistics. Throughout the program, group case discussion sessions, case-related activities and didactic sessions are integrated into the experience.

These include:

- Skill development labs and workshops (year two)
- Public health grand rounds (for all faculty, students, and community partners) provide access to scholars and their cutting-edge research and initiatives in public health

**Curriculum**

The MPH full-time educational program is structured on a quarter-term basis, with a total of 64.0 credit hours required. This is generally taken as a two-year program; all coursework must be completed within five years of the date of matriculation for the full-time program.

The second-year curriculum is composed of four required courses, three elective courses, and the Community-Based Master’s Project (CBMP), the culminating experience required of full-time Drexel MPH students. Students spend approximately 12 hours each week working on a community-oriented, health-related project, often working as an integral part of a community-based organization. This can be in the areas of government, healthcare and social services, among others.

In preparation for developing their final paper, students are required to identify an issue or problem of significance to the target community or agency, synthesize the literature, develop an approach or methodology to address the issue and either implement and test the validity of a proposed approach or set out a detailed prescription for addressing the problem. Students may also work with faculty in specific research areas.

**Joint Doctor of Medicine and Master of Public Health Degree (MD/MPH)**

Students wishing to complete a course of study earning the joint MD/MPH degree can complete such a program in 5 years. They must apply for the joint program and be accepted by both the Drexel University College of Medicine and the Dornsife School of Public Health. Students in this program have enriched public health content in their first two years of medical school and spend their third year of study full time in the Dornsife School of Public Health. Students are able to enter clinical rotations and residency selection having obtained the MPH degree.

**Additional Information**

For additional information about this program, contact:
Stephanie Johnson
snj22@drexel.edu
267.359.6065

**Admission Requirements**

Applicants to the MS in Biostatistics must meet the following requirements, having:

- a baccalaureate degree, ideally in a quantitative field such as mathematics, economics and computer science or a scientific area such as natural, biological, medical and environmental sciences.
- at least two semesters of calculus in college.
- at least one semester of linear algebra in college.
- knowledge and experience in computing such as operating system, office software and Internet. Familiarity with a programming language or a statistical package is desirable.

The application package will include:

- undergraduate and graduate transcripts
- three letters of recommendation from faculty or professionals who can evaluate the applicant’s promise as a graduate student
- Graduate Record Examination (GRE) scores
- a written statement of career and educational goals

**Degree Requirements**

Completion of the MS in Biostatistics requires: (1) a minimum of 51.0 credit hours of course work; (2) a cumulative grade point average of 3.0 or higher; (3) a substantial data analysis project (6 credit hours) with a written report (30-50 pages) and oral presentation.

**Required Public Health Courses**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
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<td>PBHL 516</td>
<td>Introduction to Public Health</td>
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**Required Biostatistics Courses**

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<td>PBHL 622</td>
<td>Statistical Inference I</td>
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<td>PBHL 623</td>
<td>Introduction to Statistical Computing</td>
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<td>PBHL 625</td>
<td>Longitudinal Data Analysis</td>
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<td>PBHL 628</td>
<td>Survival Data Analysis</td>
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<td>PBHL 631</td>
<td>Applied Multivariate Analysis</td>
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<td>PBHL 683</td>
<td>Advanced Clinical Trials &amp; Experiment Design</td>
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<td>PBHL 684</td>
<td>Statistical Inference II</td>
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<td>PBHL 686</td>
<td>Advanced Statistical Computing</td>
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<td>PBHL 685</td>
<td>Data Analysis Project</td>
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<td>PBHL 694</td>
<td>Biostatistical Literature Review</td>
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<td>PBHL 695</td>
<td>Statistical Consulting</td>
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<tr>
<td>PBHL 696</td>
<td>Nonparametric and Semiparametric Models</td>
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<td>PBHL 697</td>
<td>Generalized Linear Model</td>
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<td>PBHL 698</td>
<td>Linear Statistical Models</td>
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**Required Epidemiology Courses**

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<tbody>
<tr>
<td>PBHL 530</td>
<td>Principles of Epidemiology</td>
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<tr>
<td>PBHL 630</td>
<td>Intermediate Epidemiology</td>
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Complete 2 of the following:

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<th>Course</th>
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<tr>
<td>BIO 631</td>
<td>Bioinformatics I</td>
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<tr>
<td>BIO 640</td>
<td>Biometry</td>
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</tr>
<tr>
<td>MATH 510</td>
<td>Applied Probability and Statistics I</td>
<td></td>
</tr>
<tr>
<td>MATH 511</td>
<td>Applied Probability and Statistics II</td>
<td></td>
</tr>
<tr>
<td>PBHL 632</td>
<td>Applied Survey Research in Epidemiology</td>
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<tr>
<td>PBHL 804</td>
<td>Research Methods for Community Health and Prevention</td>
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</tr>
<tr>
<td>PBHL 830</td>
<td>Advanced Epidemiology</td>
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<tr>
<td>STAT 628</td>
<td>Applied Regression Analysis</td>
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**Total Credits**

<table>
<thead>
<tr>
<th>Credits</th>
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**Degree Requirements**

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PBHL 516</td>
<td>Introduction to Public Health</td>
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<td>Course Code</td>
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<tr>
<td>PBHL 520</td>
<td>Principles of Biostatistics</td>
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<td>PBHL 530</td>
<td>Principles of Epidemiology</td>
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<tr>
<td>PBHL 540</td>
<td>Prevention Principles and Practices</td>
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<td>PBHL 600</td>
<td>Management, Leadership, Assurance and Health Services</td>
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<td>PBHL 640</td>
<td>Environmental Health</td>
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<td>PBHL 650</td>
<td>Public Policy and Advocacy</td>
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<td><strong>Required Community-Based Master’s Project Courses</strong> 12.0</td>
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<tr>
<td>PBHL 680</td>
<td>Community Based Master’s Project I</td>
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<td>PBHL 681</td>
<td>Community Based Master’s Project II</td>
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<td>PBHL 682</td>
<td>Community Based Master’s Project III</td>
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<td><strong>Required Courses</strong> 15.0</td>
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<tr>
<td>PBHL 620</td>
<td>Intermediate Biostatistics I</td>
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<td>PBHL 621</td>
<td>Intermediate Biostatistics II</td>
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<tr>
<td>PBHL 623</td>
<td>Introduction to Statistical Computing</td>
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<tr>
<td>PBHL 630</td>
<td>Intermediate Epidemiology</td>
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<tr>
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<td>and choose 1 of the follow:</td>
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<tr>
<td>PBHL 622</td>
<td>Statistical Inference I</td>
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<tr>
<td>PBHL 629</td>
<td>Design &amp; Analysis of Clinical Trials</td>
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<tr>
<td>PBHL 683</td>
<td>Advanced Clinical Trials &amp; Experiment Design</td>
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<tr>
<td>PBHL 691</td>
<td>Pathophysiology Basis of Epidemiologic Research</td>
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<tr>
<td>PBHL 692</td>
<td>Public Health Obesity Prevention Research</td>
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<td></td>
<td><strong>Electives</strong> 12.0</td>
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<td></td>
<td>Students are required to successfully complete four electives (12.0 credits). These courses may be within the School of Public Health, or from other academic units within the University. Students must meet with their Academic Advisor in selecting their electives. It is the responsibility of the student to determine course restrictions and the registration process for campus electives taken at the Main Campus. The following is a sample of some of the School of Public Health electives offered by department:</td>
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<tr>
<td></td>
<td><strong>Biostatistics Electives</strong></td>
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<tr>
<td>PBHL 622</td>
<td>Statistical Inference I</td>
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<td>PBHL 628</td>
<td>Survival Data Analysis</td>
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<td>PBHL 629</td>
<td>Design &amp; Analysis of Clinical Trials</td>
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<td>PBHL 631</td>
<td>Applied Multivariate Analysis</td>
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<td>PBHL 657</td>
<td>Data Management</td>
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<td>PBHL 683</td>
<td>Advanced Clinical Trials &amp; Experiment Design</td>
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<tr>
<td>PBHL 684</td>
<td>Statistical Inference II</td>
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<td>PBHL 686</td>
<td>Advanced Statistical Computing</td>
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<td>Public Health Obesity Prevention Research</td>
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<td>PBHL 693</td>
<td>Applied Bayesian Analysis</td>
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<td>PBHL 696</td>
<td>Nonparametric and Semiparametric Models</td>
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<td>PBHL 699</td>
<td>Biostatistical Computing with Stata</td>
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<td><strong>Community Health and Prevention Electives</strong></td>
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<tr>
<td>PBHL 674</td>
<td>Studying Rare or Hidden Groups</td>
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<td>PBHL 675</td>
<td>LGBT Health Disparities</td>
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<td>PBHL 676</td>
<td>Intersectional Perspectives</td>
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<td>PBHL 678</td>
<td>Drug Use and Public Health</td>
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<tr>
<td>PBHL 801</td>
<td>Theory &amp; Practice of Community Health &amp; Preventions I</td>
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<tr>
<td>PBHL 803</td>
<td>Theory &amp; Practice of Community Health and Preventions II</td>
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<td>PBHL 804</td>
<td>Research Methods for Community Health and Prevention</td>
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<tr>
<td>PBHL 805</td>
<td>Qualitative Research in Community Health</td>
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<td>PBHL 808</td>
<td>Community Program Evaluation</td>
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<td>PBHL 810</td>
<td>Practicum in Community Health and Prevention</td>
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<tr>
<td>PBHL 814</td>
<td>Community Based Participatory Research</td>
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<tr>
<td>PBHL 823</td>
<td>Faith, Religion, Spirituality, and Health</td>
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<td>PBHL 824</td>
<td>Public Health Ethics</td>
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<tr>
<td>PBHL 827</td>
<td>Advanced Topics in Qualitative Analysis</td>
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<td><strong>Environmental and Occupational Health Electives</strong></td>
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<tr>
<td>PBHL 560</td>
<td>Overview of Issues in Global Health</td>
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<tr>
<td>PBHL 642</td>
<td>Healthy Housing &amp; Built Environment</td>
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<td>PBHL 645</td>
<td>Exposure Assessment</td>
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<td>PBHL 646</td>
<td>Environmental Health in Vulnerable Populations</td>
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<td>PBHL 648</td>
<td>Public Health and Disaster Preparedness</td>
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<td>PBHL 649</td>
<td>Occupational and Environmental Cancers</td>
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<td>PBHL 663</td>
<td>Injury Prevention and Control</td>
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<td>PBHL 664</td>
<td>Safety in Healthcare</td>
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<td><strong>Epidemiology Electives</strong></td>
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<td>PBHL 532</td>
<td>Autism as a Public Health Challenge</td>
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<td>PBHL 633</td>
<td>Epidemiology of Cancer</td>
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<td>PBHL 635</td>
<td>Social Epidemiology and Psychiatric Epidemiology</td>
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<td>PBHL 636</td>
<td>Infectious Disease Epidemiology</td>
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<td>PBHL 638</td>
<td>Perinatal Epidemiology</td>
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<td>PBHL 639</td>
<td>Cardiovascular Disease Epidemiology &amp; Prevention</td>
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<td>PBHL 655</td>
<td>Making Sense of Data</td>
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<td>PBHL 656</td>
<td>Pharmacoepidemiology</td>
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<td>PBHL 691</td>
<td>Pathophysiology Basis of Epidemiologic Research</td>
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<td>PBHL 692</td>
<td>Public Health Obesity Prevention Research</td>
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<td><strong>Health Management and Policy Electives</strong></td>
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<td>PBHL 604</td>
<td>Public Health Advocacy and Activism</td>
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<td>PBHL 606</td>
<td>Vaccines and Public Health Policy</td>
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<td>PBHL 610</td>
<td>Active Issues in Public Health</td>
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<td>PBHL 612</td>
<td>Public Health Funding &amp; Program Development</td>
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<tr>
<td>PBHL 613</td>
<td>Seminar in Fire Arms and Public Health</td>
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<td>PBHL 614</td>
<td>Coordinating a Population's Care</td>
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<td>PBHL 615</td>
<td>Perspectives on Gender, Race, Ethnicity, and Social Class</td>
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<td>PBHL 616</td>
<td>Public Health Surveillance: Aligning Data and Policy Use</td>
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<td>PBHL 617</td>
<td>Health Disparities: Systemic, Structural, Environmental &amp; Economic</td>
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<td>PBHL 618</td>
<td>Historical and Contemporary Developments in Social Justice</td>
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<td>PBHL 652</td>
<td>Public Health Leadership</td>
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<td>PBHL 802</td>
<td>Health and Human Rights</td>
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<td>PBHL 851</td>
<td>Health Systems Policy Analysis</td>
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<tr>
<td>PBHL 852</td>
<td>Health Economics I</td>
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<td>PBHL 853</td>
<td>Health Economics II</td>
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<tr>
<td>PBHL 854</td>
<td>The Politics of Food &amp; Gender</td>
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</table>
School of Public Health Faculty

Amy Auchincloss, PhD (University of Michigan) Department of Biostatistics and Epidemiology. Assistant Professor. Environmental determinants of health and the health effects of air pollution; contribution of resources in residential environments to health behaviors, obesity, diabetes and cardiovascular disease; the use of spatial analysis methods and agent-based models.

Zekarias Berhane, PhD (University of Pittsburgh) Department of Epidemiology and Biostatistics. Assistant Research Professor. Modeling time-to-event data with single and multiple outcomes, mixed effect models and regression diagnostics.

Sandra Bloom, MD (Temple University School of Medicine) Department of Health Management and Policy. Associate Professor. Psychological trauma and organizational stress.

Jennifer Breaux, DrPh, MPH (Drexel School of Public Health) Department of Community Health and Prevention; Office of Academic Affairs, Director of Undergraduate Public Health Education. Assistant Teaching Professor. Maternal and child health, community health, human rights.

Darryl R. Brown, PhD (Johns Hopkins Bloomberg School of Public Health) Department of Health Management and Policy. Assistant Professor. Health care research and planning; patient outcomes and applied health economic methods.

Igor Burstyn, PhD (Utrecht University) Department of Environmental and Occupational Health. Associate Professor. Occupational and environmental epidemiology, industrial hygiene.

Carla Campbell, MD, MS (Kentucky College of Medicine; Mount Sinai School of Medicine) Department of Environmental and Occupational Health. Associate Professor. Community and environmental medicine, pediatrics, lead poisoning.


Mariana Chilton, PhD, MPH (University of Pennsylvania) Department of Health Management and Policy. Associate Professor. Human rights and health; race, ethnicity and poverty; nutrition and chronic disease; ethnography and participatory research; complementary and alternative medicine.

Curtis E. Cummings, MD, MPH (Jefferson Medical College) Department of Environmental and Occupational Health. Associate Teaching Professor. Occupational medicine, radiology, chemical and radiation toxicity, Medical Corps, US Navy (Ret.).

Nancy Epstein, MPH (University of North Carolina) Department of Community Health and Prevention. Associate Teaching Professor. Healthcare for underserved communities, health education and coalition building, health and disability policy, oral health, faith and health.

Alison A. Evans, Sc D (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Epidemiology studies of hepatitis B infection and its complications; prevention of liver cancer in East Asian populations in the Delaware Valley.

Robert I. Field, PhD, JD, MPH (Boston University; Columbia University School of Law; Harvard University School of Public Health) Joint Appointment between Dornsife School of Public Health and Earle Mack School of Law. Professor. Health law and public health; ethical issues in managed care, public policy and legal facets of health care reform and genetic screening.

Janet Fleetwood, PhD (University of Southern California, School of Philosophy) Department of Community Health and Prevention; Vice Provost for Strategic Development & Initiatives. Professor. Higher education strategy planning, faculty development and equity, bioethics.

Arthur L. Frank, MD, PhD (Mount Sinai School Medicine City University of New York) Chair, Department of Environmental and Occupational Health. Professor. Environmental and occupational health, agricultural safety and health, pneumoconiosis, occupational toxicology, environmental pollution.

Dennis Gallagher, MA, MPA (University of Pittsburgh) Department of Health Management and Policy. Associate Professor. Health policy, Medicare/Medicaid/SCHIP, health care access for the uninsured, health system transformation.

Marla Gold, MD (University of Medicine and Dentistry-New Jersey Medical School). Professor. Design of HIV/AIDS care systems, treatment protocols, resource utilization, and epidemiology; CQI, managed care and systems of health care, health administration, behavioral health care and substance abuse treatment systems.

Edward J. Gracely, PhD (Temple University) Department of Epidemiology and Biostatistics. Associate Professor. Statistics, experimental design/research methods and statistical analysis, clinical trials.

William J. Hickey, PhD (Northwestern University) Department of Health Management and Policy. Associate Teaching Professor. Organization behavior, health care administration.

Warren Hilton, MA (Indiana University of Pennsylvania) Assistant Dean for Student and External Affairs. Assistant Teaching Professor. Leadership development, organizational management, health disparities training.

Mary E. Hovinga, PhD, MPH (University of Michigan) Associate Dean of Academic Affairs; Department of Epidemiology and Biostatistics. Associate Professor. Surveillance and etiology of mental retardation, environmental epidemiology, and the human health effects of heavy metals, PCBs and DDT.

Ann Klassen, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Community Health and Prevention, Chair; Associate Dean for Research. Professor. Social and geographical determinants of chronic disease disparities, cancer prevention and control, behavioral science.

Jennifer Kolker, MPH (University of Michigan) Department of Health Management and Policy. Associate Teaching Professor. Planning and policy development for health and welfare, early childhood education, epidemiological data collection and analysis, disease controls.

Stephen E. Lankenau, PhD (University of Maryland) Department of Community Health and Prevention. Associate Professor. Substance misuse, overdose prevention, high-risk youth, and mixed methods.

Brian K. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor.
Neuroepidemiology, autism, dementia, environmental risk factors, genetic-environmental interaction, propensity score methods, machine learning, stress.

Nora L. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Research Professor. Perinatal epidemiology; low birth weight; preterm birth; macrosomia; maternal and child health; second-hand smoke; environmental exposures; autism spectrum disorders; China.

Longjian Liu, MD, MSC, PhD (University of Hong Kong) Department of Epidemiology and Biostatistics. Associate Professor. Nutrition, aging, cross-cultural and racial/ethnic variation and health.


Shannon Marquez, MEng, PhD (University of North Carolina Gillings School of Global Public Health) Director of Global Public Health Initiatives, Interim Associate Dean. Associate Professor. Agricultural safety, health disparities, environmental health, international health.

Yvonne Michael, ScD (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Associate Professor. Epidemiology of aging, social epidemiology, women's health, community-based participatory research.

Jana M. Mossey, PhD, MPH, MSN (University of North Carolina) Department of Epidemiology and Biostatistics. Professor. Epidemiological methods; research design and methods including observational and clinical trials research; psychosocial aspects of health; epidemiology of aging; depression and chronic pain; sub-threshold and minor depression; pain in the elderly.

Craig J. Newschaffer, PhD (Johns Hopkins University) Chair, Department of Epidemiology and Biostatistics. Professor. Development of methods for monitoring autism spectrum disorders prevalence; participation in the National CADDRE Study of Autism and Child Development.

Hernando Perez, PhD, MPH, CIH, CSP (Purdue University) Department of Environmental and Occupational Health. Assistant Teaching Professor. Children's environmental health, housing and health, environmental and occupational exposure assessment.

Marcia Polansky, MS, ScD, MSW (Harvard University) Department of Epidemiology and Biostatistics. Associate Professor. Biostatistics; experimental design/research methods and statistical analysis, clinical trials; asthma epidemiology and interventions; attachment theory and mothers with drug and alcohol addictions.

John A. Rich, MD, MPH (Duke University Medical School) Interim Dean, Dornsife School of Public Health: Chair, Department of Health Management and Policy. Professor. Inner-city health problems, urban violence, male health and racial disparities.

Lucy Robinson, PhD (Columbia University) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; statistical analysis; spatial statistics/epidemiology; application of statistics to behavioral, biological and medical sciences; environmental health; neurological disorders.

John Rossi, VMD, M.Bioethics (University of Pennsylvania) Department of Community Health and Prevention. Assistant Professor. Bioethics and public health ethics, including moral theory, research ethics, ethics of risk & health communication, pediatric ethics, animal ethics.

Randall L. Sell, ScD (Harvard University) Department of Community Health and Prevention. Associate Professor. Demographic variables, defining and measuring sexual orientations, sampling sexual minorities for public health research.

David Barton Smith, PhD (The University of Michigan School of Public Health) Department of Health Management and Policy. Research Professor. Racial disparities in healthcare, long term care policy, health services research and program evaluation.

Loni Philip Tabb, PhD (Harvard School of Public Health) Department of Community Health and Prevention. Assistant Professor. Methods for categorical, missing and hierarchical data, spatial epidemiology/statistics.

Jennifer A. Taylor, PhD, MPH (Johns Hopkins University) Department of Environmental and Occupational Health. Associate Professor. Injury prevention and control, quality improvement, and occupational safety.

Renee M. Turchi, MD, MPH (Johns Hopkins University) Department of Community Health and Prevention. Associate Professor. Medical Home; children and youth with special health care needs; care coordination; cultural competency and access to care.

Nicole A. Vaughn, PhD (Uniformed Services University of the Health Sciences) Department of Health Management and Policy. Assistant Professor. Community-based approaches to eliminating health disparities, health care access and utilization among insured and uninsured minority groups, obesity, women's health and the influence of culture on health behaviors particularly for chronic conditions.

Augusta M. Villanueva, PhD (University of Texas at Austin) Department of Community Health and Prevention. Associate Professor. Role of race, culture, and ethnicity on health status/outcomes; community-based participatory research; immigrant communities; academic service-learning.

Seth Welles, PhD, ScD (Boston University) Department of Epidemiology and Biostatistics. Professor. Impact of HIV phenotypic and genotypic antiretroviral drug resistance on HIV disease progression and transmission; psychosocial risk for HIV infection and STDs among sexual minority adults and adolescents, and surveys of sexual minority adults at community festivals and at health-clinics to assess demographic and psychosocial determinants of sexual risk-taking and HIV/STD infections.

Yunwen Yang, PhD (University of Illinois at Urbana-Champaign) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; bayesian methods; application of statistics to behavioral, biological and medical sciences; mixed methods.

Michael Yudell, MPH, MPhil, PhD (Columbia University, City University of New York) Department of Community Health and Prevention. Associate Professor. Public health genomics; bioethics; history of public health; and addiction.

Issa Zakeri, PhD (University of Illinois and Urbana-Champaign) Department of Epidemiology and Biostatistics. Professor. Biostatistics.
Interdepartmental Faculty
Robert J. Brulle, PhD (George Washington University). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

Certificate in Epidemiology and Biostatistics
Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 9.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time To Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 26.1309
Standard Occupational Classification (SOC) Code: 19-1041

The Certificate in Epidemiology and Biostatistics offered by Drexel University’s School of Public Health, is an interdisciplinary program designed for working professionals of diverse backgrounds, including public health administrators, physicians, nurses, clinical research professionals, health educators, and policy experts.

Never before has disease prevention and health promotion been more important. As world events develop, with the added threat of bioterrorism and other emerging public health issues, those who can apply knowledge gained through research to real-world problems are in great demand across all sectors: health care, pharmaceuticals, governmental and non-governmental agencies, business, and academia.

The certificate program is supervised by the School of Public Health’s director of eLearning and the department chair. The program is administered through Drexel University Online. Applications to the certificate program are managed by Drexel University Online. For the most current admission information, please visit www.drexel.com (http://www.drexel.com/online-degrees/public-health-degrees/cert-epi-bio) on the Drexel Online University website.

About the Curriculum
The certificate program provides research-oriented training in the theory and tools of core public health disciplines. Students build the statistical background needed to conduct research, develop hypotheses, analyze data, and interpret and communicate results.

The certificate program consists of three sequential 3.0 credit courses. Each course is taught over a 10-week period, allowing completion of the certificate within a 30-week period. The curriculum reflects core epidemiological and biostatistical concepts and practices in a similar manner to the full-time and Executive MPH programs. Contact between faculty and students creates an intense experience over this exclusively online format. The online format allows asynchronous learning while providing flexibility for adult learners constrained by physical and time limitations.

Requirements
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<th>Course</th>
<th>Title</th>
<th>Credits</th>
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<tr>
<td>PBHL 701</td>
<td>Introduction to Descriptive Epidemiology and Biostatistics</td>
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<tr>
<td>PBHL 702</td>
<td>Introduction to Analytic Epidemiology and Biostatistics</td>
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Total Credits 9.0

Additional information
For more information about the program, visit the Certificate in Epidemiology & Biostatistics (http://www.drexel.com/online-degrees/public-health-degrees/cert-epi-bio) on the Drexel Online University website.

Certificate in Global Health
Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 18.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 2 years
Financial Aid Eligibility: Aid eligible
Classification of Instructional Program (CIP) Code: 51.2210
Standard Occupational Classification (SOC) Code: 21-1091

This online certificate in global health is designed to train post-baccalaureate students and public health professionals for a career in global health and development, including in international settings. The program stresses the development of analytic and technical skills required for pursing further work in the growing areas of global health and international development. The curriculum focuses on designing, implementing, and evaluating programs in under-served communities in the US and international/developing countries. Students will learn to translate theory into practical applications to current global health and developmental challenges. Course materials are designed for the adult-learner in an online, distributed format.

Admissions
Admission requirements to the program include:
- a bachelor's degree
- completion of Certificate Program Application Form
- working knowledge of and access to a PC or Mac with DVD/CD-ROM drive, high speed connection to the Internet as well as MS Office.
- the ability to download free versions of Adobe Acrobat Reader, Skype, and/or VSee video teleconferencing applications.

Required Courses
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<tr>
<td>PBHL 704</td>
<td>Proseminar in Global Health Ethics (Offered as a series of three 1-credit seminar courses.)</td>
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<td>PBHL 705</td>
<td>Public Health in Developing Countries</td>
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<tr>
<td>PBHL 706</td>
<td>Globalization, Development and Comparative Health Systems</td>
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<tr>
<td>PBHL 707</td>
<td>Monitoring and Evaluation in Global Health</td>
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<tr>
<td>PBHL 708</td>
<td>Global Health Integration Module and Field Practicum Experience</td>
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Total Credits 18.0
Certificate in Lesbian, Gay, Bisexual and Transgender (LGBT) Health

Certificate Level: Graduate
Admissions Requirements: Bachelor's degree
Certificate Type: Certificate
Number of Credits to Completion: 9.0
Instructional Delivery: Online
Calendar Type: Quarter
Expected Time to Completion: 1 year
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.2207
Standard Occupational Classification (SOC) Code: 21-1091

The Certificate in Lesbian, Gay, Bisexual and Transgender (LGBT) Health program is designed to address the complex issues confronting the health disparities and health-seeking behaviors of LGBT people. The sequence of courses examines health disparities, research, sampling and measurement methodologies involved in the study of LGBT populations, and the intersections of social identities/inequalities (such as those based on ethnicity, sexual orientation and sex/gender among others).

The program is offered entirely online, and in a flexible format to provide qualified students and health professionals with an opportunity to acquire these credentials regardless of restrictions in time and physical location. Those who successfully complete the certificate program and wish to broaden their scope of public health education could pursue an MPH degree program.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBHL 674</td>
<td>Studying Rare or Hidden Groups</td>
<td>3.0</td>
</tr>
<tr>
<td>PBHL 675</td>
<td>LGBT Health Disparities</td>
<td>3.0</td>
</tr>
<tr>
<td>PBHL 676</td>
<td>Intersectional Perspectives</td>
<td>3.0</td>
</tr>
<tr>
<td><strong>Total Credits</strong></td>
<td></td>
<td><strong>9.0</strong></td>
</tr>
</tbody>
</table>

Additional Information

For additional information about this program, contact:

Randall L. Sell, ScD
Department of Community Health and Prevention
School of Public Health, Drexel University
randy@drexel.edu

Community Health and Prevention

Major: Community Health and Prevention
Degree Awarded: Master of Public Health (MPH) or Doctor of Public Health (DrPH)
Calendar Type: Quarter
Total Credit Hours: 64.0 (MPH); 60.0 (DrPH)
Classification of Instructional Programs (CIP) code: 51.2201
Standard Occupational Classification (SOC) code: 11-9111; 21-1091; 21-1094

About the Program (MPH)

Master of Public Health (MPH)

The Master of Public Health program is intended for individuals interested in careers as community educators; population health planners; policy analysts, evaluators, researchers; and managers of health service delivery organizations and systems, managed-care programs, and other population-based organizations.

The 64.0 quarter-credit program is interdisciplinary and requires students to complete a comprehensive, community-based master’s project. The program prepares students to enter an array of fields related to public health or a range of doctoral programs. Drexel University’s Master of Public Health (MPH) program provides practical skills and experience, with a unique focus on relevant community issues, challenges, and priorities.

Program Highlights

The first year of the program covers the five core disciplines offered within the context of culture and community. These include environmental and occupational health; health care systems organization, management, and policy; social and behavioral sciences for population health; epidemiology; biostatistics. Throughout the program, group case discussion sessions, case-related activities and didactic sessions are integrated into the experience.

These include:

- Skill development labs and workshops (year two)
- Public health grand rounds (for all faculty, students, and community partners) provide access to scholars and their cutting-edge research and initiatives in public health

Curriculum

The MPH full-time educational program is structured on a quarter-term basis, with a total of 64.0 credit hours required. This is generally taken as a two-year program; all coursework must be completed within five years of the date of matriculation for the full-time program.

The second-year curriculum is composed of four required courses, three elective courses, and the Community-Based Master’s Project (CBMP), the culminating experience required of full-time Drexel MPH students. Students spend approximately 12 hours each week working on a community-oriented, health-related project, often working as an integral part of a community-based organization. This can be in the areas of government, healthcare and social services, among others.

In preparation for developing their final paper, students are required to identify an issue or problem of significance to the target community or agency, synthesize the literature, develop an approach or methodology to address the issue and either implement and test the validity of a proposed approach or set out a detailed prescription for addressing the problem. Students may also work with faculty in specific research areas.

Joint Doctor of Medicine and Master of Public Health Degree (MD/MPH)

Students wishing to complete a course of study earning the joint MD/MPH degree can complete such a program in 5 years. They must apply for the joint program and be accepted by both the Drexel University College of Medicine and the School of Public Health. Students in this program have enriched public health content in their first two years of medical school and spend their third year of study full time in the School of Public Health. Students are able to enter clinical rotations and residency selection having obtained the MPH degree.

Additional Information

For additional information about this program, contact:
The five core competencies are as follows:

- Health and Prevention and the practice community.
- On Linkages between Academia and Public Health Practice* with the program integrate public health competencies developed by the Council specific public health problems. The core competencies for the DrPH expected to attain five core competencies for understanding and solving public health problems; and the practicum, which structures the application of concepts and methods to understanding and application of core public health competencies; the comprehensive exam, which reassures student understanding and application of core public health competencies; the practicum, which structures the application of concepts and methods to solving public health problems; and the dissertation, which showcases the student’s competency in applied research. This general framework is infused with community public health practice, rigorous qualitative and quantitative applied research methods, and skilled advocacy.

Developing Core Competencies for Understanding and Solving Public Health Problems

Students in the DrPH program in Community Health and Prevention are expected to attain five core competencies for understanding and solving specific public health problems. The core competencies for the DrPH program integrate public health competencies developed by the Council on Linkages between Academia and Public Health Practice* with the unique characteristics of the faculty of the Department of Community Health and Prevention and the practice community.

The five core competencies are as follows:

- Understand the mission, goals, and strategies of community health and prevention
- Understand and assess community health status and needs
- Understand and assess individual and environmental determinants of health
- Design, implement, and evaluate public health programs and policies
- Translate findings into policy recommendations and advocate for change

* The Council on Linkages between Academia and Public Health Practice represents national public health academic and practice organizations including the American Public Health Association, the Association of Schools of Public Health, and the Centers for Disease Control and Prevention. Over the past decade, the council has developed a list of public health competencies to guide curriculum development in public health education.

For more information, visit the Drexel University School of Public Health (http://publichealth.drexel.edu) website or contact:

Patience Ajoff-Foster, M.S.
Senior Academic Coordinator
pna24@drexel.edu
267-359-6036

Admission Requirements (DrPH)

Admission to the doctor of public health program in Community Health and Prevention is competitive. Students who demonstrate an ability to integrate public health competencies and skills into public health practice are preferred.

Applicants to the DrPH program must meet the following requirements:

- A master’s of public health degree (MPH) or a master’s degree in a related field
- Documented evidence of applied research
- Potential for a high level of performance in the DrPH program and for significant contributions to the field of public health.

To qualify for admission, the applicant must present a portfolio that includes:

- Undergraduate and graduate transcripts;
- GRE General Test (verbal, quantitative, analytical writing);
- Evidence of applied research skills (master's thesis, master's research paper, or publication);
- Three letters of recommendation, including one from a public health practitioner; and
- A written statement of career and educational goals, professional experience, and area of interest for the dissertation.
- An in-person or telephone interview is required of all finalists.

For more information about the admissions process, please contact:

Patience Ajoff-Foster, M.S.
Senior Academic Coordinator
pna24@drexel.edu
267-359-6036

Forms, details about requirements, and information about application deadlines are all available on the DrPH Community Health and Prevention (http://publichealth.drexel.edu/admissions/admissions-application-requirements/#full-time%20MPH) page of Drexel’s Graduate Admissions website.

Degree Requirements

<table>
<thead>
<tr>
<th>Foundation Courses</th>
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</thead>
<tbody>
<tr>
<td>PBHL 516</td>
</tr>
<tr>
<td>PBHL 520</td>
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</tbody>
</table>

Stephanie Johnson
snj22@drexel.edu
267-359-6065

Doctor of Public Health (DrPH): 60.0 quarter credits

About the Program (DrPH)

Doctor of Public Health (DrPH)

Drexel University’s School of Public Health (http://publichealth.drexel.edu) offers a doctoral program in Community Health and Prevention, leading to the doctor of public health (DrPH) degree. The mission of the School of Public Health is to promote health and quality of life through graduate education, applied research, and community service in the prevention and control of disease, injury, and disability. The DrPH program in Community Health and Prevention builds upon the unique strengths of the School of Public Health, including the master’s program in public health, a multidisciplinary faculty, and institutional resources.

The goal of the DrPH program in Community Health and Prevention is to produce doctoral-level public health graduates who exhibit a broad-based, systemic understanding of public health and are committed to effecting meaningful change in public and/or community health systems. Integrating applied research, education, service and advocacy, the program emphasizes the application of interdisciplinary, theoretical, and applied research paradigms to the understanding and prevention of public health problems.

The DrPH program in Community Health and Prevention is structured as follows: required courses, which build core competencies in community health and prevention; elective courses, which develop specific areas of expertise; the comprehensive exam, which reassures student understanding and application of core public health competencies; the practicum, which structures the application of concepts and methods to solving public health problems; and the dissertation, which showcases the student’s competency in applied research. This general framework is infused with community public health practice, rigorous qualitative and quantitative applied research methods, and skilled advocacy.

Introduction to Public Health

25.0
PBHL 530 Principles of Epidemiology
PBHL 540 Prevention Principles and Practices
PBHL 600 Management, Leadership, Assurance and Health Services
PBHL 640 Environmental Health
PBHL 650 Public Policy and Advocacy

**Required Community-Based Master’s Project Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PBHL 680</td>
<td>Community Based Master’s Project I</td>
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<tr>
<td>PBHL 681</td>
<td>Community Based Master’s Project II</td>
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<tr>
<td>PBHL 682</td>
<td>Community Based Master’s Project III</td>
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**Required Courses**

<table>
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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PBHL 670</td>
<td>Multicultural Competence in Community Health and Prevention</td>
</tr>
<tr>
<td>PBHL 671</td>
<td>Theory and Practice of Community Health and Prevention</td>
</tr>
<tr>
<td>PBHL 672</td>
<td>Theory and Practice in Health Communication</td>
</tr>
<tr>
<td>PBHL 673</td>
<td>Outcomes Assessment of Community Health and Prevention</td>
</tr>
</tbody>
</table>

**Electives**

Students are required to successfully complete five electives (15.0 credits). These courses may be within the School of Public Health, or from other academic units within the University. Students must meet with their Academic Advisor in selecting their electives. It is the responsibility of the student to determine course restrictions and the registration process for campus electives taken at the Main Campus. The following is a sample of some of the School of Public Health electives offered by department:

**Biostatistics Electives**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PBHL 621</td>
<td>Intermediate Biostatistics II</td>
</tr>
<tr>
<td>PBHL 622</td>
<td>Statistical Inference I</td>
</tr>
<tr>
<td>PBHL 628</td>
<td>Survival Data Analysis</td>
</tr>
<tr>
<td>PBHL 629</td>
<td>Design &amp; Analysis of Clinical Trials</td>
</tr>
<tr>
<td>PBHL 631</td>
<td>Applied Multivariate Analysis</td>
</tr>
<tr>
<td>PBHL 657</td>
<td>Data Management</td>
</tr>
<tr>
<td>PBHL 683</td>
<td>Advanced Clinical Trials &amp; Experiment Design</td>
</tr>
<tr>
<td>PBHL 684</td>
<td>Statistical Inference II</td>
</tr>
<tr>
<td>PBHL 686</td>
<td>Advanced Statistical Computing</td>
</tr>
<tr>
<td>PBHL 691</td>
<td>Pathophysiology Basis of Epidemiologic Research</td>
</tr>
<tr>
<td>PBHL 692</td>
<td>Public Health Obesity Prevention Research</td>
</tr>
<tr>
<td>PBHL 693</td>
<td>Applied Bayesian Analysis</td>
</tr>
<tr>
<td>PBHL 696</td>
<td>Nonparametric and Semiparametric Models</td>
</tr>
<tr>
<td>PBHL 699</td>
<td>Biostatistical Computing with Stata</td>
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</table>

**Community Health and Prevention Electives**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PBHL 674</td>
<td>Studying Rare or Hidden Groups</td>
</tr>
<tr>
<td>PBHL 675</td>
<td>LGBT Health Disparities</td>
</tr>
<tr>
<td>PBHL 676</td>
<td>Intersectional Perspectives</td>
</tr>
<tr>
<td>PBHL 678</td>
<td>Drug Use and Public Health</td>
</tr>
<tr>
<td>PBHL 801</td>
<td>Theory &amp; Practice of Community Health &amp; Preventions I</td>
</tr>
<tr>
<td>PBHL 803</td>
<td>Theory &amp; Practice of Community Health and Preventions II</td>
</tr>
<tr>
<td>PBHL 804</td>
<td>Research Methods for Community Health and Prevention</td>
</tr>
<tr>
<td>PBHL 805</td>
<td>Qualitative Research in Community Health</td>
</tr>
</tbody>
</table>

**Environmental and Occupational Health Electives**

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<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PBHL 560</td>
<td>Overview of Issues in Global Health</td>
</tr>
<tr>
<td>PBHL 642</td>
<td>Healthy Housing &amp; Built Environment</td>
</tr>
<tr>
<td>PBHL 645</td>
<td>Exposure Assessment</td>
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<tr>
<td>PBHL 646</td>
<td>Environmental Health in Vulnerable Populations</td>
</tr>
<tr>
<td>PBHL 648</td>
<td>Public Health and Disaster Preparedness</td>
</tr>
<tr>
<td>PBHL 649</td>
<td>Occupational and Environmental Cancers</td>
</tr>
<tr>
<td>PBHL 663</td>
<td>Injury Prevention and Control</td>
</tr>
<tr>
<td>PBHL 664</td>
<td>Safety in Healthcare</td>
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</table>

**Epidemiology Electives**

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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PBHL 532</td>
<td>Autism as a Public Health Challenge</td>
</tr>
<tr>
<td>PBHL 633</td>
<td>Epidemiology of Cancer</td>
</tr>
<tr>
<td>PBHL 635</td>
<td>Social Epidemiology and Psychiatric Epidemiology</td>
</tr>
<tr>
<td>PBHL 636</td>
<td>Infectious Disease Epidemiology</td>
</tr>
<tr>
<td>PBHL 638</td>
<td>Perinatal Epidemiology</td>
</tr>
<tr>
<td>PBHL 639</td>
<td>Cardiovascular Disease Epidemiology &amp; Prevention</td>
</tr>
<tr>
<td>PBHL 655</td>
<td>Making Sense of Data</td>
</tr>
<tr>
<td>PBHL 656</td>
<td>Pharmacoepidemiology</td>
</tr>
<tr>
<td>PBHL 691</td>
<td>Pathophysiology Basis of Epidemiologic Research</td>
</tr>
<tr>
<td>PBHL 692</td>
<td>Public Health Obesity Prevention Research</td>
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</tbody>
</table>

**Health Management and Policy Electives**

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PBHL 604</td>
<td>Public Health Advocacy and Activism</td>
</tr>
<tr>
<td>PBHL 606</td>
<td>Vaccines and Public Health Policy</td>
</tr>
<tr>
<td>PBHL 610</td>
<td>Active Issues in Public Health</td>
</tr>
<tr>
<td>PBHL 612</td>
<td>Public Health Funding &amp; Program Development</td>
</tr>
<tr>
<td>PBHL 613</td>
<td>Seminar in Fire Arms and Public Health</td>
</tr>
<tr>
<td>PBHL 614</td>
<td>Coordinating a Population’s Care</td>
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<tr>
<td>PBHL 615</td>
<td>Perspectives on Gender, Race, Ethnicity, and Social Class</td>
</tr>
<tr>
<td>PBHL 616</td>
<td>Public Health Surveillance: Aligning Data and Policy Use</td>
</tr>
<tr>
<td>PBHL 617</td>
<td>Health Disparities: Systemic, Structural, Environmental &amp; Economic</td>
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<tr>
<td>PBHL 618</td>
<td>Historical and Contemporary Developments in Social Justice</td>
</tr>
<tr>
<td>PBHL 652</td>
<td>Public Health Leadership</td>
</tr>
<tr>
<td>PBHL 802</td>
<td>Health and Human Rights</td>
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<tr>
<td>PBHL 851</td>
<td>Health Systems Policy Analysis</td>
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<tr>
<td>PBHL 852</td>
<td>Health Economics I</td>
</tr>
<tr>
<td>PBHL 853</td>
<td>Health Economics II</td>
</tr>
<tr>
<td>PBHL 854</td>
<td>The Politics of Food &amp; Gender</td>
</tr>
<tr>
<td>PBHL 856</td>
<td>Violence, Trauma and Adversity in Public Health</td>
</tr>
</tbody>
</table>

**Total Credits**

64.0

* 800 level courses may require professor's permission.
Degree Requirements

Completion of the DrPH program requires the following:

- 60.0 quarter credit hours of coursework beyond the master’s degree (36.0 credits of required coursework; 9.0 credits of elective courses; a 3.0 credit practicum; and 12.0 credits for the dissertation).

Coursework covers the theory and practice of community health and prevention, health and human rights, community health interventions, qualitative research methods, community epidemiology, statistical methods for prevention research, program evaluation, health policy development and analysis, and leadership and advocacy;
- a minimum cumulative grade point average of 3.3;
- completion of the a practicum experience;
- passage of the doctoral comprehensive/candidacy examination; and
- completion of a dissertation that is highly relevant to community health practice and involves applied research, policy analysis, or management analysis.

All coursework is designed to develop the five core competencies (http://publichealth.drexel.edu/academics/degrees/drph-degree-in-community-health) of community health and prevention.

Electives

The 9 credits of elective coursework enable doctoral students to expand and enhance skills within specific areas of competency. New courses are developed and added regularly, based on interests of faculty and students.

School Required Courses 12.0

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
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<tbody>
<tr>
<td>PBHL 620</td>
<td>Intermediate Biostatistics I</td>
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<tr>
<td>PBHL 630</td>
<td>Intermediate Epidemiology</td>
</tr>
<tr>
<td>PBHL 802</td>
<td>Health and Human Rights</td>
</tr>
<tr>
<td>PBHL 824</td>
<td>Public Health Ethics</td>
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</table>

Department Required Courses 24.0

<table>
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<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PBHL 632</td>
<td>Applied Survey Research in Epidemiology</td>
</tr>
<tr>
<td>PBHL 801</td>
<td>Theory &amp; Practice of Community Health &amp; Prevention I</td>
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<tr>
<td>PBHL 803</td>
<td>Theory &amp; Practice of Community Health and Prevention II</td>
</tr>
<tr>
<td>PBHL 804</td>
<td>Research Methods for Community Health and Prevention</td>
</tr>
<tr>
<td>PBHL 805</td>
<td>Qualitative Research in Community Health</td>
</tr>
<tr>
<td>PBHL 808</td>
<td>Community Program Evaluation</td>
</tr>
<tr>
<td>PBHL 814</td>
<td>Community Based Participatory Research</td>
</tr>
<tr>
<td>PBHL 825</td>
<td>Measuring Health</td>
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Practicum 3.0

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<tbody>
<tr>
<td>PBHL 810</td>
<td>Practicum in Community Health and Prevention</td>
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Dissertation Sequence (12 credits minimum) 12.0

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PBHL 901</td>
<td>Dissertation Seminar I</td>
</tr>
<tr>
<td>PBHL 902</td>
<td>Dissertation Seminar II</td>
</tr>
<tr>
<td>PBHL 998</td>
<td>Dissertation Guidance</td>
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</table>

Electives 9.0

<table>
<thead>
<tr>
<th>Course</th>
<th>Title</th>
</tr>
</thead>
<tbody>
<tr>
<td>PBHL 670</td>
<td>Multicultural Competence in Community Health and Prevention</td>
</tr>
<tr>
<td>PBHL 671</td>
<td>Theory and Practice of Community Health and Prevention</td>
</tr>
<tr>
<td>PBHL 672</td>
<td>Theory and Practice in Health Communication</td>
</tr>
<tr>
<td>PBHL 673</td>
<td>Outcomes Assessment of Community Health and Prevention</td>
</tr>
<tr>
<td>PBHL 678</td>
<td>Drug Use and Public Health</td>
</tr>
<tr>
<td>PBHL 822</td>
<td>Course PBHL 822 Not Found</td>
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<tr>
<td>PBHL 823</td>
<td>Faith, Religion, Spirituality, and Health</td>
</tr>
<tr>
<td>PBHL 827</td>
<td>Advanced Topics in Qualitative Analysis</td>
</tr>
</tbody>
</table>

Total Credits 60.0

- Students are not limited to the electives offered by the DrPH program. Each student is encouraged to choose electives that maximize the fit between the student’s educational objectives and opportunities throughout the University.

School of Public Health Faculty

Amy Auchincloss, PhD (University of Michigan) Department of Biostatistics and Epidemiology. Assistant Professor. Environmental determinants of health and the health effects of air pollution; contribution of resources in residential environments to health behaviors, obesity, diabetes and cardiovascular disease; the use of spatial analysis methods and agent-based mode.

Zekarias Berhane, PhD (University of Pittsburgh) Department of Epidemiology and Biostatistics. Assistant Research Professor. Modeling time-to-event data with single and multiple outcomes, mixed effect models and regression diagnostics.

Sandra Bloom, MD (Temple University School of Medicine) Department of Health Management and Policy. Associate Professor. Psychological trauma and organizational stress.

Jennifer Breaux, DrPh, MPH (Drexel School of Public Health) Department of Community Health and Prevention; Office of Academic Affairs, Director of Undergraduate Public Health Education. Assistant Teaching Professor. Maternal and child health, community health, human rights.

Darryl R. Brown, PhD (Johns Hopkins Bloomberg School of Public Health) Department of Health Management and Policy. Assistant Professor. Health care research and planning; patient outcomes and applied health economic methods.

Igor Burstyn, PhD (Utrecht University) Department of Environmental and Occupational Health. Associate Professor. Occupational and environmental epidemiology, industrial hygiene.

Carla Campbell, MD, MS (Kentucky College of Medicine; Mount Sinai School of Medicine) Department of Environmental and Occupational Health. Associate Professor. Community and environmental medicine, pediatrics, lead poisoning.


Mariana Chilton, PhD, MPH (University of Pennsylvania) Department of Health Management and Policy. Associate Professor. Human rights and health; race, ethnicity and poverty; nutrition and chronic disease; ethnography and participatory research; complementary and alternative medicine.
Robert I. Field, PhD, JD, MPH (Boston University; Columbia University School of Law; Harvard University School of Public Health) Joint Appointment between Dornsife School of Public Health and Earle Mack School of Law. Professor. Health law and public health; ethical issues in managed care, public policy and legal facets of health care reform and genetic screening.

Janet Fleetwood, PhD (University of Southern California, School of Philosophy) Department of Community Health and Prevention; Vice Provost for Strategic Development & Initiatives. Professor. Higher education strategy planning, faculty development and equity, bioethics.

Arthur L. Frank, MD, PhD (Mount Sinai School Medicine City University of New York) Chair, Department of Environmental and Occupational Health. Professor. Environmental and occupational health, agricultural safety and health, pneumoconiosis, occupational toxicology, environmental pollution.

Dennis Gallagher, MA, MPA (University of Pittsburgh) Department of Health Management and Policy. Associate Professor. Health policy, Medicare/Medicaid/SCHIP, health care access for the uninsured, health system transformation.

Marla Gold, MD (University of Medicine and Dentistry-New Jersey Medical School). Professor. Design of HIV/AIDS care systems, treatment protocols, resource utilization, and epidemiology; CQI, managed care and systems of health care, health administration, behavioral health care and substance abuse treatment systems.

Edward J. Gracely, PhD (Temple University) Department of Epidemiology and Biostatistics. Associate Professor. Statistics, experimental design/research methods and statistical analysis, clinical trials.

William J. Hickey, PhD (Northwestern University) Department of Health Management and Policy. Associate Teaching Professor. Organization behavior, health care administration.

Warren Hilton, MA (Indiana University of Pennsylvania) Assistant Dean for Student and External Affairs. Assistant Teaching Professor. Leadership development, organizational management, health disparities training.

Mary E. Hovinga, PhD (University of Michigan) Associate Dean of Academic Affairs; Department of Epidemiology and Biostatistics. Associate Professor. Surveillance and etiology of mental retardation, environmental epidemiology, and the human health effects of heavy metals, PCBs and DDT.

Ann Klassen, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Community Health and Prevention; Chair; Associate Dean for Research. Professor. Social and geographical determinants of chronic disease disparities, cancer prevention and control, behavioral science.

Jennifer Kolker, MPH (University of Michigan) Department of Health Management and Policy. Associate Teaching Professor. Planning and policy development for health and welfare, early childhood education, epidemiological data collection and analysis, disease controls.

Stephen E. Lankenau, PhD (University of Maryland) Department of Community Health and Prevention. Associate Professor. Substance misuse, overdose prevention, high-risk youth, and mixed methods.

Brian K. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Neuroepidemiology, autism, environmental risk factors, gene-environmental interaction, propensity score methods, machine learning, stress.

Nora L. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Associate Professor. Nutrition, aging, cross-cultural and racial/ethnic variation and health.

Raymond K. Lum, MPhil, MS (University of Pennsylvania) Department of Health Management and Policy. Associate Teaching Professor. Organizational learning theory, change management, systems thinking, innovation diffusion, technology transition, e-health.

Shannon Marquez, MEng, PhD (University of North Carolina Gillings School of Global Public Health) Director of Global Public Health Initiatives, Interim Associate Dean. Associate Professor. Agricultural safety, health disparities, environmental health, international health.

Yvonne Michael, ScD (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Associate Professor. Epidemiology of aging, social epidemiology, women's health, community-based participatory research.

Jana M. Mossey, PhD, MPH, MSN (University of North Carolina) Department of Epidemiology and Biostatistics. Professor. Epidemiological methods; research design and methods including observational and clinical trials research; psychosocial aspects of health; epidemiology of aging; depression and chronic pain; sub-threshold and minor depression; pain in the elderly.

Craig J. Newschaffer, PhD (Johns Hopkins University) Chair, Department of Epidemiology and Biostatistics. Professor. Development of methods for monitoring autism spectrum disorders prevalence; participation in the National CADDRE Study of Autism and Child Development.

Hernando Perez, PhD, MPH, CIH, CSP (Purdue University) Department of Environmental and Occupational Health. Assistant Teaching Professor. Children's environmental health, housing and health, environmental and occupational exposure assessment.

Marcia Polansky, MS, ScD, MSW (Harvard University) Department of Epidemiology and Biostatistics. Associate Professor. Biostatistics; experimental design/research methods and statistical analysis, clinical
trials; asthma epidemiology and interventions; attachment theory and mothers with drug and alcohol addictions.

John A. Rich, MD, MPH (Duke University Medical School) Interim Dean, Dornsife School of Public Health; Chair, Department of Health Management and Policy. Professor. Inner-city health problems, urban violence, male health and racial disparities.

Lucy Robinson, PhD (Columbia University) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; statistical analysis; spatial statistics/epidemiology; application of statistics to behavioral, biological and medical sciences; environmental health; neurological disorders.

John Rossi, VMD, M Bioethics (University of Pennsylvania) Department of Community Health and Prevention. Assistant Professor. Demographic variables, defining and measuring sexual orientations, sampling sexual minorities for public health research.

David Barton Smith, PhD (The University of Michigan School of Public Health) Department of Health Management and Policy. Research Professor. Racial disparities in healthcare, long term care policy, health services research and program evaluation.

Loni Philip Tabb, PhD (Harvard School of Public Health) Department of Community Health and Prevention. Assistant Professor. Methods for categorical, missing and hierarchical data, spatial epidemiology/statistics.

Jennifer A. Taylor, PhD, MPH (Johns Hopkins University) Department of Environmental and Occupational Health. Associate Professor. Injury prevention and control, quality improvement, and occupational safety.

Renee M. Turchi, MD, MPH (Johns Hopkins University) Department of Community Health and Prevention. Associate Professor. Medical Home; children and youth with special health care needs; care coordination; cultural competency and access to care.

Nicole A. Vaughn, PhD (Uniformed Services University of the Health Sciences) Department of Health Management and Policy. Assistant Professor. Community-based approaches to eliminating health disparities, health care access and utilization among insured and uninsured minority groups, obesity, women's health and the influence of culture on health behaviors particularly for chronic conditions.

Augusta M. Villanueva, PhD (University of Texas at Austin) Department of Community Health and Prevention. Associate Professor. Role of race, culture, and ethnicity on health status/outcomes; community-based participatory research; immigrant communities; academic service-learning.

Seth Welles, PhD, ScD (Boston University) Department of Epidemiology and Biostatistics. Professor. Impact of HIV phenotypic and genotypic antiretroviral drug resistance on HIV disease progression and transmission; psychosocial risk for HIV infection and STDs among sexual minority adults and adolescents, and surveys of sexual minority adults at community festivals and at health-clinics to assess demographic and psychosocial determinants of sexual risk-taking and HIV/STD infections.

Yunwen Yang, PhD (University of Illinois at Urbana-Champaign) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; bayesian methods; application of statistics to behavioral, biological and medical sciences; mixed methods.

Michael Yudell, MPH, MPhil (Columbia University, City University of New York) Department of Community Health and Prevention. Associate Professor. Public health genomics; bioethics; history of public health; and addiction.

Issa Zakeri, PhD (University of Illinois and Urbana-Champaign) Department of Epidemiology and Biostatistics. Professor. Biostatistics.

Interdepartmental Faculty

Robert J. Brulle, PhD (George Washington University). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

Health Policy and Social Justice

Major: Health Policy and Social Justice
Degree Awarded: Doctor of Public Health (DrPH)
Calendar Type: Quarter
Total Credit Hours: 60.0
Classification of Instructional Programs (CIP) code: 51.2201
Standard Occupational Classification (SOC) code: 11-9111

About the Program

The Dornsife School of Public Health (http://drexel.edu/dornsife) offers a doctoral program in Health Policy and Social Justice, leading to the doctor of public health (DrPH) degree. The Doctor of Public Health in Health Policy and Social Justice is designed to prepare students to play strong professional roles in developing and implementing policies that improve public health by focusing on those in the community who are most vulnerable.

The mission of the Dornsife School of Public Health is to promote health and quality of life through graduate education, population-based research, and community service in the prevention and control of disease, injury and disability and the maintenance of health and quality of life. Effective public health practice is built on a foundation of effective programs and health policy and necessitates long-term partnerships with community, organizations and regulatory bodies.

Inequities based on social group memberships, including race, ethnicity, gender, sexual orientation and class, are well documented in the scientific literature. Equally alarming are disparities in access to health care and health outcomes based on race, ethnicity and other social indicators. Graduates of the DrPH in Health Policy and Social Justice will generate new knowledge about social justice and will use this knowledge in the analysis, evaluation and modification of existing policy as well as the design and delivery of new policy affecting public health practice.

The DrPH in Health Policy and Social Justice will prepare students to play strong professional roles in developing and implementing policies that improve public health by focusing on those who are most vulnerable. By studying important racial and ethnic, social class and gender differences within the larger social justice framework, students will emerge from the program with a sound theoretical and practical foundation for critical scholarship in health disparities, cultural competency and social justice. Furthermore, they will gain the tools to implement effective policies in both public and private health sectors.
Developing Core Competencies for Understanding and Solving Public Health Problems

The core competencies of the DrPH were developed in response to the proposed core competencies of the Council on Linkages between Academia and Public Health Practice. These competencies include the ability to:

1. Identify health system problems and health policy opportunities
2. Analyze structural, economic and political forces that affect the health of populations
3. Evaluate the social justice implications of policy formulation, analysis and implementation
4. Inform and education leaders and policy-makers about public health issues and opportunities
5. Develop policies and plans that support the health of the public
6. Apply sound health economics principals and methods to health policy analyses
7. Evaluate effectiveness, accessibility, outcomes and quality of health services
8. Research for new insights and innovative approaches to public health policy
9. Apply social justice and human rights principles when addressing health system and health policy problems and opportunities
10. Conduct policy and health services research to improve health and health services in diverse populations
11. Develop public health policies and strategies based upon well-articulated problem statements and an understanding of the values of the communities involved
12. Use appropriate methods of policy analysis, economic evaluation, measurement and statistical approaches to reach sound and defensible conclusions
13. Disseminate findings, analyses and effective models to the lay public, leaders and policy makers across disciplines.

Additional Information

For more information about the program, contact:

Allison Keene, MS
Dornsife School of Public Health/DrPH Program
Drexel University
Nesbitt Hall
3215 Market Street
Philadelphia PA 19104
ah849@drexel.edu
267.359.6032

Additional information can be found on the Dornsife School of Public Health (http://drexel.edu/dornsife) website.

Admission Requirements

Applicants to the DrPH Program in Health Policy and Social Justice must meet the following requirements:

- Completed MPH degree or other health-related master’s degree program.*
- Potential for high level of performance in the DrPH Program and subsequent contributions to the field of Public Health Policy.
- Must be completed at least 1-year in advance of Fall enrollment for the DrPH Program.

Students will be admitted on a competitive basis, and those with a demonstrated ability to integrate public health competencies and skills into public health practice will be preferred. The admission portfolio will include:

- Undergraduate and graduate transcript;
- Three letters of recommendation from faculty or professionals who can evaluate the applicant's promise as a graduate student;
- Official Graduate Record Examination scores;
- Documented evidence of applied research or a writing sample;
- A written statement of career and educational goals, professional experience, and area of research interest that aligns with a faculty member in the division of Health Management and Policy.

For international students or applicants who earned a degree outside of the US, an international transcript evaluation is required. For more information regarding international applicant requirements, view the International Students Admissions Information (http://drexel.edu/grad/resources/international) page.

An in-person or telephone interview is required of all finalists.

Additional Information

For more information about Admissions, contact:

Allison H. Keene, MS
Dornsife School of Public Health/DrPH Program
Drexel University
Nesbitt Hall 357
3215 Market Street
Philadelphia PA 19104
ah849@drexel.edu
267.359.6032

Forms, details about requirements, and information about application deadlines are all available on the DrPH in Health Policy and Social Justice (http://www.drexel.edu/grad/programs/pubhealth/health-policy-and-social-justice) page of Drexel’s Graduate Admissions website.

Degree Requirements

Completion of the DrPH in Health Policy and Social Justice requires the following:

- 60 quarter credit hours of coursework beyond the master's degree (33 credits of required coursework; 12 credits of elective course; a 3 credit practicum; and 12 credits for the dissertation);
- A minimum cumulative grade point average of 3.3;
- Completion of a practicum experience;
- Passage of the doctoral comprehensive/candidacy examination; and
- Completion of a dissertation that involves applied research, policy analysis, or management analysis.
All coursework is designed to develop the core competencies of health policy and social justice.

**Electives**

The 12 credits of elective coursework enable doctoral students to expand and enhance skills within specific areas of competency. New courses are developed and added regularly, based on interests of faculty and students. Students are not limited to the electives offered by the DrPH program. Each student is encouraged to choose electives that maximize the fit between the student’s educational objectives and opportunities throughout the University.

**Curriculum**

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<th>Required Courses (Doctoral Core)</th>
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<tr>
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<td>PBHL 630 Intermediate Epidemiology</td>
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<td>PBHL 632 Applied Survey Research in Epidemiology</td>
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<td>PBHL 802 Health and Human Rights</td>
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<td>PBHL 804 Research Methods for Community Health and Prevention</td>
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<td>PBHL 617 Health Disparities: Systemic, Structural, Environmental &amp; Economic</td>
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<td>PBHL 618 Historical and Contemporary Developments in Social Justice</td>
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<td>PBHL 851 Health Systems Policy Analysis</td>
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<tr>
<td>PBHL 805 Qualitative Research in Community Health or PBHL 855 Health Services Research</td>
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<td>PBHL 651 Legal Aspects of Public Health</td>
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In consultation with their advisors, students select elective courses appropriate for their educational goals. These courses may be from the School of Public Health or may be offered by other schools and colleges at Drexel University.

**School of Public Health Faculty**

Amy Auchincloss, PhD (University of Michigan) Department of Biostatistics and Epidemiology. Assistant Professor. Environmental determinants of health and the health effects of air pollution; contribution of resources in residential environments to health behaviors, obesity, diabetes and cardiovascular disease; the use of spatial analysis methods and agent-based model

Zekarias Berhane, PhD (University of Pittsburgh) Department of Epidemiology and Biostatistics. Assistant Research Professor. Modeling time-to-event data with single and multiple outcomes, mixed effect models and regression diagnostics.

Sandra Bloom, MD (Temple University School of Medicine) Department of Health Management and Policy. Associate Professor. Psychological trauma and organizational stress.

Jennifer Breaux, DrPh, MPH (Drexel School of Public Health) Department of Community Health and Prevention; Office of Academic Affairs, Director of Undergraduate Public Health Education. Assistant Teaching Professor. Maternal and child health, community health, human rights.

Darryl R. Brown, PhD (Johns Hopkins Bloomberg School of Public Health) Department of Health Management and Policy. Assistant Professor. Health care research and planning; patient outcomes and applied health economic methods.

Igor Burstyn, PhD (Utrecht University) Department of Environmental and Occupational Health. Associate Professor. Occupational and environmental epidemiology, industrial hygiene.

Carla Campbell, MD, MS (Kentucky College of Medicine; Mount Sinai School of Medicine) Department of Environmental and Occupational Health. Associate Professor. Community and environmental medicine, pediatrics, lead poisoning.


Mariana Chilton, PhD, MPH (University of Pennsylvania) Department of Health Management and Policy. Associate Professor. Human rights and health; race, ethnicity and poverty; nutrition and chronic disease; ethnography and participatory research; complementary and alternative medicine.

Curtis E. Cummings, MD, MPH (Jefferson Medical College) Department of Environmental and Occupational Health. Associate Teaching Professor. Occupational medicine, radiology, chemical and radiation toxicity, Medical Corps, US Navy (Ret.).

Nancy Epstein, MPH (University of North Carolina) Department of Community Health and Prevention. Associate Teaching Professor. Healthcare for underserved communities, health education and coalition building, health and disability policy, oral health, faith and health.

Alison A. Evans, Sc D (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Epidemiology studies of hepatitis B infection and its complications; prevention of liver cancer in East Asian populations in the Delaware Valley.

Robert I. Field, PhD, JD, MPH (Boston University; Columbia University School of Law; Harvard University School of Public Health) Joint Appointment between Dornsife School of Public Health and Earle Mack School of Law. Professor. Health law and public health; ethical issues in managed care, public policy and legal facets of health care reform and genetic screening.

Janet Fleetwood, PhD (University of Southern California, School of Philosophy) Department of Community Health and Prevention; Vice Provost for Strategic Development & Initiatives. Professor. Higher education strategy planning, faculty development and equity, bioethics.

Arthur L. Frank, MD, PhD (Mount Sinai School Medicine City University of New York) Chair, Department of Environmental and Occupational Health.
Professor. Environmental and occupational health, agricultural safety and health, pneumoconiosis, occupational toxicology, environmental pollution.

Dennis Gallagher, MA, MPA (University of Pittsburgh) Department of Health Management and Policy. Associate Professor. Health policy, Medicare/Medicaid/SCHIP, health care access for the uninsured, health system transformation.

Marla Gold, MD (University of Medicine and Dentistry-New Jersey Medical School). Professor. Design of HIV/AIDS care systems, treatment protocols, resource utilization, and epidemiology; CQI, managed care and systems of health care, health administration, behavioral health care and substance abuse treatment systems.

Edward J. Gracely, PhD (Temple University) Department of Epidemiology and Biostatistics. Associate Professor. Statistics, experimental design/research methods and statistical analysis, clinical trials.

William J. Hickey, PhD (Northwestern University) Department of Health Management and Policy. Associate Teaching Professor. Organization behavior, health care administration.

Warren Hilton, MA (Indiana University of Pennsylvania) Assistant Dean for Student and External Affairs. Assistant Teaching Professor. Leadership development, organizational management, health disparities training.

Mary E. Hovinga, PhD, MPH (University of Michigan) Associate Dean of Academic Affairs; Department of Epidemiology and Biostatistics. Associate Professor. Surveillance and etiology of mental retardation, environmental epidemiology, and the human health effects of heavy metals, PCBs and DDT.

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Brian K. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Neuroepidemiology, autism, dementia, environmental risk factors, gene-environmental interaction, propensity score methods, machine learning, stress.

Nora L. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Research Professor. Perinatal epidemiology; low birth weight; preterm birth; macrosomia; maternal and child health; second-hand smoke; environmental exposures; autism spectrum disorders; China.

Longjian Liu, MD, MSC, PhD (University of Hong Kong) Department of Epidemiology and Biostatistics. Associate Professor. Nutrition, aging, cross-cultural and racial/ethnic variation and health.

Raymond K. Lum, MPhil, MS (University of Pennsylvania) Department of Health Management and Policy. Associate Teaching Professor. Organizational learning theory, change management, systems thinking, innovation diffusion, technology transition, e-health.

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Lucy Robinson, PhD (Columbia University) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; statistical analysis; spatial statistics/epidemiology; application of statistics to behavioral, biological and medical sciences; environmental health; neurological disorders.

John Rossi, VMD, M.Bioethics (University of Pennsylvania) Department of Community Health and Prevention. Assistant Professor. Bioethics and public health ethics, including moral theory, research ethics, ethics of risk & health communication, pediatric ethics, animal ethics.

Randall L. Sell, ScD (Harvard University) Department of Community Health and Prevention. Associate Professor. Demographic variables, defining and measuring sexual orientations, sampling sexual minorities for public health research.

David Barton Smith, PhD (The University of Michigan School of Public Health) Department of Health Management and Policy. Research Professor. Racial disparities in healthcare, long term care policy, health services research and program evaluation.
Loni Philip Tabb, PhD (Harvard School of Public Health) Department of Community Health and Prevention. Assistant Professor. Methods for categorical, missing and hierarchical data, spatial epidemiology/statistics.

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Issa Zakeri, PhD (University of Illinois and Urbana-Champaign) Department of Epidemiology and Biostatistics. Professor. Biostatistics.

Interdepartmental Faculty

Robert J. Brulle, PhD (George Washington University). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

Environmental & Occupational Health

Major: Environmental & Occupational Health

Degree Awarded: Master of Public Health (MPH)

Calendar Type: Quarter

Total Credit Hours: 64.0

Classification of Instructional Programs (CIP) code: 51.2202

Standard Occupational Classification (SOC) code: 19-2041; 29-9011

About the Program

The Master of Public Health program is intended for individuals interested in careers as community educators; population health planners; policy analysts, evaluators, researchers; and managers of health service delivery organizations and systems, managed-care programs, and other population-based organizations.

The program is interdisciplinary and requires students to complete a community-based master’s project. It prepares students to enter an array of fields related to public health or a range of doctoral programs. Drexel University’s Master of Public Health (MPH) program provides practical skills and experience, with a unique focus on relevant community issues, challenges, and priorities. The 64.0 quarter-credit program is interdisciplinary and requires students to complete a comprehensive, community-based master’s project. The program prepares students to enter an array of fields related to public health or a range of doctoral programs.

Program Highlights

The first year of the program covers the five core disciplines offered within the context of culture and community. These include environmental and occupational health; health care systems organization, management, and policy; social and behavioral sciences for population health; epidemiology; biostatistics. Throughout the program, group case discussion sessions, case-related activities and didactic sessions are integrated into the experience.

These include:

- Skill development labs and workshops (year two)
- Public health grand rounds (for all faculty, students, and community partners) provide access to scholars and their cutting-edge research and initiatives in public health

Curriculum

The MPH full-time educational program is structured on a quarter-term basis, with a total of 64.0 credit hours required. This is generally taken as a two-year program; all coursework must be completed within five years of the date of matriculation for the full-time program.

The second-year curriculum is composed of four required courses, three elective courses, and the Community-Based Master’s Project (CBMP), the culminating experience required of full-time Drexel MPH students. Students spend approximately 12 hours each week working on a community-oriented, health-related project, often working as an integral part of a community-based organization. This can be in the areas of government, healthcare and social services, among others.

In preparation for developing their final paper, students are required to identify an issue or problem of significance to the target community or agency, synthesize the literature, develop an approach or methodology to address the issue and either implement and test the validity of a proposed approach or set out a detailed prescription for addressing the problem. Students may also work with faculty in specific research areas.

Joint Doctor of Medicine and Master of Public Health Degree (MD/MPH)

Students wishing to complete a course of study earning the joint MD/MPH degree can complete such a program in 5 years. They must apply for the joint program and be accepted by both the Drexel University College of Medicine and the School of Public Health. Students in this program have
enriched public health content in their first two years of medical school and spend their third year of study full time in the School of Public Health. Students are able to enter clinical rotations and residency selection having obtained the MPH degree.

Additional Information
For additional information about this program, contact:

Stephanie Johnson
snj22@drexel.edu
267.359.6065

Foundation Courses

<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PBHL 516</td>
<td>Introduction to Public Health</td>
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<td>PBHL 520</td>
<td>Principles of Biostatistics</td>
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<td>PBHL 530</td>
<td>Principles of Epidemiology</td>
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<td>PBHL 540</td>
<td>Prevention Principles and Practices</td>
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<td>PBHL 600</td>
<td>Management, Leadership, Assurance and Health Services</td>
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<td>PBHL 640</td>
<td>Environmental Health</td>
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<td>PBHL 650</td>
<td>Public Policy and Advocacy</td>
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Required Community-Based Master’s Project Courses

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<td>PBHL 681</td>
<td>Community Based Master’s Project II</td>
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<td>PBHL 682</td>
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Required Courses

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<td>Environmental and Occupational Toxicology</td>
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<td>PBHL 647</td>
<td>Occupational and Environmental Epidemiology</td>
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<td>PBHL 665</td>
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Electives

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<td>PBHL 686</td>
<td>Advanced Statistical Computing</td>
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<tr>
<td>PBHL 691</td>
<td>Pathophysiology Basis of Epidemiologic Research</td>
</tr>
<tr>
<td>PBHL 692</td>
<td>Public Health Obesity Prevention Research</td>
</tr>
<tr>
<td>PBHL 693</td>
<td>Applied Bayesian Analysis</td>
</tr>
<tr>
<td>PBHL 696</td>
<td>Nonparametric and Semiparametric Models</td>
</tr>
<tr>
<td>PBHL 699</td>
<td>Biostatistical Computing with Stata</td>
</tr>
</tbody>
</table>

*800 level courses may require professor’s permission

PBHL 674    Studying Rare or Hidden Groups
PBHL 675    LGBT Health Disparities
PBHL 676    Intersectional Perspectives
PBHL 678    Drug Use and Public Health
PBHL 801    Theory & Practice of Community Health & Preventions I
PBHL 803    Theory & Practice of Community Health and Preventions II
PBHL 804    Research Methods for Community Health and Prevention
PBHL 805    Qualitative Research in Community Health
PBHL 810    Practicum in Community Health and Prevention
PBHL 814    Community Based Participatory Research
PBHL 823    Faith, Religion, Spirituality, and Health
PBHL 824    Public Health Ethics
PBHL 827    Advanced Topics in Qualitative Analysis

Environmental and Occupational Health Electives

<table>
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<tr>
<th>Course Code</th>
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<tr>
<td>PBHL 560</td>
<td>Overview of Issues in Global Health</td>
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<td>PBHL 642</td>
<td>Healthy Housing &amp; Built Environment</td>
</tr>
<tr>
<td>PBHL 645</td>
<td>Exposure Assessment</td>
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<tr>
<td>PBHL 646</td>
<td>Environmental Health in Vulnerable Populations</td>
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<tr>
<td>PBHL 648</td>
<td>Public Health and Disaster Preparedness</td>
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<tr>
<td>PBHL 649</td>
<td>Occupational and Environmental Cancers</td>
</tr>
<tr>
<td>PBHL 663</td>
<td>Injury Prevention and Control</td>
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<td>PBHL 664</td>
<td>Safety in Healthcare</td>
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Epidemiology Electives

<table>
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<tr>
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<tbody>
<tr>
<td>PBHL 532</td>
<td>Autism as a Public Health Challenge</td>
</tr>
<tr>
<td>PBHL 633</td>
<td>Epidemiology of Cancer</td>
</tr>
<tr>
<td>PBHL 635</td>
<td>Social Epidemiology and Psychiatric Epidemiology</td>
</tr>
<tr>
<td>PBHL 636</td>
<td>Infectious Disease Epidemiology</td>
</tr>
<tr>
<td>PBHL 638</td>
<td>Perinatal Epidemiology</td>
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<td>PBHL 639</td>
<td>Cardiovascular Disease Epidemiology &amp; Prevention</td>
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<tr>
<td>PBHL 655</td>
<td>Making Sense of Data</td>
</tr>
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<td>PBHL 656</td>
<td>Pharmacoepidemiology</td>
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<td>PBHL 691</td>
<td>Pathophysiology Basis of Epidemiologic Research</td>
</tr>
<tr>
<td>PBHL 692</td>
<td>Public Health Obesity Prevention Research</td>
</tr>
</tbody>
</table>

Health Management and Policy Electives

*800 level courses may require professor’s permission

PBHL 604    Public Health Advocacy and Activism
PBHL 605    Change Management in Public Health
PBHL 610    Active Issues in Public Health
PBHL 612    Public Health Funding & Program Development
PBHL 613    Seminar in Fire Arms and Public Health
PBHL 614    Coordinating a Population’s Care
PBHL 615    Perspectives on Gender, Race, Ethnicity, and Social Class
PBHL 616    Public Health Surveillance: Aligning Data and Policy Use
PBHL 617    Health Disparities: Systemic, Structural, Environmental & Economic
Environmental and Occupational Health

School of Public Health Faculty

Amy Ausincloss, PhD (University of Michigan) Department of Biostatistics and Epidemiology. Assistant Professor. Environmental determinants of health and the health effects of air pollution; contribution of resources in residential environments to health behaviors, obesity, diabetes and cardiovascular disease; the use of spatial analysis methods and agent-based model

Zekarias Berhane, PhD (University of Pittsburgh) Department of Epidemiology and Biostatistics. Assistant Research Professor. Modeling time-to-event data with single and multiple outcomes, mixed effect models and regression diagnostics.

Sandra Bloom, MD (Temple University School of Medicine) Department of Health Management and Policy. Associate Professor. Psychological trauma and organizational stress.

Jennifer Breaux, DrPh, MPH (Drexel School of Public Health) Department of Community Health and Prevention; Office of Academic Affairs, Director of Undergraduate Public Health Education. Assistant Teaching Professor. Maternal and child health, community health, human rights.

Darryl R. Brown, PhD (Johns Hopkins Bloomberg School of Public Health) Department of Health Management and Policy. Assistant Professor. Health care research and planning; patient outcomes and applied health economic methods.

Igor Burstyn, PhD (Utrecht University) Department of of Environmental and Occupational Health. Associate Professor. Occupational and environmental epidemiology, industrial hygiene.

Carla Campbell, MD, MS (Kentucky College of Medicine; Mount Sinai School of Medicine) Department of Environmental and Occupational Health. Associate Professor. Community and environmental medicine, pediatrics, lead poisoning.


Mariana Chilton, PhD, MPH (University of Pennsylvania) Department of Health Management and Policy. Associate Professor. Human rights and health; race, ethnicity and poverty; nutrition and chronic disease; ethnography and participatory research; complementary and alternative medicine.

Curtis E. Cummings, MD, MPH (Jefferson Medical College) Department of Environmental and Occupational Health. Associate Teaching Professor.

Occupational medicine, radiology, chemical and radiation toxicity, Medical Corps, US Navy (Ret.).

Nancy Epstein, MPH (University of North Carolina) Department of Community Health and Prevention. Associate Teaching Professor. Healthcare for underserved communities, health education and coalition building, health and disability policy, oral health, faith and health.

Alison A. Evans, Sc D (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Epidemiology studies of hepatitis B infection and its complications; prevention of liver cancer in East Asian populations in the Delaware Valley.

Robert I. Field, PhD, JD, MPH (Boston University; Columbia University School of Law; Harvard University School of Public Health) Joint Appointment between Dornsife School of Public Health and Earle Mack School of Law. Professor. Health law and public health; ethical issues in managed care, public policy and legal facets of health care reform and genetic screening.

Janet Fleetwood, PhD (University of Southern California, School of Philosophy) Department of Community Health and Prevention; Vice Provost for Strategic Development & Initiatives. Professor. Higher education strategy planning, faculty development and equity, bioethics.

Arthur L. Frank, MD (Mount Sinai School Medicine City University of New York) Chair, Department of Environmental and Occupational Health. Professor. Environmental and occupational health, agricultural safety and health, pneumoconiosis, occupational toxicology, environmental pollution.

Dennis Gallagher, MA, MPA (University of Pittsburgh) Department of Health Management and Policy. Associate Professor. Health policy, Medicare/Medicaid/SCHIP, health care access for the uninsured, health system transformation.

Marla Gold, MD (University of Medicine and Dentistry-New Jersey Medical School). Professor. Design of HIV/AIDS care systems, treatment protocols, resource utilization, and epidemiology; CQI, managed care and systems of health care, health administration, behavioral health care and substance abuse treatment systems.

Edward J. Gracely, PhD (Temple University) Department of Epidemiology and Biostatistics. Associate Professor. Statistics, experimental design/ research methods and statistical analysis, clinical trials.

William J. Hickey, PhD (Northwestern University) Department of Health Management and Policy. Associate Teaching Professor. Organization behavior, health care administration.

Warren Hilton, MA (Indiana University of Pennsylvania) Assistant Dean for Student and External Affairs. Assistant Teaching Professor. Leadership development, organizational management, health disparities training.

Mary E. Hovinga, PhD, MPH (University of Michigan) Associate Dean of Academic Affairs; Department of Epidemiology and Biostatistics. Associate Professor. Surveillance and etiology of mental retardation, environmental epidemiology, and the human health effects of heavy metals, PCBs and DDT.

Ann Klassen, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Community Health and Prevention, Chair; Associate Dean for Research. Professor. Social and geographical determinants of chronic disease disparities, cancer prevention and control, behavioral science.
Jennifer Kolker, MPH (University of Michigan) Department of Health Management and Policy. Associate Teaching Professor. Planning and policy development for health and welfare, early childhood education, epidemiological data collection and analysis, disease controls.

Stephen E. Lankenau, PhD (University of Maryland) Department of Community Health and Prevention. Associate Professor. Substance misuse, overdose prevention, high-risk youth, and mixed methods.

Brian K. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Neuroepidemiology, autism, dementia, environmental risk factors, gene-environmental interaction, propensity score methods, machine learning, stress.

Nora L. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Research Professor. Perinatal epidemiology; low birth weight; preterm birth; macrosomia; maternal and child health; second-hand smoke; environmental exposures; autism spectrum disorders; China.

Longjian Liu, MD, MSC, PhD (University of Hong Kong) Department of Epidemiology and Biostatistics. Associate Professor. Nutrition, aging, cross-cultural and racial/ethnic variation and health.

Raymond K. Lum, MPhil, MS (University of Pennsylvania) Department of Health Management and Policy. Associate Teaching Professor. Organizational learning theory, change management, systems thinking, innovation diffusion, technology transition, e-health.

Shannon Marquez, MEng, PhD (University of North Carolina Gillings School of Global Public Health) Director of Global Public Health Initiatives, Interim Associate Dean. Associate Professor. Agricultural safety, health disparities, environmental health, international health.

Yvonne Michael, ScD (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Associate Professor. Epidemiology of aging, social epidemiology, women’s health, community-based participatory research.

Jana M. Mossey, PhD, MPH, MSN (University of North Carolina) Department of Epidemiology and Biostatistics. Professor. Epidemiological methods; research design and methods including observational and clinical trials research; psychosocial aspects of health; epidemiology of aging; depression and chronic pain; sub-threshold and minor depression; pain in the elderly.

Craig J. Newschaffer, PhD (Johns Hopkins University) Chair, Department of Epidemiology and Biostatistics. Professor. Development of methods for monitoring autism spectrum disorders prevalence; participation in the National CADDRE Study of Autism and Child Development.

Hernando Perez, PhD, MPH, CIH, CSP (Purdue University) Department of Environmental and Occupational Health. Assistant Teaching Professor. Children’s environmental health, housing and health, environmental and occupational exposure assessment.

Marcia Polansky, MS, ScD, MSW (Harvard University) Department of Epidemiology and Biostatistics. Associate Professor. Biostatistics; experimental design/research methods and statistical analysis, clinical trials; asthma epidemiology and interventions; attachment theory and mothers with drug and alcohol addictions.

John A. Rich, MD, MPH (Duke University Medical School) Interim Dean, Dornsife School of Public Health; Chair, Department of Health Management and Policy. Professor. Inner-city health problems, urban violence, male health and racial disparities.

Lucy Robinson, PhD (Columbia University) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; statistical analysis; spatial statistics/epidemiology; application of statistics to behavioral, biological and medical sciences; environmental health; neurological disorders.

John Rossi, VMD, MBioethics (University of Pennsylvania) Department of Community Health and Prevention. Assistant Professor. Bioethics and public health ethics, including moral theory, research ethics, ethics of risk & health communication, pediatric ethics, animal ethics.

Randall L. Sell, ScD (Harvard University) Department of Community Health and Prevention. Associate Professor. Demographic variables, defining and measuring sexual orientations, sampling sexual minorities for public health research.

David Barton Smith, PhD (The University of Michigan School of Public Health) Department of Health Management and Policy. Research Professor. Racial disparities in healthcare, long term care policy, health services research and program evaluation.

Loni Philip Tabb, PhD (Harvard School of Public Health) Department of Community Health and Prevention. Assistant Professor. Methods for categorical, missing and hierarchical data, spatial epidemiology/statistics.

Jennifer A. Taylor, PhD, MPH (Johns Hopkins University) Department of Environmental and Occupational Health. Associate Professor. Injury prevention and control, quality improvement, and occupational safety.

Renee M. Turchi, MD, MPH (Johns Hopkins University) Department of Community Health and Prevention. Associate Professor. Medical Home; children and youth with special health care needs; care coordination; cultural competency and access to care.

Nicole A. Vaughn, PhD (Uniformed Services University of the Health Sciences) Department of Health Management and Policy. Assistant Professor. Community-based approaches to eliminating health disparities, health care access and utilization among insured and uninsured minority groups, obesity, women’s health and the influence of culture on health behaviors particularly for chronic conditions.

Augusta M. Villanueva, PhD (University of Texas at Austin) Department of Community Health and Prevention. Associate Professor. Role of race, culture, and ethnicity on health status/outcomes; community-based participatory research; immigrant communities; academic service-learning.

Seth Welles, PhD, ScD (Boston University) Department of Epidemiology and Biostatistics. Professor. Impact of HIV phenotypic and genotypic antiretroviral drug resistance on HIV disease progression and transmission; psychosocial risk for HIV infection and STDs among sexual minority adults and adolescents, and surveys of sexual minority adults at community festivals and at health-clinics to assess demographic and psychosocial determinants of sexual risk-taking and HIV/STD infections.

Yunwen Yang, PhD (University of Illinois at Urbana-Champaign) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; bayesian methods; application of statistics to behavioral, biological and medical sciences; mixed methods.

Michael Yudell, MPH, MPhil (Columbia University, City University of New York) Department of Community Health and Prevention. Associate Professor. Policy development for health and welfare, early childhood education, epidemiological data collection and analysis, disease controls.
Interdepartmental Faculty

Robert J. Brulle, PhD (George Washington University). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

Epidemiology

Major: Epidemiology
Degree Awarded: Master of Science (MS); Master of Public Health (MPH); Doctor of Philosophy (PhD)
Calendar Type: Quarter
Total Credit Hours: 58.0 (MS); 64.0 (MPH); 69.0 (PhD)
Classification of Instructional Programs (CIP) code: 26.1309
Standard Occupational Classification (SOC) code: 19-1041

About the Programs

The MS in Epidemiology

The goal of the MS in Epidemiology program is to produce graduates who have a solid understanding of epidemiologic principles and methods and the demonstrated ability and capacity to apply that understanding and skill. The curriculum and project requirements are designed to provide and then demonstrate the ability to effectively engage in research.

This includes the development of appropriate research questions and aims, the design and conduct of epidemiologic studies, and the appropriate analysis and interpretation and presentation of research data. Upon graduation, MS students will have attained competencies in two areas: general epidemiology knowledge and skills, and epidemiologic research methods.

The MPH in Epidemiology

The Master of Public Health program is intended for individuals interested in careers as community educators; population health planners; policy analysts, evaluators, researchers; and managers of health service delivery organizations and systems, managed-care programs, and other population-based organizations. It provides practical skills and experience, with a unique focus on relevant community issues, challenges, and priorities.

The 64.0 quarter-credit program is interdisciplinary and requires students to complete a comprehensive, community-based master’s project. The program prepares students to enter an array of fields related to public health or a range of doctoral programs.

Program Highlights

The first year of the program covers the five core disciplines offered within the context of culture and community. These include environmental and occupational health; health care systems organization, management, and policy; social and behavioral sciences for population health; epidemiology; biostatistics.

Throughout the program, group case discussion sessions, case-related activities and didactic sessions are integrated into the experience. These include:

- skill development labs and workshops (year two)
- public health grand rounds (for all faculty, students, and community partners) provide access to scholars and their cutting-edge research and initiatives in public health

The PhD in Epidemiology

The PhD in Epidemiology program prepares students to approach problems with the critical analytic skills necessary for the generation of substantial and significant epidemiologic questions, and to utilize the most rigorous and parsimonious research strategies to answer such questions. Additionally, integral values of the Department and School will infuse students with the commitment to pursue important and innovative topics of inquiry even when faced with methodological challenges, and to undertake studies that generate knowledge applicable to diverse social, ethnic, and geographically defined populations.

Graduates will develop the skill and expertise necessary to initiate and direct the scientifically rigorous research necessary to generate the knowledge upon which to base public health and medical care policies and procedures designed to foster the maintenance and improvement of the health and well being of populations.

For additional information about these programs, visit Drexel’s School of Public Health (http://publichealth.drexel.edu) web site.

Admission Requirements

Master of Science Program

Applicants to the MS in Epidemiology program must meet the following requirements:

- A baccalaureate degree
- Two semesters of calculus in college
- Two courses of biology (i.e., microbiology, physiology, genetics, etc.) in college
- The application package will include: undergraduate and graduate transcripts, three letters of recommendation from faculty or professionals who can evaluate the applicant’s promise as a graduate student, GRE or MCAT scores, and a written statement of career and educational goals.
- Competitive applicants will possess a undergraduate GPA of 3.30 or higher and GRE or MCAT scores above the 60th percentile.

PhD Program

Applicants to the PhD program in Epidemiology must meet the following requirements:

- MPH degree or master’s degree in epidemiology or a related field.
- Potential for high level of performance in the PhD program and subsequent contributions to the field of epidemiology.

The application package will include:

- undergraduate and graduate transcripts,
- three letters of recommendation from faculty or professionals who can evaluate the applicant’s promise as a graduate student,
- official Graduate Record Examination scores (no other standardized test accepted for this program),
- a written statement of career and educational goals, professional experience, and area of research interest.
An in-person or telephone interview is required of all finalists.

All entering students are expected to have already completed introductory and intermediate level epidemiology and biostatistics courses (equivalents of PBHL 520 and PBHL 530) as part of their Master’s program or must enroll in these courses, or their equivalents, as additional requirements.

Forms, details about requirements, and information about application deadlines are all available on the School of Public Health Programs (http://www.drexel.edu/grad/programs/pubhealth) page on Drexel’s Graduate Admissions website.

**Degree Requirements: MS in Epidemiology**

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Credits</th>
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<tbody>
<tr>
<td><strong>Public Health</strong></td>
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<tr>
<td>PBHL 516 Introduction to Public Health</td>
<td>2.0</td>
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<tr>
<td><strong>Epidemiology</strong></td>
<td></td>
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<tr>
<td>PBHL 530 Principles of Epidemiology</td>
<td>4.0</td>
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<tr>
<td>PBHL 630 Intermediate Epidemiology</td>
<td>3.0</td>
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<tr>
<td>PBHL 632 Applied Survey Research in Epidemiology</td>
<td>3.0</td>
</tr>
<tr>
<td>PBHL 633 Epidemiology of Cancer</td>
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<tr>
<td>PBHL 636 Infectious Disease Epidemiology</td>
<td>3.0</td>
</tr>
<tr>
<td>PBHL 691 Pathophysiology Basis of Epidemiologic Research</td>
<td>3.0</td>
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<tr>
<td><strong>Biostatistics</strong></td>
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<tr>
<td>PBHL 520 Principles of Biostatistics</td>
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<td>PBHL 620 Intermediate Biostatistics I</td>
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<td>PBHL 625 Longitudinal Data Analysis</td>
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<tr>
<td>PBHL 628 Survival Data Analysis</td>
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<tr>
<td><strong>Master’s Project Courses</strong></td>
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<tr>
<td>PBHL 503 Course PBHL 503 Not Found (MS in Epidemiology Project)</td>
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<tr>
<td>PBHL 685 Data Analysis Project</td>
<td>6.0</td>
</tr>
<tr>
<td>PBHL 835 Proposal Writing Seminar</td>
<td>3.0</td>
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<tr>
<td><strong>Electives</strong></td>
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Students must select 9.0 credits total. Some potential electives include the following:

<table>
<thead>
<tr>
<th>Electives</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PBHL 629 Design &amp; Analysis of Clinical Trials</td>
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<tr>
<td>PBHL 634 Epidemiology for Public Health Practice</td>
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<tr>
<td>PBHL 635 Social Epidemiology and Psychiatric Epidemiology</td>
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<td>PBHL 638 Perinatal Epidemiology</td>
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<tr>
<td>PBHL 639 Cardiovascular Disease Epidemiology &amp; Prevention</td>
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**Total Credits: 58.0**

**Sample Plan of Study**

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<tr>
<td>PBHL 516 Introduction to Public Health</td>
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<tr>
<td>PBHL 520 Principles of Biostatistics</td>
<td>4.0</td>
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<td>PBHL 530 Principles of Epidemiology</td>
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**Winter**

<table>
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<tr>
<th>Term Credits</th>
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<tbody>
<tr>
<td>PBHL 620 Intermediate Biostatistics I</td>
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<tr>
<td>PBHL 630 Intermediate Epidemiology</td>
<td>3.0</td>
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<tr>
<td>PBHL 632 Applied Survey Research in Epidemiology</td>
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**Spring**

<table>
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<tr>
<th>Term Credits</th>
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<tbody>
<tr>
<td>PBHL 623 Introduction to Statistical Computing</td>
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</tr>
<tr>
<td>PBHL 636 Infectious Disease Epidemiology</td>
<td>3.0</td>
</tr>
<tr>
<td>PBHL 691 Pathophysiology Basis of Epidemiologic Research</td>
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**Total Credits: 9.0**

**Second Year**

<table>
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<tbody>
<tr>
<td>PBHL 503 Course PBHL 503 Not Found (MS in Epidemiology Project)</td>
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</tr>
<tr>
<td>PBHL 625 Longitudinal Data Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>MS in Epidemiology elective*</td>
<td>3.0</td>
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**Spring**

<table>
<thead>
<tr>
<th>Term Credits</th>
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<tbody>
<tr>
<td>PBHL 685 Data Analysis Project</td>
<td>6.0</td>
</tr>
<tr>
<td>Two MS in Epidemiology electives*</td>
<td>6.0</td>
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</tbody>
</table>

**Total Credits: 12.0**

* Students must take 6.0 credits of electives in the second year. View the degree requirements for a list of potential electives, or check with the Department. Two electives may be taken in either fall, winter, or spring. This sample plan of study illustrates both electives being taken in the spring term.

**Degree Requirements: MPH in Epidemiology**

The MPH full-time educational program is structured on a quarter-term basis, with a total of 64.0 credit hours required. This is generally taken as a two-year program; all coursework must be completed within five years of the date of matriculation for the full-time program.

The second-year curriculum is composed of four required courses, three elective courses, and the Community-Based Master’s Project (CBMP), the culminating experience required of full-time Drexel MPH students.

Students spend approximately 12 hours each week working on a community-oriented, health-related project, often working as an integral part of a community-based organization. This can be in the areas of government, healthcare and social services, among others. In preparation for developing their final paper, students are required to identify an issue or problem of significance to the target community or agency, synthesize the literature, develop an approach or methodology to address the issue and either implement and test the validity of a proposed approach or set
out a detailed prescription for addressing the problem. Students may also work with faculty in specific research areas.

**Foundation Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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</thead>
<tbody>
<tr>
<td>PBHL 516</td>
<td>Introduction to Public Health</td>
</tr>
<tr>
<td>PBHL 520</td>
<td>Principles of Biostatistics</td>
</tr>
<tr>
<td>PBHL 530</td>
<td>Principles of Epidemiology</td>
</tr>
<tr>
<td>PBHL 540</td>
<td>Prevention Principles and Practices</td>
</tr>
<tr>
<td>PBHL 600</td>
<td>Management, Leadership, Assurance and Health Services</td>
</tr>
<tr>
<td>PBHL 640</td>
<td>Environmental Health</td>
</tr>
<tr>
<td>PBHL 650</td>
<td>Public Policy and Advocacy</td>
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**Required Community-Based Master's Project Courses**

<table>
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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PBHL 680</td>
<td>Community Based Master's Project I</td>
</tr>
<tr>
<td>PBHL 681</td>
<td>Community Based Master's Project II</td>
</tr>
<tr>
<td>PBHL 682</td>
<td>Community Based Master's Project III</td>
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**Required Courses**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
</tr>
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<tbody>
<tr>
<td>PBHL 620</td>
<td>Intermediate Biostatistics I</td>
</tr>
<tr>
<td>PBHL 623</td>
<td>Introduction to Statistical Computing</td>
</tr>
<tr>
<td>PBHL 630</td>
<td>Intermediate Epidemiology</td>
</tr>
<tr>
<td>PBHL 632</td>
<td>Applied Survey Research in Epidemiology</td>
</tr>
<tr>
<td>PBHL 634</td>
<td>Epidemiology for Public Health Practice</td>
</tr>
</tbody>
</table>

Electives

Students are required to successfully complete four electives (12.0 credits). These courses may be within the School of Public Health, or from other academic units within the University. Students must meet with their Academic Advisor in selecting their electives. It is the responsibility of the student to determine course restrictions and the registration process for campus electives taken at the Main Campus. The following is a sample of some of the School of Public Health electives offered by department:

**Biostatistics Electives**

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PBHL 621</td>
<td>Intermediate Biostatistics II</td>
</tr>
<tr>
<td>PBHL 622</td>
<td>Statistical Inference I</td>
</tr>
<tr>
<td>PBHL 628</td>
<td>Survival Data Analysis</td>
</tr>
<tr>
<td>PBHL 629</td>
<td>Design &amp; Analysis of Clinical Trials</td>
</tr>
<tr>
<td>PBHL 631</td>
<td>Applied Multivariate Analysis</td>
</tr>
<tr>
<td>PBHL 657</td>
<td>Data Management</td>
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<tr>
<td>PBHL 683</td>
<td>Advanced Clinical Trials &amp; Experiment Design</td>
</tr>
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<td>PBHL 684</td>
<td>Statistical Inference II</td>
</tr>
<tr>
<td>PBHL 686</td>
<td>Advanced Statistical Computing</td>
</tr>
<tr>
<td>PBHL 691</td>
<td>Pathophysiology Basis of Epidemiologic Research</td>
</tr>
<tr>
<td>PBHL 692</td>
<td>Public Health Obesity Prevention Research</td>
</tr>
<tr>
<td>PBHL 693</td>
<td>Applied Bayesian Analysis</td>
</tr>
<tr>
<td>PBHL 696</td>
<td>Nonparametric and Semiparametric Models</td>
</tr>
<tr>
<td>PBHL 699</td>
<td>Biostatistical Computing with Stata</td>
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**Community Health and Prevention Electives**

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PBHL 674</td>
<td>Studying Rare or Hidden Groups</td>
</tr>
<tr>
<td>PBHL 675</td>
<td>LGBT Health Disparities</td>
</tr>
<tr>
<td>PBHL 676</td>
<td>Intersectional Perspectives</td>
</tr>
<tr>
<td>PBHL 678</td>
<td>Drug Use and Public Health</td>
</tr>
<tr>
<td>PBHL 801</td>
<td>Theory &amp; Practice of Community Health &amp; Preventions I</td>
</tr>
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<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PBHL 803</td>
<td>Theory &amp; Practice of Community Health and Preventions II</td>
</tr>
<tr>
<td>PBHL 804</td>
<td>Research Methods for Community Health and Prevention</td>
</tr>
<tr>
<td>PBHL 805</td>
<td>Qualitative Research in Community Health</td>
</tr>
<tr>
<td>PBHL 808</td>
<td>Community Program Evaluation</td>
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<tr>
<td>PBHL 810</td>
<td>Practicum in Community Health and Prevention</td>
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<tr>
<td>PBHL 814</td>
<td>Community Based Participatory Research</td>
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<tr>
<td>PBHL 823</td>
<td>Faith, Religion, Spirituality, and Health</td>
</tr>
<tr>
<td>PBHL 824</td>
<td>Public Health Ethics</td>
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<tr>
<td>PBHL 827</td>
<td>Advanced Topics in Qualitative Analysis</td>
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**Environmental and Occupational Health Electives**

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<th>Course Code</th>
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<tbody>
<tr>
<td>PBHL 560</td>
<td>Overview of Issues in Global Health</td>
</tr>
<tr>
<td>PBHL 642</td>
<td>Healthy Housing &amp; Built Environment</td>
</tr>
<tr>
<td>PBHL 645</td>
<td>Exposure Assessment</td>
</tr>
<tr>
<td>PBHL 646</td>
<td>Environmental Health in Vulnerable Populations</td>
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<tr>
<td>PBHL 648</td>
<td>Public Health and Disaster Preparedness</td>
</tr>
<tr>
<td>PBHL 649</td>
<td>Occupational and Environmental Cancers</td>
</tr>
<tr>
<td>PBHL 663</td>
<td>Injury Prevention and Control</td>
</tr>
<tr>
<td>PBHL 664</td>
<td>Safety in Healthcare</td>
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**Epidemiology Electives**

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<th>Course Code</th>
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<tr>
<td>PBHL 532</td>
<td>Autism as a Public Health Challenge</td>
</tr>
<tr>
<td>PBHL 633</td>
<td>Epidemiology of Cancer</td>
</tr>
<tr>
<td>PBHL 635</td>
<td>Social Epidemiology and Psychiatric Epidemiology</td>
</tr>
<tr>
<td>PBHL 636</td>
<td>Infectious Disease Epidemiology</td>
</tr>
<tr>
<td>PBHL 638</td>
<td>Perinatal Epidemiology</td>
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<tr>
<td>PBHL 639</td>
<td>Cardiovascular Disease Epidemiology &amp; Prevention</td>
</tr>
<tr>
<td>PBHL 655</td>
<td>Making Sense of Data</td>
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<tr>
<td>PBHL 656</td>
<td>Pharmacoepidemiology</td>
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<tr>
<td>PBHL 691</td>
<td>Pathophysiology Basis of Epidemiologic Research</td>
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<tr>
<td>PBHL 692</td>
<td>Public Health Obesity Prevention Research</td>
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**Health Management and Policy Electives**

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<tr>
<td>PBHL 604</td>
<td>Public Health Advocacy and Activism</td>
</tr>
<tr>
<td>PBHL 606</td>
<td>Vaccines and Public Health Policy</td>
</tr>
<tr>
<td>PBHL 610</td>
<td>Active Issues in Public Health</td>
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<tr>
<td>PBHL 612</td>
<td>Public Health Funding &amp; Program Development</td>
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<tr>
<td>PBHL 613</td>
<td>Seminar in Fire Arms and Public Health</td>
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<tr>
<td>PBHL 614</td>
<td>Coordinating a Population's Care</td>
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<tr>
<td>PBHL 615</td>
<td>Perspectives on Gender, Race, Ethnicity, and Social Class</td>
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<tr>
<td>PBHL 616</td>
<td>Public Health Surveillance: Aligning Data and Policy Use</td>
</tr>
<tr>
<td>PBHL 617</td>
<td>Health Disparities: Systemic, Structural, Environmental &amp; Economic</td>
</tr>
<tr>
<td>PBHL 618</td>
<td>Historical and Contemporary Developments in Social Justice</td>
</tr>
<tr>
<td>PBHL 652</td>
<td>Public Health Leadership</td>
</tr>
<tr>
<td>PBHL 802</td>
<td>Health and Human Rights</td>
</tr>
<tr>
<td>PBHL 851</td>
<td>Health Systems Policy Analysis</td>
</tr>
<tr>
<td>PBHL 852</td>
<td>Health Economics I</td>
</tr>
<tr>
<td>PBHL 853</td>
<td>Health Economics II</td>
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</table>
Degree Requirements: PhD in Epidemiology

Completion of the PhD in Epidemiology requires: (1) a minimum of 69.0 quarter credit hours of course work beyond the master's degree; (2) a minimum cumulative grade point average of 3.3; (3) passing the doctoral comprehensive examination; (4) passing the candidacy oral examination; (5) completing a dissertation of publishable quality; and (6) passing the final defense.

A student in the PhD degree program shall have seven calendar years from the date of initial registration to complete and successfully defend a dissertation.

Electives

All students must complete two epidemiology area electives and two biostatistics area electives.

School of Public Health Core Courses

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PBHL 620</td>
<td>Intermediate Biostatistics I</td>
</tr>
<tr>
<td>PBHL 630</td>
<td>Intermediate Epidemiology</td>
</tr>
<tr>
<td>Select one of the following courses:</td>
<td></td>
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<tr>
<td>PBHL 802</td>
<td>Health and Human Rights</td>
</tr>
<tr>
<td>PBHL 824</td>
<td>Public Health Ethics</td>
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Departmental Required Courses

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<tr>
<td>PBHL 621</td>
<td>Intermediate Biostatistics II</td>
</tr>
<tr>
<td>PBHL 623</td>
<td>Introduction to Statistical Computing</td>
</tr>
<tr>
<td>PBHL 625</td>
<td>Longitudinal Data Analysis</td>
</tr>
<tr>
<td>PBHL 632</td>
<td>Applied Survey Research in Epidemiology</td>
</tr>
<tr>
<td>PBHL 636</td>
<td>Infectious Disease Epidemiology</td>
</tr>
<tr>
<td>PBHL 686</td>
<td>Advanced Statistical Computing</td>
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<tr>
<td>PBHL 691</td>
<td>Pathophysiology Basis of Epidemiologic Research</td>
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<tr>
<td>PBHL 826</td>
<td>Causal Inference in Epidemiology</td>
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<tr>
<td>PBHL 830</td>
<td>Advanced Epidemiology</td>
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<tr>
<td>PBHL 833</td>
<td>Epidemiology PhD Seminar</td>
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<tr>
<td>PBHL 834</td>
<td>Methodological Challenges</td>
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<tr>
<td>PBHL 835</td>
<td>Proposal Writing Seminar</td>
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Dissertation

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<tr>
<td>PBHL 999</td>
<td>Thesis Research: Dissertation Guidance and Epidemiology</td>
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University Required Course

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<th>Course</th>
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<tr>
<td>EDUC 531</td>
<td>College Teaching &amp; Communication Skills</td>
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A minimum of two Epidemiology Area electives: 6.0

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>PBHL 633</td>
<td>Epidemiology of Cancer</td>
</tr>
<tr>
<td>PBHL 634</td>
<td>Epidemiology for Public Health Practice</td>
</tr>
<tr>
<td>PBHL 635</td>
<td>Social Epidemiology and Psychiatric Epidemiology</td>
</tr>
<tr>
<td>PBHL 638</td>
<td>Perinatal Epidemiology</td>
</tr>
<tr>
<td>PBHL 639</td>
<td>Cardiovascular Disease Epidemiology &amp; Prevention</td>
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A minimum of two Biostatistics Area electives: 6.0

<table>
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<tbody>
<tr>
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<td>Statistical Inference I</td>
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</table>

Total Credits 64.0

See the PhD Program Guide (http://publichealth.drexel.edu/~media/Files/publichealth/PhDPI%20Program%20Guide-Final%202013-2014.ashx) for additional information.

Joint Doctor of Medicine and Master of Public Health Degree (MD/MPH)

Students wishing to complete a course of study earning the joint MD/MPH degree can complete such a program in 5 years. They must apply for the joint program and be accepted by both the Drexel University College of Medicine (http://www.drexelmed.edu/home/Admissions/MDProgram.aspx) and the School of Public Health.

Students in this program have enriched public health content in their first two years of medical school and spend their third year of study full time in the School of Public Health. Students are able to enter clinical rotations and residency selection having obtained the MPH degree.

For additional information about this program, contact:

Stephanie Johnson
snj22@drexel.edu
267.359.6065

School of Public Health Faculty

Amy Auchincloss, PhD (University of Michigan) Department of Biostatistics and Epidemiology. Assistant Professor. Environmental determinants of health and the health effects of air pollution; contribution of resources in residential environments to health behaviors, obesity, diabetes and cardiovascular disease; the use of spatial analysis methods and agent-based mode

Zekarias Berhane, PhD (University of Pittsburgh) Department of Epidemiology and Biostatistics. Assistant Research Professor. Modeling time-to-event data with single and multiple outcomes, mixed effect models and regression diagnostics.

Sandra Bloom, MD (Temple University School of Medicine) Department of Health Management and Policy. Associate Professor. Psychological trauma and organizational stress.

Jennifer Breaux, DrPh, MPH (Drexel School of Public Health) Department of Community Health and Prevention; Office of Academic Affairs, Director of Undergraduate Public Health Education. Assistant Teaching Professor. Maternal and child health, community health, human rights.

Darryl R. Brown, PhD (Johns Hopkins Bloomberg School of Public Health) Department of Health Management and Policy. Assistant Professor. Health care research and planning; patient outcomes and applied health economic methods.

Igor Burstyn, PhD (Utrecht University) Department of Environmental and Occupational Health. Associate Professor. Occupational and environmental epidemiology, industrial hygiene.

Carla Campbell, MD, MS (Kentucky College of Medicine; Mount Sinai School of Medicine) Department of Environmental and Occupational
Health. Associate Professor. Community and environmental medicine, pediatrics, lead poisoning.


Mariana Chilton, PhD, MPH (University of Pennsylvania) Department of Health Management and Policy. Associate Professor. Human rights and health; race, ethnicity and poverty; nutrition and chronic disease; ethnography and participatory research; complementary and alternative medicine.

Curtis E. Cummings, MD, MPH (Jefferson Medical College) Department of Environmental and Occupational Health. Associate Teaching Professor. Occupational medicine, radiology, chemical and radiation toxicity, Medical Corps, US Navy (Ret.).

Nancy Epstein, MPH (University of North Carolina) Department of Community Health and Prevention. Associate Teaching Professor. Healthcare for underserved communities, health education and coalition building, health and disability policy, oral health, faith and health.

Alison A. Evans, Sc D (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Epidemiology studies of hepatitis B infection and its complications; prevention of liver cancer in East Asian populations in the Delaware Valley.

Robert I. Field, PhD, JD, MPH (Boston University; Columbia University School of Law; Harvard University School of Public Health) Joint Appointment between Dornsife School of Public Health and Earle Mack School of Law. Professor. Health law and public health; ethical issues in managed care, public policy and legal facets of health care reform and genetic screening.

Janet Fleetwood, PhD (University of Southern California, School of Philosophy) Department of Community Health and Prevention; Vice Provost for Strategic Development & Initiatives. Professor. Higher education strategy planning, faculty development and equity, bioethics.

Arthur L. Frank, MD, PhD (Mount Sinai School of Medicine City University of New York) Chair, Department of Environmental and Occupational Health. Professor. Environmental and occupational health, agricultural safety and health, pneumoconiosis, occupational toxicology, environmental pollution.

Dennis Gallagher, MA, MPA (University of Pittsburgh) Department of Health Management and Policy. Associate Professor. Health policy, Medicare/Medicaid/SCHIP, health care access for the uninsured, health system transformation.

Marla Gold, MD (University of Medicine and Dentistry-New Jersey Medical School). Professor. Design of HIV/AIDS care systems, treatment protocols, resource utilization, and epidemiology; COI, managed care and systems of health care, health administration, behavioral health care and substance abuse treatment systems.

Edward J. Gracely, PhD (Temple University) Department of Epidemiology and Biostatistics. Associate Professor. Statistics, experimental design/ research methods and statistical analysis, clinical trials.

William J. Hickey, PhD (Northwestern University) Department of Health Management and Policy. Associate Teaching Professor. Organization behavior, health care administration.

Warren Hilton, MA (Indiana University of Pennsylvania) Assistant Dean for Student and External Affairs. Assistant Teaching Professor. Leadership development, organizational management, health disparities training.

Mary E. Hovinga, PhD, MPH (University of Michigan) Associate Dean of Academic Affairs; Department of Epidemiology and Biostatistics. Associate Professor. Surveillance and etiology of mental retardation, environmental epidemiology, and the human health effects of heavy metals, PCBs and DDT.

Ann Klassen, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Community Health and Prevention. Chair; Associate Dean for Research. Professor. Social and geographical determinants of chronic disease disparities, cancer prevention and control, behavioral science.

Jennifer Kolker, MPH (University of Michigan) Department of Health Management and Policy. Associate Teaching Professor. Planning and policy development for health and welfare, early childhood education, epidemiological data collection and analysis, disease controls.

Stephen E. Lankenau, PhD (University of Maryland) Department of Community Health and Prevention. Associate Professor. Substance misuse, overdose prevention, high-risk youth, and mixed methods.

Brian K. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Neuroepidemiology, autism, dementia, environmental risk factors, gene-environmental interaction, propensity score methods, machine learning, stress.

Nora L. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Research Professor. Perinatal epidemiology; low birth weight; preterm birth; macrosomia; maternal and child health; second-hand smoke; environmental exposures; autism spectrum disorders; China.

Longjian Liu, MD, MSC, PhD (University of Hong Kong) Department of Epidemiology and Biostatistics. Associate Professor. Nutrition, aging, cross-cultural and racial/ethnic variation and health.

Raymond K. Lum, MPhil, MS (University of Pennsylvania) Department of Health Management and Policy. Associate Teaching Professor. Organizational learning theory, change management, systems thinking, innovation diffusion, technology transition, e-health.

Shannon Marquez, MEng, PhD (University of North Carolina Gillings School of Global Public Health) Director of Global Public Health Initiatives, Interim Associate Dean. Associate Professor. Agricultural safety, health disparities, environmental health, international health.

Yvonne Michael, ScD (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Associate Professor. Epidemiology of aging, social epidemiology, women’s health, community-based participatory research.

Jana M. Mossey, PhD, MPH, MSN (University of North Carolina) Department of Epidemiology and Biostatistics. Professor. Epidemiological methods; research design and methods including observational and clinical trials research; psychosocial aspects of health; epidemiology of aging; depression and chronic pain; sub-threshold and minor depression; pain in the elderly.

Craig J. Newschaffer, PhD (Johns Hopkins University) Chair, Department of Epidemiology and Biostatistics. Professor. Development of methods
for monitoring autism spectrum disorders prevalence; participation in the National CADDRE Study of Autism and Child Development.

Hernando Perez, PhD, MPH, CIH, CSP (Purdue University) Department of Environmental and Occupational Health. Assistant Teaching Professor. Children's environmental health, housing and health, environmental and occupational exposure assessment.

Marcia Polansky, MS, ScD, MSW (Harvard University) Department of Epidemiology and Biostatistics. Associate Professor. Biostatistics; experimental design/research methods and statistical analysis, clinical trials; asthma epidemiology and interventions; attachment theory and mothers with drug and alcohol addictions.

John A. Rich, MD, MPH (Duke University Medical School) Interim Dean, Dornsife School of Public Health: Chair, Department of Health Management and Policy. Professor. Inner-city health problems, urban violence, male health and racial disparities.

Lucy Robinson, PhD (Columbia University) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; statistical analysis; spatial statistics/epidemiology; application of statistics to behavioral, biological and medical sciences; environmental health; neurological disorders.

John Rossi, VMD, M.Bioethics (University of Pennsylvania) Department of Community Health and Prevention. Associate Professor. Bioethics and public health ethics, including moral theory, research ethics, ethics of risk & health communication, pediatric ethics, animal ethics.

Randall L. Sell, ScD (Harvard University) Department of Community Health and Prevention. Associate Professor. Demographic variables, defining and measuring sexual orientations, sampling sexual minorities for public health research.

David Barton Smith, PhD (The University of Michigan School of Public Health) Department of Health Management and Policy. Research Professor. Racial disparities in healthcare, long term care policy, health services research and program evaluation.

Loni Philip Tabb, PhD (Harvard School of Public Health) Department of Community Health and Prevention. Assistant Professor. Methods for categorical, missing and hierarchical data, spatial epidemiology/statistics.

Jennifer A. Taylor, PhD, MPH (Johns Hopkins University) Department of Environmental and Occupational Health. Associate Professor. Injury prevention and control, quality improvement, and occupational safety.

Renee M. Turchi, MD, MPH (Johns Hopkins University) Department of Community Health and Prevention. Associate Professor. Medical Home; children and youth with special health care needs; care coordination; cultural competency and access to care.

Nicole A. Vaughn, PhD (Uniformed Services University of the Health Sciences) Department of Health Management and Policy. Assistant Professor. Community-based approaches to eliminating health disparities, health care access and utilization among insured and uninsured minority groups, obesity, women's health and the influence of culture on health behaviors particularly for chronic conditions.

Augusta M. Villanueva, PhD (University of Texas at Austin) Department of Community Health and Prevention. Associate Professor. Role of race, culture, and ethnicity on health status/outcomes; community-based participatory research; immigrant communities; academic service-learning.

Seth Welles, PhD, ScD (Boston University) Department of Epidemiology and Biostatistics. Professor. Impact of HIV phenotypic and genotypic antiretroviral drug resistance on HIV disease progression and transmission; psychosocial risk for HIV infection and STDs among sexual minority adults and adolescents, and surveys of sexual minority adults at community festivals and at health-clinics to assess demographic and psychosocial determinants of sexual risk-taking and HIV/STD infections.

Yunwen Yang, PhD (University of Illinois at Urbana-Champaign) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; bayesian methods; application of statistics to behavioral, biological and medical sciences; mixed methods.

Michael Yudell, MPH, MPhil, PhD (Columbia University, City University of New York) Department of Community Health and Prevention. Associate Professor. Public health genomics; bioethics; history of public health; and addiction.

Issa Zakeri, PhD (University of Illinois and Urbana-Champaign) Department of Epidemiology and Biostatistics. Professor. Biostatistics.

Interdepartmental Faculty

Robert J. Brulle, PhD (George Washington University). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

Executive Master of Public Health

Major: Public Health
Degree Awarded: Master of Public Health (MPH)
Calendar Type: Semester
Total Credit Hours: 42.0
Classification of Instructional Programs (CIP) code: 51.2201
Standard Occupational Classification (SOC) code: 11-9111; 21-1091; 21-1094

About the Program

Designed for working professionals, the Executive Masters of Public Health (MPH) program offers a convenient class schedule in which students can earn their degree in 21 months. Whether working in public health, a related health care setting or seeking a career change, the Executive MPH program is tailored for individuals who are committed to advancing their careers and acquiring the knowledge and tools to advance to leadership roles in public health. The program is fast-paced, intensive and demanding, but builds on each individual's former education, work experience and skills. The Executive MPH program is fully accredited by the Council on Education for Public Health (CEPH).

The Executive MPH curriculum combines both on-campus coursework and online modalities. Classes meet on-campus one Friday and one Saturday per month, and utilize web-based technologies to interact with faculty and students during the weeks when not in class. Classes are taught by full-time School of Public Health faculty with active and diverse research interests as well as adjunct faculty with leadership roles as practicing public health professionals.

Like the full-time MPH program, the Executive MPH program covers the major disciplines of public health including community health and prevention, environmental and occupational health, epidemiology and
biostatistics, and health management and policy. A significant portion
of the curriculum incorporates a problem based learning (PBL) model
in which the student becomes a self-directed learner as well as a
collaborator in learning with their peers, assisted by the faculty facilitator.
The PBL model develops the students' skill sets to design and effectively
address the increasingly dynamic and evolving discipline of public health,
and prepares each individual to be an effective life-long learner.

Additional Information
For more information, about this program, contact:

Colleen Baillie
Director of Enrollment
MPH Program
cpb32@drexel.edu

William Hickey, PhD
Executive MPH Program Director
wh34@drexel.edu

Or visit the School of Public Health's Executive Master of Public Health
Degree (http://publichealth.drexel.edu/academics/degrees/executive-mph-
degree) page.

Admission Requirements
The School of Public Health seeks students with intellectual and
interpersonal competencies as well as those with potential for leadership.
The school has set a high priority on establishing a student body that is
representative of the nation’s population. We strive to recruit and to admit
applicants from underrepresented minority groups who can contribute to
the richness of our student population and to that of the nation’s public
health professionals.

While most of the students in the Executive MPH program are from the
Philadelphia area, the format of the program does not limit students from
outside the Philadelphia region from attending.

Admissions process:
• The Admissions Committee carefully reviews applications and gives
  personal essays and letters of recommendation particular attention.
• The selection process weighs prior academic and personal
  accomplishments, emphasizing demonstrated leadership.
• Diversity of background and outside interests, depth of self-appraisal,
  commitment to public heath, and working with individuals are highly
  valued.
• A minimum of 3 years of professional work experience is required.

Applicants should have:
• Satisfactorily completed an undergraduate bachelor degree program
  in an accredited US college or university, or its equivalent in another
country
• A course in Statistics is highly recommended
• Six undergraduate or graduate credits in the social or behavioral
  sciences and three in the biological sciences are preferred, but not
  required.
• Satisfactory results from one of the following taken within the past five
  years (the GRE or GMAT is preferred):
  o Graduate Record Examination (GRE)
  o Graduate Management Admission Test (GMAT)
  o Medical College Admission Test (MCAT)
  o Law School Admission Test (LSAT)
• Test of English as a Foreign Language (TOEFL) for applicants whose
  first language is not English

The Application Process also requires:
• Completion of the School's application
• A personal essay describing what you perceive to be pressing public
  health issues, why a career in the field appeals to you, and how it will
  use your strengths and commitment
• Two letters of recommendation, preferably from individuals who can
  assess the applicant's ability to handle a rigorous graduate curriculum
  (i.e., faculty, supervisor, etc.)
• Resume or CV.

Forms, details about requirements, and information about application
deadlines are all available on the Executive MPH (http://www.drexel.edu/grad/programs/pubhealth/public-health-executive) page of Drexel's
Graduate Admissions website.

Degree Requirements
The Executive Program is designed for working professionals, whether
in public health or considering a career change to public health. The
program is tailored for individuals who are committed to advancing their
careers and acquiring the knowledge and tools to advance to leadership
roles in public health.

The Executive MPH program requires a minimum of 42.0 credits. All
degree requirements must be completed within seven years of the date
of matriculation. A minimum of five consecutive academic semesters is
required for the degree. Enrollment must be continuous unless academic
leaves are granted. A minimum overall GPA of 3.0 is required for
graduation.

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PBHL 520ES</td>
<td>BIOSTATISTICS</td>
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</tr>
<tr>
<td>PBHL 530ES</td>
<td>Epidemiology</td>
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</tr>
<tr>
<td>PBHL 540ES</td>
<td>Behavioral Assessment</td>
<td>4.0</td>
</tr>
<tr>
<td>PBHL 550ES</td>
<td>Community Based Prevention Practices</td>
<td>4.0</td>
</tr>
<tr>
<td>PBHL 570ES</td>
<td>Integrated Public Health Case Analysis</td>
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</tr>
<tr>
<td>PBHL 600ES</td>
<td>Health Management and Leadership</td>
<td>4.0</td>
</tr>
<tr>
<td>PBHL 612ES</td>
<td>Program Planning &amp; Evaluation</td>
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<tr>
<td>PBHL 640ES</td>
<td>Environmental &amp; Occupational Health</td>
<td>4.0</td>
</tr>
<tr>
<td>PBHL 650ES</td>
<td>Health Policy &amp; Advocacy</td>
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Master's Project Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>PBHL 560ES</td>
<td>MPH Comm Based MP Part A</td>
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</tr>
<tr>
<td>PBHL 630ES</td>
<td>MPH Comm Based MP Part B</td>
<td>1.0</td>
</tr>
<tr>
<td>PBHL 635ES</td>
<td>MPH Comm Based MP Part C</td>
<td>2.0</td>
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Elective Courses

Students must take two of the four courses listed below:

<table>
<thead>
<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PBHL 516ES</td>
<td>Public Health History and Ethics</td>
</tr>
<tr>
<td>PBHL 602ES</td>
<td>Practicing Public Health</td>
</tr>
<tr>
<td>PBHL 699ES</td>
<td>Special Topics in PH</td>
</tr>
<tr>
<td>PBHL 855ES</td>
<td>Course PBHL 855ES Not Found</td>
</tr>
</tbody>
</table>

Total Credits: 42.0
School of Public Health Faculty

Amy Auchincloss, PhD (University of Michigan) Department of Biostatistics and Epidemiology. Assistant Professor. Environmental determinants of health and the health effects of air pollution; contribution of resources in residential environments to health behaviors, obesity, diabetes and cardiovascular disease; the use of spatial analysis methods and agent-based models.

Zekarias Berhane, PhD (University of Pittsburgh) Department of Epidemiology and Biostatistics. Assistant Research Professor. Modeling time-to-event data with single and multiple outcomes, mixed effect models and regression diagnostics.

Sandra Bloom, MD (Temple University School of Medicine) Department of Health Management and Policy. Associate Professor. Psychological trauma and organizational stress.

Jennifer Breaux, DrPh, MPH (Drexel University) Department of Community Health and Prevention; Office of Academic Affairs, Director of Undergraduate Public Health Education. Assistant Teaching Professor. Maternal and child health, community health, human rights.

Darryl R. Brown, PhD (Johns Hopkins Bloomberg School of Public Health) Department of Health Management and Policy. Associate Professor. Health care research and planning; patient outcomes and applied health economic methods.

Igor Burstyn, PhD (Utrecht University) Department of Environmental and Occupational Health. Associate Professor. Occupational and environmental epidemiology, industrial hygiene.

Carla Campbell, MD, MS (Kentucky College of Medicine; Mount Sinai School of Medicine) Department of Environmental and Occupational Health. Associate Professor. Community and environmental medicine, pediatrics, lead poisoning.


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Shannon Marquez, MEng, PhD (University of North Carolina Gillings School of Global Public Health) Director of Global Public Health Initiatives, Interim Associate Dean. Associate Professor. Agricultural safety, health disparities, environmental health, international health.

Yvonne Michael, ScD (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Associate Professor. Epidemiology of aging, social epidemiology, women's health, community-based participatory research.

Jana M. Mossey, PhD, MPH, MSN (University of North Carolina) Department of Epidemiology and Biostatistics. Professor. Epidemiological methods; research design and methods including observational and clinical trials research; psychosocial aspects of health; epidemiology of aging; depression and chronic pain; sub-threshold and minor depression; pain in the elderly.

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John A. Rich, MD, MPhil (Duke University Medical School) Interim Dean, Dornsife School of Public Health; Chair, Department of Health Management and Policy. Professor. Inner-city health problems, urban violence, male health and racial disparities.

Lucy Robinson, PhD (Columbia University) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; statistical analysis; spatial statistics/epidemiology; application of statistics to behavioral, biological and medical sciences; environmental health; neurological disorders.

John Rossi, VMD, M.Bioethics (University of Pennsylvania) Department of Community Health and Prevention. Assistant Professor. Bioethics and public health ethics, including moral theory, research ethics, ethics of risk & health communication, pediatric ethics, animal ethics.

Randall L. Sell, ScD (Harvard University) Department of Community Health and Prevention. Associate Professor. Demographic variables, defining and measuring sexual orientations, sampling sexual minorities for public health research.

David Barton Smith, PhD (The University of Michigan School of Public Health) Department of Health Management and Policy. Research Professor. Racial disparities in healthcare, long term care policy, health services research and program evaluation.

Lon Philip Tabb, PhD (Harvard School of Public Health) Department of Community Health and Prevention. Assistant Professor. Methods for categorical, missing and hierarchical data; spatial epidemiology/statistics.

Jennifer A. Taylor, PhD, MPH (Johns Hopkins University) Department of Environmental and Occupational Health. Associate Professor. Injury prevention and control; quality improvement, and occupational safety.

Renee M. Turchi, MD, MPH (Johns Hopkins University) Department of Community Health and Prevention. Associate Professor. Medical Home; children and youth with special health care needs; care coordination; cultural competency and access to care.

Nicole A. Vaughn, PhD (Uniformed Services University of the Health Sciences) Department of Health Management and Policy. Assistant Professor. Community-based approaches to eliminating health disparities, health care access and utilization among insured and uninsured minority groups, obesity, women's health and the influence of culture on health behaviors particularly for chronic conditions.

Augusta M. Villanueva, PhD (University of Texas at Austin) Department of Community Health and Prevention. Associate Professor. Role of race, culture, and ethnicity on health status/outcomes; community-based participatory research; immigrant communities; academic service-learning.

Seth Welles, PhD, ScD (Boston University) Department of Epidemiology and Biostatistics. Professor. Impact of HIV phenotypic and genotypic antiretroviral drug resistance on HIV disease progression and transmission; psychosocial risk for HIV infection and STDs among sexual minority adults and adolescents, and surveys of sexual minority adults at community festivals and at health-clinics to assess demographic and psychosocial determinants of sexual risk-taking and HIV/STD infections.

Yunwen Yang, PhD (University of Illinois at Urbana-Champaign) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; bayesian methods; application of statistics to behavioral, biological and medical sciences; mixed methods.

Michael Yudell, MPH, MPhil, PhD (Columbia University, City University of New York) Department of Community Health and Prevention. Associate Professor. Public health genomics; bioethics; history of public health; and addiction.

Issa Zakeri, PhD (University of Illinois and Urbana-Champaign) Department of Epidemiology and Biostatistics. Professor. Biostatistics.

**Interdepartmental Faculty**

Robert J. Brulle, PhD (George Washington University). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.
Health Management and Policy

Major: Health Management and Policy
Degree Awarded: Master of Public Health (MPH)
Calendar Type: Quarter
Total Credit Hours: 64.0
Classification of Instructional Programs (CIP) code: 51.0701
Standard Occupational Classification (SOC) code: 11-9111

About the Program

The Master of Public Health program is intended for individuals interested in careers as community educators; population health planners; policy analysts, evaluators, researchers; and managers of health service delivery organizations and systems, managed-care programs, and other population-based organizations.

The program is interdisciplinary and requires students to complete a community-based master's project. It prepares students to enter an array of fields related to public health or a range of doctoral programs. Drexel University’s Master of Public Health (MPH) program provides practical skills and experience, with a unique focus on relevant community issues, challenges, and priorities. The 64.0 quarter-credit program is interdisciplinary and requires students to complete a comprehensive, community-based master’s project. The program prepares students to enter an array of fields related to public health or a range of doctoral programs.

Program Highlights

The first year of the program covers the five core disciplines offered within the context of culture and community. These include environmental and occupational health; health care systems organization, management, and policy; social and behavioral sciences for population health; epidemiology; biostatistics. Throughout the program, group case discussion sessions, case-related activities and didactic sessions are integrated into the experience.

These include:
• Skill development labs and workshops (year two)
• Public health grand rounds (for all faculty, students, and community partners) provide access to scholars and their cutting-edge research and initiatives in public health

Curriculum

The MPH full-time educational program is structured on a quarter-term basis, with a total of 64.0 credit hours required. This is generally taken as a two-year program; all coursework must be completed within five years of the date of matriculation for the full-time program.

The second-year curriculum is composed of four required courses, three elective courses, and the Community-Based Master’s Project (CBMP), the culminating experience required of full-time Drexel MPH students. Students spend approximately 12 hours each week working on a community-oriented, health-related project, often working as an integral part of a community-based organization. This can be in the areas of government, healthcare and social services, among others.

In preparation for developing their final paper, students are required to identify an issue or problem of significance to the target community or agency, synthesize the literature, develop an approach or methodology to address the issue and either implement and test the validity of a proposed approach or set out a detailed prescription for addressing the problem.

Students may also work with faculty in specific research areas.

Joint Doctor of Medicine and Master of Public Health Degree (MD/MPH)

Students wishing to complete a course of study earning the joint MD/MPH degree can complete such a program in 5 years. They must apply for the joint program and be accepted by both the Drexel University College of Medicine and the School of Public Health. Students in this program have enriched public health content in their first two years of medical school and spend their third year of study full time in the School of Public Health. Students are able to enter clinical rotations and residency selection having obtained the MPH degree.

Additional Information

For additional information about this program, contact:

Stephanie Johnson
snj22@drexel.edu
267.359.6065

Program Requirements

Foundation Courses 25.0

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
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<tbody>
<tr>
<td>PBHL 516</td>
<td>Introduction to Public Health</td>
</tr>
<tr>
<td>PBHL 520</td>
<td>Principles of Biostatistics</td>
</tr>
<tr>
<td>PBHL 530</td>
<td>Principles of Epidemiology</td>
</tr>
<tr>
<td>PBHL 540</td>
<td>Prevention Principles and Practices</td>
</tr>
<tr>
<td>PBHL 600</td>
<td>Management, Leadership, Assurance and Health</td>
</tr>
<tr>
<td>PBHL 640</td>
<td>Environmental Health</td>
</tr>
<tr>
<td>PBHL 650</td>
<td>Public Policy and Advocacy</td>
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Required Community-Based Master's Project Courses 12.0

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<th>Course Code</th>
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<tbody>
<tr>
<td>PBHL 680</td>
<td>Community Based Master's Project I</td>
</tr>
<tr>
<td>PBHL 681</td>
<td>Community Based Master's Project II</td>
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<tr>
<td>PBHL 682</td>
<td>Community Based Master's Project III</td>
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Required Courses 12.0

Students must choose two courses from each of the following two categories of courses:

Macro Theory and Practice

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<tr>
<td>PBHL 607</td>
<td>Evolution of United States Health Policy</td>
</tr>
<tr>
<td>PBHL 609</td>
<td>Issues in United States Health Policy</td>
</tr>
<tr>
<td>PBHL 618</td>
<td>Historical and Contemporary Developments in Social Justice</td>
</tr>
<tr>
<td>PBHL 651</td>
<td>Legal Aspects of Public Health</td>
</tr>
<tr>
<td>PBHL 852</td>
<td>Health Economics I</td>
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Micro Theory and Practice

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<tr>
<td>PBHL 601</td>
<td>Management of Healthcare Outcomes</td>
</tr>
<tr>
<td>PBHL 602</td>
<td>Public Health Practice</td>
</tr>
<tr>
<td>PBHL 603</td>
<td>Advanced Healthcare Financial Management</td>
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<tr>
<td>PBHL 605</td>
<td>Change Management in Public Health</td>
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Electives 15.0

<table>
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<th>Course Code</th>
<th>Course Title</th>
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</table>
Students are required to successfully complete five electives (15.0 credits). These courses may be within the School of Public Health, or from other academic units within the University. Students must meet with their Academic Advisor in selecting their electives. It is the responsibility of the student to determine course restrictions and the registration process for campus electives taken at the Main Campus.

The following is a sample of some of the School of Public Health electives offered by department:

### Biostatistics Electives
- **PBHL 621** Intermediate Biostatistics II
- **PBHL 622** Statistical Inference I
- **PBHL 628** Survival Data Analysis
- **PBHL 629** Design & Analysis of Clinical Trials
- **PBHL 631** Applied Multivariate Analysis
- **PBHL 657** Data Management
- **PBHL 683** Advanced Clinical Trials & Experiment Design
- **PBHL 684** Statistical Inference II
- **PBHL 686** Advanced Statistical Computing
- **PBHL 691** Pathophysiology Basis of Epidemiologic Research
- **PBHL 692** Public Health Obesity Prevention Research
- **PBHL 693** Applied Bayesian Analysis
- **PBHL 696** Nonparametric and Semiparametric Models
- **PBHL 699** Biostatistical Computing with Stata

### Community Health and Prevention Electives
*800 level courses may require professor's permission*
- **PBHL 674** Studying Rare or Hidden Groups
- **PBHL 675** LGBT Health Disparities
- **PBHL 676** Intersectional Perspectives
- **PBHL 678** Drug Use and Public Health
- **PBHL 801** Theory & Practice of Community Health & Preventions I
- **PBHL 803** Theory & Practice of Community Health and Preventions II
- **PBHL 804** Research Methods for Community Health and Prevention
- **PBHL 805** Qualitative Research in Community Health
- **PBHL 808** Community Program Evaluation
- **PBHL 810** Practicum in Community Health and Prevention
- **PBHL 814** Community Based Participatory Research
- **PBHL 823** Faith, Religion, Spirituality, and Health
- **PBHL 824** Public Health Ethics
- **PBHL 827** Advanced Topics in Qualitative Analysis

### Environmental and Occupational Health Electives
- **PBHL 560** Overview of Issues in Global Health
- **PBHL 642** Healthy Housing & Built Environment
- **PBHL 645** Exposure Assessment
- **PBHL 646** Environmental Health in Vulnerable Populations
- **PBHL 648** Public Health and Disaster Preparedness
- **PBHL 649** Occupational and Environmental Cancers
- **PBHL 663** Injury Prevention and Control
- **PBHL 664** Safety in Healthcare

### Epidemiology Electives
- **PBHL 532** Autism as a Public Health Challenge
- **PBHL 633** Epidemiology of Cancer
- **PBHL 635** Social Epidemiology and Psychiatric Epidemiology
- **PBHL 636** Infectious Disease Epidemiology
- **PBHL 638** Perinatal Epidemiology
- **PBHL 639** Cardiovascular Disease Epidemiology & Prevention
- **PBHL 655** Making Sense of Data
- **PBHL 656** Pharmacoeconomics
- **PBHL 691** Pathophysiology Basis of Epidemiologic Research
- **PBHL 692** Public Health Obesity Prevention Research

### Health Management and Policy Electives
*800 level courses may require professor's permission*
- **PBHL 604** Public Health Advocacy and Activism
- **PBHL 606** Vaccines and Public Health Policy
- **PBHL 610** Active Issues in Public Health
- **PBHL 612** Public Health Funding & Program Development
- **PBHL 613** Seminar in Fire Arms and Public Health
- **PBHL 614** Coordinating a Population’s Care
- **PBHL 615** Perspectives on Gender, Race, Ethnicity, and Social Class
- **PBHL 616** Public Health Surveillance: Aligning Data and Policy Use
- **PBHL 617** Health Disparities: Systemic, Structural, Environmental & Economic
- **PBHL 618** Historical and Contemporary Developments in Social Justice
- **PBHL 652** Public Health Leadership
- **PBHL 602** Health and Human Rights
- **PBHL 851** Health Systems Policy Analysis
- **PBHL 853** Health Economics II
- **PBHL 854** The Politics of Food & Gender
- **PBHL 856** Violence, Trauma and Adversity in Public Health

**Total Credits: 64.0**

### School of Public Health Faculty

Amy Auchenilless, PhD (University of Michigan) Department of Biostatistics and Epidemiology. Assistant Professor. Environmental determinants of health and the health effects of air pollution; contribution of resources in residential environments to health behaviors, obesity, diabetes and cardiovascular disease; the use of spatial analysis methods and agent-based mode

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John A. Rich, MD, MPH (Duke University Medical School) Interim Dean, Dornsife School of Public Health; Chair, Department of Health Management and Policy. Professor. Inner-city health problems, urban violence, male health and racial disparities.

Lucy Robinson, PhD (Columbia University) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; statistical analysis; spatial statistics/epidemiology; application of statistics to behavioral, biological and medical sciences; environmental health; neurological disorders.

John Rossi, VMD, MBioethics (University of Pennsylvania) Department of Community Health and Prevention. Assistant Professor. Bioethics and public health ethics, including moral theory, research ethics, ethics of risk & health communication, pediatric ethics, animal ethics.

Randall L. Sell, ScD (Harvard University) Department of Community Health and Prevention. Associate Professor. Demographic variables, defining and measuring sexual orientations, sampling sexual minorities for public health research.

David Barton Smith, PhD (The University of Michigan School of Public Health) Department of Health Management and Policy. Research Professor. Racial disparities in healthcare, long term care policy, health services research and program evaluation.

Loni Philip Tabb, PhD (Harvard School of Public Health) Department of Community Health and Prevention. Assistant Professor. Methods for categorical, missing and hierarchical data, spatial epidemiology/statistics.

Jennifer A. Taylor, PhD, MPH (Johns Hopkins University) Department of Environmental and Occupational Health. Associate Professor. Injury prevention and control, quality improvement, and occupational safety.

Renée M. Turchi, MD, MPH (Johns Hopkins University) Department of Community Health and Prevention. Associate Professor. Medical Home; children and youth with special health care needs; care coordination; cultural competency and access to care.

Nicole A. Vaughn, PhD (Uniformed Services University of the Health Sciences) Department of Health Management and Policy. Assistant Professor. Community-based approaches to eliminating health disparities, health care access and utilization among insured and uninsured minority groups, obesity, women's health and the influence of culture on health behaviors particularly for chronic conditions.

Augusta M. Villanueva, PhD (University of Texas at Austin) Department of Community Health and Prevention. Associate Professor. Role of race, culture, and ethnicity on health status/outcomes; community-based participatory research; immigrant communities; academic service-learning.

Seth Welles, PhD, ScD (Boston University) Department of Epidemiology and Biostatistics. Professor. Impact of HIV phenotypic and genotypic antiretroviral drug resistance on HIV disease progression and transmission; psychosocial risk for HIV infection and STDs among sexual minority adults and adolescents, and surveys of sexual minority adults at community festivals and at health-clinics to assess demographic and psychosocial determinants of sexual risk-taking and HIV/STD infections.

Yunwen Yang, PhD (University of Illinois at Urbana-Champaign) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; bayesian methods; application of statistics to behavioral, biological and medical sciences; mixed methods.

Michael Yudell, MPH, MPhil (Columbia University, City University of New York) Department of Community Health and Prevention. Associate Professor. Public health genomics; bioethics; history of public health; and addiction.

Issa Zakeri, PhD (University of Illinois and Urbana-Champaign) Department of Epidemiology and Biostatistics. Professor. Biostatistics.

Interdepartmental Faculty

Robert J. Brulle, PhD (George Washington University). Professor. Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.

Public Health

Major: Public Health

Degree Awarded: Master of Public Health (MPH)

Calendar Type: Quarter

Total Credit Hours: 64.0

Classification of Instructional Programs (CIP) code: 51.2201

Standard Occupational Classification (SOC) code: 11-9111; 21-1091; 21-1094

About the Program

The Master of Public Health program is intended for individuals interested in careers as community educators; population health planners; policy analysts, evaluators, researchers; and managers of health service delivery organizations and systems, managed-care programs, and other population-based organizations.

The program is interdisciplinary and requires students to complete a community-based master’s project. It prepares students to enter an array of fields related to public health or a range of doctoral programs.

Drexel University’s Master of Public Health (MPH) program provides practical skills and experience, with a unique focus on relevant community issues, challenges, and priorities.

The 64.0 quarter-credit program is interdisciplinary and requires students to complete a comprehensive, community-based master’s project. The
program prepares students to enter an array of fields related to public health or a range of doctoral programs.

**Program Highlights**

The first year of the program covers the five core disciplines offered within the context of culture and community. These include environmental and occupational health; health care systems organization, management, and policy; social and behavioral sciences for population health; epidemiology; biostatistics. During the second year of the program, students select one of five following concentrations from the school’s four academic departments:

- Biostatistics
- Epidemiology
- Community Health and Prevention
- Environmental and Occupational Health
- Health Management and Policy

Throughout the program, group case discussion sessions, case-related activities and didactic sessions are integrated into the experience. These include:

- Skill development labs and workshops (year two);
- Public health grand rounds (for all faculty, students, and community partners) provide access to scholars and their cutting-edge research and initiatives in public health.

**Curriculum**

The MPH full-time educational program is structured on a quarter-term basis, with a total 64.0 credit hours required. This is generally taken as a two-year program; all coursework must be completed within seven years of the date of matriculation for the full-time program. The second-year curriculum is composed of four courses in the chosen area of concentration (Biostatistics; Epidemiology; Community Health and Prevention; Environmental and Occupational Health; Health Management and Policy), three elective courses, and the Community-Based Master’s Project (CBMP), the culminating experience required of full-time Drexel MPH students. Students spend approximately 12 hours each week working on a community-oriented, health-related project, often working as an integral part of a community-based organization. This can be in the areas of government, healthcare and social services, among others. In preparation for developing their final paper, students are required to identify an issue or problem of significance to the target community or agency, synthesize the literature, develop an approach or methodology to address the issue, and either implement and test the validity of a proposed approach or set out a detailed prescription for addressing the problem. Students may also work with faculty in specific research areas.

**Joint Doctor of Medicine and Master of Public Health Degree (MD/MPH)**

Students wishing to complete a course of study earning the joint MD/MPH degree can complete such a program in 5 years. They must apply for the joint program and be accepted by both the Drexel University School of Medicine and the School of Public Health.

Students in this program have enriched public health content in their first two years of medical school and spend their third year of study full time in the School of Public Health. Students are able to enter clinical rotations and residency selection having obtained the MPH degree.

**Additional Information**

For additional information about this program, contact:

Stephanie Johnson
snj22@drexel.edu
267.359.6065

**Admission Requirements**

The School of Public Health seeks students with intellectual and interpersonal competencies as well as those with potential for leadership. The school has set a high priority on establishing a student body that is representative of the nation’s population. We strive to recruit and to admit applicants from underrepresented minority groups who can contribute to the richness of our student population and to that of the nation’s public health professionals.

**Admissions Process**

- The Admissions Committee carefully reviews applications and gives personal essays and letters of recommendation particular attention.
- The selection process weighs prior academic and personal accomplishments, emphasizing demonstrated leadership.
- Diversity of background and outside interests, depth of self-appraisal, commitment to public health, and working with individuals are highly valued.
- Prior work experience in a field related to public health is highly recommended.

Applicants should have:

- Satisfactorily completed an undergraduate bachelor degree program in an accredited US college or university, or its equivalent in another country
- A course in Statistics is highly recommended
- Six undergraduate or graduate credits in the social or behavioral sciences and three in the biological sciences are preferred, but not required
- Satisfactory results from one of the following taken within the past five years (the GRE or GMAT is preferred):
  - Graduate Record Examination (GRE)
  - Graduate Management Admission Test (GMAT)
  - Medical College Admission Test (MCAT)
  - Law School Admission Test (LSAT)
- Test of English as a Foreign Language (TOEFL) for applicants whose first language is not English

Please note: Drexel University’s School code for submitting GRE scores is 2194.

The Application Process also requires:

- A personal essay describing what you perceive to be pressing public health issues, why a career in the field appeals to you, and how it will use your strengths and commitment
- Three letters of recommendation
- Resume or CV
Applicants to the joint MD/MPH program must be accepted to both the Drexel College of Medicine (http://www.drexelmed.edu) and the School of Public Health (http://publichealth.drexel.edu).

## Degree Requirements
The full-time educational program is structured on a quarter term basis, with a total credit hour requirement of 64.0 quarter credit hours. This is generally taken as a two-year program; all course work must be completed within four years of the date of matriculation for the full-time program.

### Required core courses 25.0
- PBHL 516 Introduction to Public Health
- PBHL 520 Principles of Biostatistics
- PBHL 530 Principles of Epidemiology
- PBHL 540 Prevention Principles and Practices
- PBHL 600 Management, Leadership, Assurance and Health Services
- PBHL 640 Environmental Health
- PBHL 650 Public Policy and Advocacy

### Required community-based Master’s project courses 12.0
- PBHL 680 Community Based Master’s Project I
- PBHL 681 Community Based Master’s Project II
- PBHL 682 Community Based Master’s Project III

### Required Courses by Concentration 12.0
Near the end of their first year, students select a concentration area and complete four courses for a total of 12.0 credits.

#### Biostatistics
- PBHL 620 Intermediate Biostatistics I
- PBHL 621 Intermediate Biostatistics II
- PBHL 622 Statistical Inference I
- PBHL 630 Intermediate Epidemiology

#### Community Health and Prevention
- PBHL 670 Multicultural Competence in Community Health and Prevention
- PBHL 671 Theory and Practice of Community Health and Prevention
- PBHL 672 Theory and Practice in Health Communication
- PBHL 673 Outcomes Assessment of Community Health and Prevention

#### Environmental and Occupational Health
- PBHL 641 Environmental Hazard Assessment
- PBHL 643 Environmental and Occupational Toxicology
- PBHL 647 Occupational and Environmental Epidemiology
- PBHL 662 Environmental and Occupational Policy

#### Epidemiology
- PBHL 620 Intermediate Biostatistics I
- PBHL 630 Intermediate Epidemiology
- PBHL 632 Applied Survey Research in Epidemiology
- PBHL 634 Epidemiology for Public Health Practice

#### Health Management and Policy
Students in this concentration must choose two courses from each of the following two categories of courses:
- Macro Theory and Practice

### Electives 15.0
Students are required to successfully complete five electives (15.0 credits). These courses may be within the School of Public Health, or from other academic units within the University. Students must meet with their Academic Advisor in selecting their electives. It is the responsibility of the student to determine course restrictions and the registration process for campus electives taken at the Main Campus. The following is a sample of some of the School of Public Health electives offered by department:

#### Biostatistics Electives
- PBHL 623 Introduction to Statistical Computing
- PBHL 628 Survival Data Analysis
- PBHL 629 Design & Analysis of Clinical Trials
- PBHL 657 Data Management
- PBHL 684 Statistical Inference II
- PBHL 686 Advanced Statistical Computing

#### Community Health and Prevention Electives
- PBHL 805 Qualitative Research in Community Health
- PBHL 809 Community Health Policy Development and Analysis

#### Environmental and Occupational Health Electives
- PBHL 560 Overview of Issues in Global Health
- PBHL 645 Exposure Assessment
- PBHL 648 Public Health and Disaster Preparedness
- PBHL 649 Occupational and Environmental Cancers
- PBHL 661 Occupational and Environmental Diseases

#### Epidemiology Electives
- PBHL 532 Autism as a Public Health Challenge
- PBHL 633 Epidemiology of Cancer
- PBHL 636 Infectious Disease Epidemiology
- PBHL 638 Perinatal Epidemiology
- PBHL 639 Cardiovascular Disease Epidemiology & Prevention
- PBHL 655 Making Sense of Data
- PBHL 656 Pharmacoepidemiology

#### Health Management and Policy Electives
- COM 675 Grant Writing for the Arts and Humanities
- PBHL 602 Public Health Practice
- PBHL 604 Public Health Advocacy and Activism
- PBHL 606 Vaccines and Public Health Policy
- PBHL 607 Evolution of United States Health Policy
- PBHL 615 Perspectives on Gender, Race, Ethnicity, and Social Class
- PBHL 617 Health Disparities: Systemic, Structural, Environmental & Economic
- PBHL 618 Historical and Contemporary Developments in Social Justice
<table>
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<tr>
<th>Course Code</th>
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<tbody>
<tr>
<td>PBHL 652</td>
<td>Public Health Leadership</td>
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<td>PBHL 802</td>
<td>Health and Human Rights</td>
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<tr>
<td>PBHL 817</td>
<td>Economic Evaluation Methods for Community Health and Prevention</td>
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<tr>
<td>PBHL 851</td>
<td>Health Systems Policy Analysis</td>
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<tr>
<td>PBHL 852</td>
<td>Health Economics I</td>
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<tr>
<td>PBHL 854</td>
<td>The Politics of Food &amp; Gender</td>
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<tr>
<td>PBHL 856</td>
<td>Violence, Trauma and Adversity in Public Health</td>
</tr>
</tbody>
</table>

**Total Credits: 64.0**

### School of Public Health Faculty

Amy Aushincloss, PhD (University of Michigan) Department of Biostatistics and Epidemiology. Assistant Professor. Environmental determinants of health and the health effects of air pollution; contribution of resources in residential environments to health behaviors, obesity, diabetes and cardiovascular disease; the use of spatial analysis methods and agent-based mode.

Zekarias Berhane, PhD (University of Pittsburgh) Department of Epidemiology and Biostatistics. Assistant Research Professor. Modeling time-to-event data with single and multiple outcomes, mixed effect models and regression diagnostics.

Sandra Bloom, MD (Temple University School of Medicine) Department of Health Management and Policy. Associate Professor. Psychological trauma and organizational stress.

Jennifer Breaux, DrPh, MPH (Drexel School of Public Health) Department of Community Health and Prevention; Office of Academic Affairs, Director of Undergraduate Public Health Education. Assistant Teaching Professor. Maternal and child health, community health, human rights.

Darryl R. Brown, PhD (Johns Hopkins Bloomberg School of Public Health) Department of Health Management and Policy. Assistant Professor. Health care research and planning; patient outcomes and applied health economic methods.

Igor Burstyn, PhD (Utrecht University) Department of Environmental and Occupational Health. Associate Professor. Occupational and environmental epidemiology, industrial hygiene.

Carla Campbell, MD, MS (Kentucky College of Medicine; Mount Sinai School of Medicine) Department of Environmental and Occupational Health. Associate Professor. Community and environmental medicine, pediatrics, lead poisoning.


Mariana Chilton, PhD, MPH (University of Pennsylvania) Department of Health Management and Policy. Associate Professor. Human rights and health; race, ethnicity and poverty; nutrition and chronic disease; ethnography and participatory research; complementary and alternative medicine.

Curtis E. Cummings, MD, MPH (Jefferson Medical College) Department of Environmental and Occupational Health. Associate Teaching Professor. Occupational medicine, radiology, chemical and radiation toxicity, Medical Corps, US Navy (Ret.).

Nancy Epstein, MPH (University of North Carolina) Department of Community Health and Prevention. Associate Teaching Professor. Healthcare for underserved communities, health education and coalition building, health and disability policy, oral health, faith and health.

Alison A. Evans, Sc D (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Epidemiology studies of hepatitis B infection and its complications; prevention of liver cancer in East Asian populations in the Delaware Valley.

Robert I. Field, PhD, JD, MPH (Boston University; Columbia University School of Law; Harvard University School of Public Health) Joint Appointment between Dornsife School of Public Health and Earle Mack School of Law. Professor. Health law and public health; ethical issues in managed care, public policy and legal facets of health care reform and genetic screening.

Janet Fleetwood, PhD (University of Southern California, School of Philosophy) Department of Community Health and Prevention; Vice Provost for Strategic Development & Initiatives. Professor. Higher education strategy planning, faculty development and equity, bioethics.

Arthur L. Frank, MD, PhD (Mount Sinai School Medicine City University of New York) Chair, Department of Environmental and Occupational Health. Professor. Environmental and occupational health, agricultural safety and health, pneumoconiosis, occupational toxicology, environmental pollution.

Dennis Gallagher, MA (University of Pittsburgh) Department of Health Management and Policy. Associate Professor. Health policy, Medicare/Medicaid/SCHIP, health care access for the uninsured, health system transformation.

Maria Gold, MD (University of Medicine and Dentistry-New Jersey Medical School). Professor. Design of HIV/AIDS care systems, treatment protocols, resource utilization, and epidemiology; CQI, managed care and systems of health care, health administration, behavioral health care and substance abuse treatment systems.

Edward J. Gracely, PhD (Temple University) Department of Epidemiology and Biostatistics. Associate Professor. Statistics, experimental design/ research methods and statistical analysis, clinical trials.

William J. Hickey, PhD (Northwestern University) Department of Health Management and Policy. Associate Teaching Professor. Organization behavior, health care administration.

Warren Hilton, MA (Indiana University of Pennsylvania) Assistant Dean for Student and External Affairs. Assistant Teaching Professor. Leadership development, organizational management, health disparities training.

Mary E. Hovinga, PhD, MPH (University of Michigan) Associate Dean of Academic Affairs: Department of Epidemiology and Biostatistics. Associate Professor. Surveillance and etiology of mental retardation, environmental epidemiology, and the human health effects of heavy metals, PCBs and DDT.

Ann Klassen, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Community Health and Prevention, Chair; Associate Dean for Research. Professor. Social and geographical determinants of chronic disease disparities, cancer prevention and control, behavioral science.

Jennifer Kolker, MPH (University of Michigan) Department of Health Management and Policy. Associate Teaching Professor. Planning and
policy development for health and welfare, early childhood education, epidemiological data collection and analysis, disease controls.

Stephen E. Lankenau, PhD (University of Maryland) Department of Community Health and Prevention. Associate Professor. Substance misuse, overdose prevention, high-risk youth, and mixed methods.

Brian K. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Professor. Neuroepidemiology, autism, dementia, environmental risk factors, gene-environmental interaction, propensity score methods, machine learning, stress.

Nora L. Lee, PhD (Johns Hopkins, Bloomberg School of Public Health) Department of Epidemiology and Biostatistics. Assistant Research Professor. Perinatal epidemiology; low birth weight; preterm birth; macrosomia; maternal and child health; second-hand smoke; environmental exposures; autism spectrum disorders; China.

Longjian Liu, MD, MSC, PhD (University of Hong Kong) Department of Epidemiology and Biostatistics. Associate Professor. Nutrition, aging, cross-cultural and racial/ethnic variation and health.


Shannon Marquez, MEng, PhD (University of North Carolina Gillings School of Global Public Health) Director of Global Public Health Initiatives, Interim Associate Dean. Associate Professor. Agricultural safety, health disparities, environmental health, international health.

Yvonne Michael, ScD (Harvard School of Public Health) Department of Epidemiology and Biostatistics. Associate Professor. Epidemiology of aging, social epidemiology, women's health, community-based participatory research.

Jana M. Mossey, PhD, MPH, MSN (University of North Carolina) Department of Epidemiology and Biostatistics. Professor. Epidemiological methods; research design and methods including observational and clinical trials research; psychosocial aspects of health; epidemiology of aging; depression and chronic pain; sub-threshold and minor depression; pain in the elderly.

Craig J. Newshaffer, PhD (Johns Hopkins University) Chair, Department of Epidemiology and Biostatistics. Professor. Development of methods for monitoring autism spectrum disorders prevalence; participation in the National CADDRE Study of Autism and Child Development.

Hernando Perez, PhD, MPH, CIH, CSP (Purdue University) Department of Environmental and Occupational Health. Assistant Teaching Professor. Children’s environmental health, housing and health, environmental and occupational exposure assessment.

Marcia Polansky, MS, ScD, MSW (Harvard University) Department of Epidemiology and Biostatistics. Associate Professor. Biostatistics; experimental design/research methods and statistical analysis, clinical trials; asthma epidemiology and interventions; attachment theory and mothers with drug and alcohol addictions.

John A. Rich, MD, MPH (Duke University Medical School) Interim Dean, Dornsife School of Public Health; Chair, Department of Health Management and Policy. Professor. Inner-city health problems, urban violence, male health and racial disparities.

Lucy Robinson, PhD (Columbia University) Department of Epidemiology and Biostatistics. Assistant Professor. Statistics; statistical analysis; spatial statistics/epidemiology; application of statistics to behavioral, biological and medical sciences; environmental health; neurological disorders.

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Jennifer A. Taylor, PhD, MPH (Johns Hopkins University) Department of Environmental and Occupational Health. Associate Professor. Injury prevention and control, quality improvement, and occupational safety.

Renee M. Turchi, MD, MPH (Johns Hopkins University) Department of Community Health and Prevention. Associate Professor. Medical Home; children and youth with special health care needs; care coordination; cultural competency and access to care.

Nicole A. Vaughn, PhD (Uniformed Services University of the Health Sciences) Department of Health Management and Policy. Assistant Professor. Community-based approaches to eliminating health disparities, health care access and utilization among insured and uninsured minority groups, obesity, women's health and the influence of culture on health behaviors particularly for chronic conditions.

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Seth Welles, PhD, ScD (Boston University) Department of Epidemiology and Biostatistics. Professor. Impact of HIV phenotypic and genotypic antiretroviral drug resistance on HIV disease progression and transmission; psychosocial risk for HIV infection and STDs among sexual minority adults and adolescents. and surveys of sexual minority adults at community festivals and at health-clinics to assess demographic and psychosocial determinants of sexual risk-taking and HIV/STD infections.

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Michael Yudell, MPH, MPhil, PhD (Columbia University, City University of New York) Department of Community Health and Prevention. Associate Professor. Health services research, general public health, operational research, demography, genomics.
Professor. Public health genomics; bioethics; history of public health; and addiction.

Issa Zakeri, PhD (University of Illinois and Urbana-Champaign)
Department of Epidemiology and Biostatistics. Professor. Biostatistics.

**Interdepartmental Faculty**

Robert J. Brulle, PhD (George Washington University). Professor.
Environmental policy and politics, critical theory, marine risk, social movements, environmental sociology.
Thomas R. Kline School of Law

The Thomas R. Kline School of Law (http://www.drexel.edu/law) was established in 2006, and was built on the strengths of Drexel University, including experiential education and the fields of engineering, science, business, and health care.

The School offers the Juris Doctor (JD) degree, which has been designed to prepare law students for the challenges of 21st-century practice. Students can elect to fulfill concentrations in business and entrepreneurship law, health law, intellectual property law, and criminal law. The School also offers a Master of Legal Studies (MLS) program for individuals in other disciplines and professions who would benefit from focused legal knowledge in their field.

Educational Objectives

The educational objectives of the Thomas R. Kline School of Law include knowledge of the law, training in practical skills, and commitment to professionalism. The Juris Doctor (JD) degree program offers a standard law school curriculum, to ensure that its graduates are well-equipped to pass the bar examination upon graduation and to be competent legal professionals, regardless of their particular practice areas. Students may complete the JD on a full-time basis in either two or three years.

The Master of Legal Studies (MLS) program and associated certificates, designed for individuals who are not seeking to become attorneys, are intended to develop and improve career-related skills through the study of the legal system, legal writing, law, regulation, and policy.

Accreditation

The Juris Doctor program at the Thomas R. Kline School of Law at Drexel University is fully accredited by the American Bar Association (ABA). The ABA does not offer accreditation to non-JD programs, but has acquiesced to the Master of Legal Studies and certificate programs offered by the Thomas R. Kline School of Law.

Majors

- American Legal Practice (LLM) (p. 442)
- Juris Doctor (JD) (p. 445)
- Legal Studies (MLS) (p. 444)
- Trial Advocacy and Dispute Resolution (LLM) (p. 446)

Certificates

- Criminal Law (p. 442)
- Health Care Compliance (p. 442)
- Human Resources Compliance (p. 443)
- NCAA Compliance (p. 443)

Admissions Requirements

Admission to the Thomas R. Kline School of Law is determined using a variety of factors evaluated by the law admissions committee. For Juris Doctor (JD) candidates, the committee evaluates the student’s LSAT score, academic record (including graduate degrees), work and volunteer experience, and personal background.

To apply, prospective JD students submit the following:

- a resume - describing employment history, including part-time and summer employment.
- a personal statement - essay discussing motivation for attending law school and how the Thomas R. Kline School of Law will help the applicant achieve his or her goals.
- LSDAS registration - all applicants, including those educated abroad, are required to register with the Law School Data Assembly Service (LSDAS). The LSDAS will provide Drexel University with a report containing information important in the admission process.

Visit the Law School Admission Council Website at www.lsac.org (http://www.lsac.org) for more information and to register.

The report includes an undergraduate academic summary; undergraduate, graduate and law/professional school transcripts; LSAT scores; and letters of recommendation (at least two) processed by the Law School Admission Council (LSAC).

To access the online application (http://drexel.edu/law/admissions/apply) or for additional guidelines on how to apply, visit the Thomas R. Kline School of Law (http://www.drexel.edu/law) website.

Students who are interested in the Master of Legal Studies or Certificate programs should visit www.drexel.com (http://www.drexel.com) to apply through Drexel University Online.

Facilities

Located in the heart of the University’s main campus in University City, the Thomas R. Kline School of Law (http://www.drexel.edu/law) is in a 57,254 square foot facility that includes:

- a 2-story atrium and balcony area for meetings, receptions and casual conversation
- two large classrooms, seating 72
- one moot courtroom, seating 65
- one medium classroom, seating 55
- two classrooms, seating 32
- two seminar rooms
- one classroom, seating 18
- thirty-seven offices for full-time faculty, plus 2 offices for adjunct professors
- office space for student organizations, Trial Team, Moot Court, Law Review and in-house clinics
- the Legal Research Center (http://www.earlemacklaw.drexel.edu/lrc), one-floor library with 14,500 linear feet of shelving
- quiet study areas and group study rooms within the library

Additionally, the Thomas R. Kline School of Law utilizes space in the Dornsife Center for Neighborhood Partnerships and the Papadakis Integrated Sciences Building. The entire area shares Drexel's campus-wide wireless access to the internet, and all classrooms include data ports for each student and high-tech audio/visual resources. The law building is located on Market Street, between 33rd and 34th Streets. It is also a half-block from both the Market-Frankford elevated subway line (serving Center City and the Northeast), as well as the subway-surface lines (serving the City’s western suburbs), making the law school convenient to where students will live and to the courts and co-op placements in the downtown legal district.
School of Law Faculty

Tabatha Abu El-Haj, PhD, LL.M., JD (New York University; Georgetown University Law Center; New York University School of Law). Associate Professor. Constitutional law (specifically, First Amendment and election law), popular constitutionalism, administrative law, and the sociology of law.

Bret D. Asbury, JD (Yale Law School). Associate Professor. Civil procedure; law and literature.

Adam Benforado, JD (Harvard Law School). Associate Professor. Law and mind sciences, corporate law and contract law.

Mark P. Bernstein, MLS, JD (University of Pittsburgh; Tulane University Law School) Legal Research Center Director. Professor. Legal research, legal education, interdisciplinary research and the role of librarians as educators.

Amelia Boss, JD (Rutgers-Camden School of Law). Trustee Professor. Commercial law, including electronic payment systems, bankruptcy and contracts.

Susan Brooks, JD (New York University) Associate Dean for Experiential Learning. Professor. Clinical and co-op education; family law; children's rights; legal ethics.

Chapin Cimino, JD (University of Chicago Law School). Associate Professor. Contract law; constitutional law; law and humanities; higher education law.

David S. Cohen, JD (Columbia University School of Law). Associate Professor. Constitutional law; civil rights; sex discrimination.

Clare Keefe Coleman, JD (Villanova University School of Law) Director of Student Advising. Assistant Teaching Professor. Writing specialist.

Roger J. Dennis, JD (Northwestern University School of Law) Founding Dean. Professor. Corporate law; business organizations; civil procedure; law and economics.

Tracye Edwards, JD (Duke University School of Law). Assistant Teaching Professor. Co-op education.

Daniel M. Filler, JD (New York University School of Law) Senior Associate Dean for Academic and Faculty Affairs. Professor. Criminal law and procedure; sentencing and death penalty; law and society; law and humanities.

Richard H. Frankel, LLM, JD (Georgetown University Law Center; Yale Law School) Director of the Appellate Litigation Clinic. Associate Professor. Appellate litigation, access to justice in areas including consumer, administrative, and immigration law.

Barry Furrow, JD (Harvard Law School) Director of Health Law Concentration. Professor. Health law; torts.

Alex Geisinger, LLM, JD (Harvard Law School; University of Connecticut School of Law). Professor. Environmental law; torts; commercial law; behavioral law and economics.

Deborah Gordon, JD (New York University School of Law). Associate Professor. Trusts and estates, gift tax, legal methods.

Beth L. Haas, JD (Villanova University School of Law) Faculty Director for Online Education. Assistant Teaching Professor. Aviation litigation, product liability defense and toxic torts.

Aimée Kahan, JD (University of Pennsylvania School of Law) Director of the Master of Legal Studies Program. Assistant Teaching Professor. Appellate law and the functioning of court and judicial systems; bioethics; reproductive rights; intersection of law and religion.

Anil Kalhan, MPPM, JD (Yale School of Management; Yale Law School). Associate Professor. Immigration and citizenship law, constitutional law, comparative law and criminal law.

Nancy C. Kraybill, JD (University of California-Los Angeles School of Law) Director of Academic Skills. Associate Teaching Professor. Arbitration, mediation, civil litigation and academic skill development.

Amy Landers, JD (University of California) Director of the Intellectual Property Law Program. Professor. Patents and intellectual property law.

Rachel Lopez, LLM, JD (Universite Paris 1, Pantheon-Sorbonne; University of Texas School of Law) Director of the Community Lawyering Clinic. Assistant Professor. Appellate law and the functioning of court and judicial systems; bioethics; reproductive rights; intersection of law and religion.

Lisa T. McElroy, JD (Harvard Law School). Associate Professor. Legal methods; United States Supreme Court practice, family law.

Amy Montemarano, JD (Rutgers University School of Law – Camden). Assistant Teaching Professor. Legal research and writing.

Kevin P. Oates, LLM, JD (Temple University School of Law; Pace University School of Law) Senior Associate Dean of Students. Associate Professor. Legal methods; evidence; conflicts of law; legal ethics.

Karl Okamoto, JD (Columbia University School of Law) Director of Business and Entrepreneurial Law Concentration. Professor. Entrepreneurship; business organizations; corporate law; venture finance; securities law.

Reena E. Parambath, JD (Temple University School of Law) Director of the Co-op Program. Associate Teaching Professor.

Pammela Quinn Saunders, JD (Duke University School of Law). Assistant Professor. International law and enforcement of legal norms at the international and domestic levels.

Terry Jean Seligmann, JD (New York University School of Law) Director of Legal Writing. Arlin M. Adams Professor of Legal Writing. Legal methods; education and special education law.

Norman P Stein, JD (Duke University School of Law). Professor. Pension law; employee benefits; tax law.

Gwen Roseman Stern, JD (Temple University School of Law) Director of Trial Advocacy Program. Associate Teaching Professor. Medical malpractice and product-liability law, trial advocacy and community awareness of legal procedures.

Donald F. Tibbs, PhD, LLM, JD (Arizona State University; University of Wisconsin Law School; University of Pittsburgh School of Law). Associate Professor. The overlapping issues of law, civil rights, criminal procedure, race and punishment and professional responsibility.
Kevin Woodson, PhD, JD (Princeton University; Yale Law School). Associate Professor. Race and the legal profession; criminal procedure; civil rights law.

Emily B. Zimmerman, JD (Yale Law School) Director of the Criminal Law Program. Associate Professor. Legal methods; criminal law and procedure.

Interdepartmental Faculty

Rose Corrigan, PhD (Rutgers University). Associate Professor. Women, public law, American politics and policy.

David DeMatteo, PhD, JD (MCP Hahnemann University; Villanova University School of Law) Director of the JD-PhD Program in Law and Psychology. Associate Professor. Psychopathy, forensic mental health assessment, drug policy; offender diversion.

Robert I. Field, PhD, JD, MPH (Boston University; Columbia University School of Law; Harvard University School of Public Health) Joint Appointment between Dornsife School of Public Health and Earle Mack School of Law. Professor. Health law and public health; ethical issues in managed care, public policy and legal facets of health care reform and genetic screening.

Emeritus Faculty

Donald Bersoff, JD, PhD (Yale University, New York University). Professor Emeritus. Law and psychology; mental health law.

American Legal Practice

Major: American Legal Practice
Degree Awarded: Masters of Law (LLM)
Calendar Type: Semester
Total Credit Hours: 24.0
Classification of Instructional Programs (CIP) code: 22.0101
Standard Occupational Classification (SOC) code: 23-1011

Degree Requirements

The Master of Laws (LL.M.) in American Legal Practice is designed for students who have completed, at minimum, an LL.B. or its equivalent outside of the United States. The LL.M. provides these students with a sophisticated knowledge of U.S. legal practice and grounds them in a basic understanding of U.S. law.

To earn the LL.M., students must successfully complete 24 semester credits. There are no distribution requirements. Every student will receive individualized academic counseling and the student’s individual program of study will be set up in consultation with an advisor.

Admission Requirements

Students must have an earned Bachelor of Laws (LL.B.) or its equivalent. Admissions will be based on applicant grades from their prior institutions. No entry exam is required, except that students who have completed their first law degree program in a language other than English will be required to have a minimum score on the TOEFL or a comparable exam.

Certificate in Health Care Compliance

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Semester
Expected Time to Completion: 4.5 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 51.0717
Standard Occupational Classification (SOC) Code: 19-3041

The certificate in health care compliance is a post-baccalaureate non-degree program designed for individuals to develop and improve career-related skills in the diverse fields that relate to health care, such as law enforcement, probation and parole, corrections, social work, immigration and customs, and the military. The certificate program includes both a small core of general law courses that and form the and study of central issues in criminal law.

Admission Requirements

Acceptance for graduate study at Drexel University requires a four-year bachelor's degree from a regionally accredited institution in the United States or an equivalent international institution. Applicants who have not received a degree in the United States are required to take the Test of English as a Foreign Language (TOEFL).

This program is designed to be completed on a part-time basis and requires 15.0 semester credits. Students may apply for transfer in to the Master of Legal Studies program prior to completing their certificate, and apply all earned credits toward the Master of Legal Studies (p. 444).

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSTU 500S</td>
<td>Introduction to the Legal System</td>
<td>2.0</td>
</tr>
<tr>
<td>LSTU 501S</td>
<td>Compliance Skills: Auditing, Investigation &amp; Reporting</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 502S</td>
<td>Ethics and Professional Standards</td>
<td>2.0</td>
</tr>
<tr>
<td>LAW 558S</td>
<td>Criminal Law</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 670S</td>
<td>Criminal Procedure: Investigations</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 530S</td>
<td>Corrections Law</td>
<td>2.0</td>
</tr>
<tr>
<td>Total Credits</td>
<td></td>
<td>15.0</td>
</tr>
</tbody>
</table>

Certificate in Criminal Law

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Admission Requirements

Acceptance for graduate study at Drexel University requires a four-year bachelor's degree from a regionally accredited institution in the United States or an equivalent international institution. Applicants who have not received a degree in the United States are required to take the Test of English as a Foreign Language (TOEFL).

This program is designed to be completed on a part-time basis and requires 15.0 semester credits. Students may apply for transfer in to the Master of Legal Studies program prior to completing their certificate, and apply all earned credits toward the Master of Legal Studies (p. 444).

Required Courses

<table>
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<tr>
<th>Course</th>
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</thead>
<tbody>
<tr>
<td>LSTU 500S</td>
<td>2.0</td>
</tr>
<tr>
<td>LSTU 501S</td>
<td>3.0</td>
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<tr>
<td>LSTU 502S</td>
<td>2.0</td>
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<tr>
<td>LSTU 504S</td>
<td>3.0</td>
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<tr>
<td>LSTU 505S</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 506S</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Total Credits 15.0

Certificate in Human Resources Compliance

Certificate Level: Graduate
Admission Requirements: Bachelor's degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Semester
Expected Time to Completion: 4.5 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 52.1099
Standard Occupational Classification (SOC) Code: 13-1071

The Certificate in Human Resources Compliance is a post-baccalaureate non-degree program designed for individuals to develop and improve career-related skills in the focused area of human resources compliance. The certificate program includes both a small core of general law courses, focused training in ethics and compliance, and in-depth study of crucial issues in human resources rules and regulation. Ideal candidates include individuals working in human resources and related fields who would benefit from focused legal knowledge regarding compliance, as well as individuals seeking career changes.

Admission Requirements

Acceptance for graduate study at Drexel University requires a four-year bachelor's degree from a regionally accredited institution in the United States or an equivalent international institution. Applicants who have not received a degree in the United States are required to take the Test of English as a Foreign Language (TOEFL).

The program is designed to be completed on a part-time basis and requires 15.0 semester credits. Students may apply for transfer in to the Master of Legal Studies program prior to completing their certificate, and apply all earned credits toward the Master of Legal Studies (p. 444).

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
<th>Credits</th>
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</thead>
<tbody>
<tr>
<td>LSTU 500S</td>
<td>2.0</td>
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<tr>
<td>LSTU 501S</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 502S</td>
<td>2.0</td>
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<tr>
<td>LSTU 504S</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 505S</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 506S</td>
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</table>

Total Credits 15.0

Program Requirements

<table>
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<tr>
<th>Course</th>
<th>Credits</th>
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<tbody>
<tr>
<td>LSTU 500S</td>
<td>2.0</td>
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<tr>
<td>LSTU 501S</td>
<td>3.0</td>
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<tr>
<td>LSTU 502S</td>
<td>2.0</td>
</tr>
<tr>
<td>LSTU 504S</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 505S</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 506S</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Total Credits 15.0

Certificate in NCAA Compliance

Certificate Level: Graduate
Admissions Requirements: Bachelor’s degree
Certificate Type: Post-Baccalaureate
Number of Credits to Completion: 15.0
Instructional Delivery: Online
Calendar Type: Semester
Expected Time to Completion: 4.5 years
Financial Aid Eligibility: Not aid eligible
Classification of Instructional Program (CIP) Code: 31.0504
Standard Occupational Classification (SOC) Code: 25-1193

The certificate in NCAA compliance is a post-baccalaureate non-degree program designed for individuals to develop and improve career-related skills in the focused area of compliance with NCAA—National Collegiate Athletic Association—rules and regulations. The certificate program includes a small core of general law courses, focused training in ethics and compliance, and in-depth study of crucial issues in NCAA regulatory compliance. Ideal candidates include individuals working in collegiate sports programs who would benefit from focused legal knowledge regarding compliance, as well as individuals seeking career changes.

Admission Requirements

Acceptance for graduate study at Drexel University requires a four-year bachelor's degree from a regionally accredited institution in the United States or an equivalent international institution. Applicants who have not received a degree in the United States are required to take the Test of English as a Foreign Language (TOEFL).

The program is designed to be completed on a part-time basis and requires 15.0 semester credits. Students may apply for transfer in to the Master of Legal Studies program prior to completing their certificate, and apply all earned credits toward the Master of Legal Studies (p. 444).

Required Courses

<table>
<thead>
<tr>
<th>Course</th>
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<tbody>
<tr>
<td>LSTU 500S</td>
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<tr>
<td>LSTU 501S</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 502S</td>
<td>2.0</td>
</tr>
<tr>
<td>LSTU 504S</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 505S</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 506S</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Total Credits 15.0
# Master of Legal Studies

**Major:** Legal Studies  
**Degree Awarded:** Master of Legal Studies (MLS)  
**Calendar Type:** Semester  
**Total Credit Hours:** 30.0  
**Classification of Instructional Programs (CIP) code:** 22-9999  
**Standard Occupational Classification (SOC) code:** 11-1071; 13-1011; 13-1075

## About the Program

As society becomes increasingly regulated, job candidates with advanced skills in legal and regulatory analysis, as well as regulatory compliance, have become highly appealing to many employers. Although many employers do not want to hire additional attorneys, they require employees with sophisticated and narrowly focused exposure to law and legal regulation.

The Master of Legal Studies (MLS) program is a post-baccalaureate degree designed for individuals to develop and improve career-related skills through the study of the legal system, legal writing, law, regulation, and policy. Ideal candidates include individuals in other disciplines, professionals who would benefit from focused legal knowledge (such as those in the fields of health, college sports, education, human resources, finance, etc.), individuals seeking career changes, and those generally interested in the field of law. Upon completion of each degree program, graduates will understand how the law relates to and impacts their particular areas of interest, although they will not be attorneys.

Currently, four optional concentrations are offered:

- Criminal Law
- Health Care Compliance
- Human Resources Compliance
- NCAA Compliance and Sports Law

The program is designed to be completed on either a part-time or full-time basis.

## Degree Requirements

All students must complete the required core curriculum courses, and additional electives or concentration courses, totaling 30.0 semester credits.

Within the program, four optional concentrations are currently offered:

- Criminal Law
- Health Care Compliance
- Human Resources Compliance
- NCAA Compliance and Sports Law

### Required Core Curriculum Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSTU 500S</td>
<td>Introduction to the Legal System</td>
<td>2.0</td>
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<td>LSTU 501S</td>
<td>Compliance Skills: Auditing, Investigation &amp; Reporting</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 502S</td>
<td>Ethics and Professional Standards</td>
<td>2.0</td>
</tr>
<tr>
<td>LSTU 503S</td>
<td>Legal Research and Analysis</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 507S</td>
<td>Risk Assessment and Management</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 540S</td>
<td>MLS Masters Capstone</td>
<td>3.0-4.0</td>
</tr>
</tbody>
</table>

### Electives or Concentration

| Course Code | Course Title                                      | Credits |

### Health Care Compliance Concentration

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSTU 504S</td>
<td>Health Care Rules and Regulations</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 505S</td>
<td>Health Care Quality, Patient Safety and Risk Management</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 506S</td>
<td>Patients and Privacy: HIPAA and Related Regulations</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Total Credits: 8.0

* In the process of completing the core courses, students completing this concentration select the LSTU 540S MLS Capstone course section that is focused on health care compliance.

### NCAA Compliance and Sports Law Concentration

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSTU 510S</td>
<td>NCAA Governance Process</td>
<td>2.0</td>
</tr>
<tr>
<td>LSTU 511S</td>
<td>NCAA Rules I and Infractions Cases</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 512S</td>
<td>NCAA Rules II and Enforcement Process</td>
<td>3.0</td>
</tr>
</tbody>
</table>

Total Credits: 8.0

* In the process of completing the core courses, students completing this concentration select the LSTU 540S MLS Capstone course section that is focused on NCAA and sports law.

### Human Resources Compliance Concentration

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSTU 520S</td>
<td>Legal Issues in Employee Hiring and Termination</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 521S</td>
<td>Human Resources Compliance: Managing the Employer/Employee Relationship</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 522S</td>
<td>Human Resources in Practice: Negotiation, Mediation, and Alternative Dispute Resolution</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Total Credits: 8.0

* In the process of completing the core courses, students completing this concentration select the LSTU 540S MLS Capstone course section that is focused on human resources compliance.

### Criminal Law Concentration

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAW 558S</td>
<td>Criminal Law</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 670S</td>
<td>Criminal Procedure: Investigations</td>
<td>3.0</td>
</tr>
<tr>
<td>LSTU 530S</td>
<td>Corrections Law</td>
<td>2.0</td>
</tr>
</tbody>
</table>

Total Credits: 8.0

* In the process of completing the core courses, students completing this concentration select the LSTU 540S MLS Capstone course section that is focused on criminal law.

### Higher Education Compliance Concentration

Required Courses

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LSED 532S</td>
<td>Legal Landscape of Student Rights and Campus Safety</td>
<td></td>
</tr>
</tbody>
</table>

Complete LSTU, LAW electives or any combination of electives & concentrations 13.0-14.0

Total Credits: 30.0
The JD Program

Major: Law
Degree Awarded: Juris Doctor (JD)
Calendar Type: Semester
Total Credit Hours: 85.0
Classification of Instructional Programs (CIP) code: 22.0101
Standard Occupational Classification (SOC) code: 23-1011

About the Program

The School of Law offers a rigorous law curriculum that aims to prepare students for the realities of practice, combining the classic foundation of legal education with the experiential components that are so vital to both Drexel University’s mission and to legal employers today. Students have the option of completing the JD in the traditional three years, or through an accelerated two-year program designed to get students into the legal workforce faster, with the same essential skills and knowledge.

Students spend their first year on campus being introduced to the foundations of legal analysis, skills, and professionalism in a diverse learning community. The program includes traditional first-year courses, such as contracts and criminal law. It also includes a comprehensive legal methods course, taught by full-time faculty, which instructs students on the fundamentals of legal writing and analysis, as well as a class on interviewing, counseling, and negotiation. Students choose one elective course as part of their first year curriculum.

The remaining curriculum exposes students to a broad array of topics relevant to the study of law. Students are required to complete courses in professional responsibility, legal writing and other practice skills, and statutory law. Students must also complete at least 50 hours of pro bono work.

The Experiential Education Program

Students are required to complete either a co-op placement or a clinical experience in order to graduate. This requirement provides students with an integrated learning experience that prepares them for the complexities of modern-day practice. Additionally, students can choose from a broad selection of simulation courses that involve in-depth trial practice, advocacy, litigation, transactional practice, and alternative dispute resolution.

The cooperative education program allows upper-level students to spend a semester - or in some cases, a full year - at a single legal placement. The School of Law has relationships with a wide-ranging selection of co-op partners including judicial chambers, private law firms, in-house counsel offices, and non-profit organizations, but has also assisted many students in creating opportunities in other practice jurisdictions. Students are not paid for their work but will instead receive academic credits for their co-op experiences and for a lawyering practice seminar that must be taken in conjunction with the co-op.

The school offers students the chance to represent real clients in a clinical setting. Clinical offerings include a Civil Litigation Field Clinic, Criminal Litigation Field Clinic, Appellate Litigation Clinic, Community Lawyering Clinic, and Entrepreneurial Law Clinic. These experiences are paired with a seminar that guides students through reflection on their work and its impact on the community.

About the Concentrations

The Thomas R. Kline School of Law builds on some of the strengths for which Drexel University is nationally known by offering four optional concentrations. These are areas in which there are expanding employment opportunities and a need for specialized knowledge and skills: intellectual property, health, business & entrepreneurship, and criminal law. These concentrations consist not only of specialized courses taught in the classroom, but also experiential learning opportunities such as co-ops and simulations.

Joint Degrees

For those law students interested in pursuing expertise in another area of study, the School also offers several joint degrees combining law with other subjects, including Law and Business Administration (JD/MBA), Law and Library and Information Science (JD/MSLIS), (p. 260) Law and Psychology (JD/PhD (p. 260)), Law and Public Health (JD/MPH), and Law and Public Policy (JD/MSPP). For more details about joint degree opportunities, visit the Thomas R. Kline School of Law Joint Degree (http://www.drexel.edu/law/academics/jointDegrees) website.

Additional Information

For additional information about the JD program, visit the the Thomas R. Kline School of Law (http://www.drexel.edu/law) website.

Degree Requirements

<table>
<thead>
<tr>
<th>Required Courses</th>
<th>Total Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAW 550S Torts</td>
<td>4.0</td>
</tr>
<tr>
<td>LAW 552S Contracts</td>
<td>4.0</td>
</tr>
<tr>
<td>LAW 554S Civil Procedure</td>
<td>4.0</td>
</tr>
<tr>
<td>LAW 556S Property</td>
<td>4.0</td>
</tr>
<tr>
<td>LAW 558S Criminal Law</td>
<td>4.0</td>
</tr>
<tr>
<td>LAW 560S Constitutional Law</td>
<td>5.0</td>
</tr>
<tr>
<td>LAW 565S Legal Methods I</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 566S Legal Methods II</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 568S Intro to Interviewing, Counseling, and Negotiations</td>
<td>1.0</td>
</tr>
<tr>
<td>LAW 830S Professional Responsibility</td>
<td>3.0</td>
</tr>
<tr>
<td>1st-Year Elective (LAW 57X)</td>
<td>2.0</td>
</tr>
</tbody>
</table>

A total of 85 semester credits are required to graduate, with a minimum of 61 credits of “in-class” coursework (see Law School Student Handbook for courses that do not count.)

Additional Requirements:

Students must also complete:

1. At least one legal writing course designated as meeting the standard of the Upper-Level Writing requirement [WUL], as indicated by the course materials;
2. At least one Skills course, as indicated by the course material; and
3. At least one Statutory course, as indicated by the course materials.

Professional Practice Requirement

Beginning with students admitted for the traditional three-year JD in Fall of 2014, a Professional Practice Requirement will be implemented. Students can meet this requirement by enrolling in a law co-op or a law clinic.

Pro Bono Requirement

Students must fulfill a minimum of 50 hours of qualifying pro bono service.

*The Senior Associate Dean of Students may waive this course requirement for students who transfer in after their first year.

Trial Advocacy and Dispute Resolution

Major: Trial Advocacy and Dispute Resolution  
Degree Awarded: Master of Laws (LLM)  
Calendar Type: Semester  
Total Credit Hours: 24.0  
Classification of Instructional Programs (CIP) code: 22.0101  
Standard Occupational Classification (SOC) code: 23-1022

About the Program

The LLM in Trial Advocacy and Dispute Resolution will train students to become more effective client advocates in a variety of dispute-related settings. These include client interviewing and counseling, pre-trial advocacy, jury selection, and appellate advocacy. The program is designed to both re-train attorneys whose work has not previously demanded, or taught, such skills, as well as to improve the advocacy skills of attorneys who already work in this area.

The LLM may be taken either part-time or full-time. Students may maintain part-time status by enrolling in a minimum of 5.0 credits per semester. To maintain full-time status, students must enroll in a minimum of 9.0 credits per academic semester. The program is designed to be completed in either one or two years.

Additional information about the Thomas R. Kline School of Law (http://drexel.edu/law) is available on the school’s website.

Admission Requirements

The LLM program is open to applicants who have received a JD, an LLB, or a comparable law degree. International applicants must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL) or similar examination. In addition to test scores, telephone or Skype interviews may also be used for foreign applicants.

Applications will be accepted on a rolling basis, but new students will typically begin in the Fall semester.

Degree Requirements

The LLM is a 24-credit program, with 17.0 credits made up of required courses:

<table>
<thead>
<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>LAW 637S</td>
<td>Advanced Evidence</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 646S</td>
<td>Mediation and Arbitration</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 904S</td>
<td>Advanced Trial Advocacy: Civil</td>
<td>3.0</td>
</tr>
<tr>
<td>or LAW 906S</td>
<td>Advanced Trial Advocacy: Criminal</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 811S</td>
<td>Expert Witnesses</td>
<td>3.0</td>
</tr>
<tr>
<td>LAW 882S</td>
<td>Litigation Drafting</td>
<td>2.0</td>
</tr>
<tr>
<td>LAW 981S</td>
<td>Litigation Technology</td>
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</tr>
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</table>

In addition, students must complete additional credits through electives. Students may complete:

<table>
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<tr>
<th>Course Code</th>
<th>Course Title</th>
<th>Credits</th>
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<tbody>
<tr>
<td>LAW 982S</td>
<td>Jury Selection</td>
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<tr>
<td>LAW 904S</td>
<td>Advanced Trial Advocacy: Civil</td>
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<tr>
<td>or LAW 906S</td>
<td>Advanced Trial Advocacy: Criminal</td>
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<td>E-Discovery &amp; Digital Evidence</td>
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<td>LAW 900S</td>
<td>Pre-Trial Advocacy</td>
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<tr>
<td>LAW 890S</td>
<td>Improvisation for Lawyers</td>
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</table>

* Students may select the version of Advanced Trial Advocacy they did not select in fulfillment of the core requirement.

The LLM degree will be conferred only after the student completes 24.0 credits. A student must maintain a GPA of 2.20 each semester and at program completion.

Sample Plan of Study

Students may complete the LLM in one or two years, depending on whether the student chooses to pursue the degree on a full-time or part-time basis. A potential plan of study for a full-time student would be as follows:

**First Year**

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<td>LAW 906S</td>
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<td>LAW 981S</td>
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<td>LAW 882S</td>
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| Total Credit: | 11.0 |

**First Year**

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<td>LAW 811S</td>
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<td>Electives</td>
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| Total Credit: | 13.0 |
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  • Graduate (p. 447)
  • Undergraduate (http://catalog.drexel.edu/coursedescriptions/quarter/undergrad)

• Semester (p. 449)
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  • Undergraduate (http://catalog.drexel.edu/coursedescriptions/semester/undergrad)

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College of Arts and Sciences (AS)
LeBow College of Business (B)
College of Computing and Informatics (CI)
College of Engineering (E)
Goodwin College of Professional Studies (GC)
College of Nursing Health Professions (NH)
School of Public Health (PH)
COM School of Biomedical Sciences Professional Studies (QQ)
School of Biomedical Engineering, Science Health Systems (R)
Center for Hospitality and Sport Management (SH)
School of Education (T)
University Courses (X)

Accounting
Adult Education

Architectural Engineering
Architecture
Art History
Arts Administration
Biomedical Engineering & Science
Bioscience & Biotechnology
Business Statistics
Career Integrated Education
Chemical Engineering
Chemistry
Civil Engineering
Communication
Complement & Integrative Therapy
Computer Science
Computing & Security Technology
Construction Management
Cooperative Management
Couple & Family Therapy
Creative Arts in Therapy
Creativity Studies
Design and Merchandising
Digital Media
E-Learning
Economics
Education Human Resource Development
Education Improvement & Transformation
Education Learning Technology
Educational Administration
Educational Lifelong Literacy
Educational Policy
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Electrical & Computer Engineering - Computers
Electrical & Computer Engineering - Electroph
Electrical & Computer Engineering - Power Engineering
Electrical & Computer Engineering - Systems
Emergency Medical Services
Engineering Geology
Engineering Management
Engineering Technology
Engineering, General
Environmental Engineering
Environmental Policy
Environmental Science
Fashion Design
Finance
Food Science
Forensic Criminalistic Analysis
Forensic Science
General Business
Geography Education
Global & International Education
Higher Education
History
Homeland Security Management
Hotel & Restaurant Management
Human Resource Management
Industrial Design
Information Science & Systems
Interior Design
International Business
Intra Professional Studies
Legal Studies
Linguistics
Management
Management of Information Systems
Marketing
Materials Engineering
Mathematics
Mathematics Education
Clinical Research
Clinical Research Health Prof
Communication & Preventative Medicine (noncredit)
Communication & Preventive Medicine (credit)
Critical Care
Dermatology
Drexel Pathway to Medicine
Emergency Medicine
Family Medicine
Forensic Criminalistic Analysis
Forensic Science
Histotechnology
Human & Molecular Genetics
IMS Prog. Interdepartmental Sciences
Interdepartmental
Interdisciplinary Health Science
Law
Legal Studies
MMS Prog. - Masters in Med. Science
Master of Lab Animal Science
Medical Science Preparatory
Medical and Healthcare Simulation
Medicine
Microbiology and Immunology
Molecular & Cellular Bio & Genetics
Neurology
Neuroscience
Neurosurgery
Obstetrics & Gynecology
Office of Medical Education
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Otolaryngology
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