Drexel University

Catalog 2007 / 2008

Table of Contents

The College of Medicine Graduate Programs

The Drexel University College of Medicine

Drexel University College of Medicine, a new name just a few years ago, 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, with over 1,000 medical students, Drexel University College of Medicine (DUCOM) is the largest private medical school in the country. Biomedical graduate students number more than 500. There are some 550 residents, 600 clinical and basic science faculty, and over 1,700 affiliate and volunteer faculty.

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, which includes Hahnemann University Hospital. Our Pediatrics Department is at St. Christopher's Hospital for Children, and Psychiatry is based at Friends Hospital. Students can receive clinical education at 25 affiliated hospitals and ambulatory sites chosen for commitment to teaching as well as medical excellence.

DUCOM's clinical practice, Drexel University Physicians®, is a patient-focused practice emphasizing quality, innovation and community service, and enhanced by physician involvement in the research and educational programs.

The College has participated in pioneering clinical trials involving the world's first implantable artificial heart, established a major regional center for spinal cord research, and founded one of the leading centers for malaria study in the nation. Collaborative projects leveraging Drexel University's technological expertise push the frontiers of nanomedicine and neuroengineering.

Drexel University College of Medicine houses one of just 21 National Centers of Excellence in Women's Health designated by the Department of Health & Human Services. It has developed the largest HIV/AIDS primary care practice in the Mid-Atlantic region. Faculty clinicians are highly respected in numerous other specialties, including pain management, sports medicine and toxicology.

For more information, visit the Drexel University College of Medicine web site.

Biochemistry

About the M.S. Program

A minimum of two years of full-time study is required for an M. S. 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.

About the Ph.D. Program

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

For more information, visit the College of Medicine's Biochemistry web site.

M.S. in Biochemistry

48.0 credits.

Ph.D. in Biochemistry

97.0 credits.

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.

Curriculum

First Year

Fall

IDPT 521S	**Core Curriculum I**	9.0
	- IDPT 522S Molecular Structure and Metabolism	
	- IDPT 523S Molecular Biology and Genetics	
BIOC 502S	**Biochemistry 1st Lab Rotation**	4.0
BIOC 506S	**Biochemistry Journal Club**	1.0
BIOC 507S	**Biochemistry Seminar Series**	1.0
	Total credits	15.0

Spring

IDPT 501S	**Biostatistics I**	2.0
IDPT 526S	**Core Curriculum II**	9.0
	- IDPT 527S Cell Biology I	
	- IDPT 528S Cell Biology II	
	- IDPT 529S Cell Signaling and Cell Cycle	
	- IDPT 530S Cells to Systems	
BIOC 503S	**Biochemistry 2nd Lab Rotation**	4.0
BIOC 505S	**Biochemical Basis of Disease**	1.0

BIOC 506S	**Biochemistry Journal Club**	1.0
BIOC 507S	**Biochemistry Seminar Series**	1.0
	Total credits	18.0

Second Year

Fall

BIOC 504S	**Biochemistry 3rd Lab Rotation**	4.0
BIOC 506S	**Biochemistry Journal Club**	1.0
BIOC 507S	**Biochemistry Seminar Series**	1.0
BIOC508S	**Experimental Approaches to Biochemical Problems**	4.0
BIOC 600S	**Biochemistry Thesis Research**	9.0
	Elective*	2.0 - 4.0
	Total credits	21.0 -24.0

*Students must select one of the following courses:

MIIM 555S Molecular Mechanisms of Microbial Pathogenesis 3.0
NEUR 607S Advanced Neuroscience 4.0
PHRM 512S Graduate Pharmacology 3.0
PHYS 503S Graduate Physiology 4.0

Spring*

IDPT 500S	**Scientific Integrity and Ethics**	3.0
MCBG 507S	**Macromolecular Structure and Function**	2.0
BIOC 511S	**Writing for Researchers**	1.0
BIOC 600S	**Biochemistry Thesis Research**	9.0
	Total credits	15.0

*Students may consider the following elective in the Spring:
MCBG 506S Advanced Cell Biology 2.0
MIIM 630S Advanced Molecular Biology 2.0
PATH 601S Cell and Molecular Pathobiology of Cancer 4.0

Third Year and Beyond*

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. Ph.D. 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.

BIOC 506S	**Biochemistry Journal Club**	1.0
BIOC 507S	**Biochemistry Seminar Series**	1.0
BIOC 600S	**Biochemistry Thesis Research**	9.0
	Total credits	11.0

*Additional electives may include:
IDPT 600S Thesis Defense (non-billable) 9.0
IDPT 800S Registered for Degree Only 9.0

Microbiology and Immunology

About the M.S. Program
M.S. students are required to successfully complete the core curriculum and the first year Program-specific course work (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 M.S. degree. In all semesters, M.S. students must attend seminars and journal clubs.

About the Ph.D. Program
Ph.D students are required to successfully complete the core curriculum and the first year program-specific course work (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, and microbial pathogenesis are offered to interested students in the second year and Ph.D. students are required to enroll for credit for at least two advanced courses.

Ph.D. candidates must pass a qualifying examination in the middle of their third year. In all semesters, Ph.D. 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 Ph.D. requirements is five years.

For more information, visit the College of Medicine's Microbiology and Immunology Program web site.

M.S. in Microbiology and Immunology

48.0 credits.

Ph.D. in Microbiology and Immunology

96.0 credits.

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.

Curriculum

First Year

Fall

IDPT 521S	**Core Curriculum I**	9.0
	- IDPT 522S Molecular Structure and Metabolism	
	- IDPT 523S Molecular Biology and Genetics	
MIIM 502S	**Microbiology and Immunology Journal Club**	1.0
MIIM 504S	**Microbiology and Immunology: 1st Lab Rotation**	4.0
MIIM 507S	**Microbiology and Immunology Student Seminar Series**	1.0
MIIM 508S	**Immunology I**	3.0
MIIM 512S	**Molecular Pathogenesis I**	3.0
MIIM 606S	**Microbiology and Immunology Seminar**	1.0
	Total credits	22.0

Spring

IDPT 501S	**Biostatistics I**	2.0
IDPT 526S	**Core Curriculum II**	9.0
	- IDPT 527S Cell Biology I	
	- IDPT 528S Cell Biology II	

	- IDPT 529S Cell Signaling and Cell Cycle	
	- IDPT 530S Cells to Systems	
MIIM 502S	**Microbiology and Immunology Journal Club**	1.0
MIIM 505S	**Microbiology and Immunology 2nd Lab Rotation**	4.0
MIIM 507S	**Microbiology and Immunology Student Seminar Series**	1.0
MIIM 513S	**Molecular Pathogenesis II**	3.0
MIIM 506S	**Microbiology and Immunology Journal Club**	1.0
	Total credits	21.0

Second Year

Fall

MIIM 502S	**Microbiology and Immunology Journal Club**	1.0
MIIM 504S	**Microbiology and Immunology 3rd Lab Rotation**	4.0
MIIM 507S	**Microbiology and Immunology Student Seminar Series**	1.0
MIIM 606S	**Microbiology and Immunology Seminar**	1.0
MIIM 600S	**Microbiology and Immunology Thesis Research**	9.0
	Elective*	3.0
	Total credits	18.0

*Students must select one of the following advanced courses:
MIIM 604 Special Topics in Virology 3.0
MIIM 555S Molecular Mechanisms of Microbial Pathogenesis 3.0
MIIM 612S Molecular Mechanisms of Viral Pathogenesis 2.0

Spring*

IDPT 500S	**Scientific Integrity and Ethics**	3.0
MIIM 502S	**Microbiology and Immunology Journal Club**	1.0
MIIM 507S	**Microbiology and Immunology Student Seminar Series**	1.0
MIIM 600S	**Microbiology and Immunology Thesis Research**	9.0
MIIM 606S	**Microbiology and Immunology Seminar**	1.0
MIIM 607S	**Immunology II**	3.0
	Elective*	2.0 - 3.0
	Total credits	20.0 - 21.0

*Students must select one of the following advanced courses:
MIIM 607S Immunology II 3.0
MIIM 630S Advanced Molecular Biology 2.0
MIIM 613S Emerging Infectious Disease 3.0

Third Year and Beyond*

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. Ph.D. 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.

MIIM 502S	**Microbiology and Immunology Journal Club**	1.0
MIIM 507S	**Microbiology and Immunology Student Seminar Series**	1.0
MIIM 600S	**Microbiology and Immunology Thesis Research**	9.0
MIIM 606S	**Microbiology and Immunology Seminar**	1.0
	Total credits	12.0

*Additional electives may include:
IDPT 600S Thesis Defense (non-billable) 9.0
IDPT 800S Registered for Degree Only 9.0

Molecular and Cell Biology and Genetics

General Information

This is an intensive, interdisciplinary, research-oriented program that offers both M. S., and Ph.D. degrees. Its strength is derived from the combined research expertise of the faculty in various departments, including Neurobiology and Anatomy, Biochemistry, Microbiology and Immunology, Medicine, Surgery, Pathology, Pediatrics, and Pharmacology and Physiology.

About the M.S. Program

In the M.S. 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 the fast-expanding field.

About the Ph.D. Program

Ph.D. students must pass a qualifying exam in their third year. Advanced courses covering topics of molecular and cell biology and genetics are offered.

For more information, visit the College of Medicine's Molecular and Cell Biology and Genetics Program web site.

M.S. in Molecular and Cell Biology and Genetics

48.0 credits.

Ph.D. in Molecular and Cell Biology and Genetics

96.0 credits.

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.

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.

Curriculum

First Year

Fall

IDPT 521S	**Core Curriculum I**	9.0
	- IDPT 522S Molecular Structure and Metabolism	
	- IDPT 523S Molecular Biology and Genetics	
MCBG 512S	**Molecular and Cell Biology and Genetics Journal Club**	1.0
MCBG 501S	**Molecular and Cell Biology and Genetics: 1st Lab Rotation**	4.0
MCBG 513S	**Molecular and Cell Biology and Genetics Seminar**	1.0
	Total credits	15.0

Spring

IDPT 501S	**Biostatistics I**	2.0
IDPT 526S	**Core Curriculum II**	9.0
	- IDPT 527S Cell Biology I	
	- IDPT 528S Cell Biology II	
	- IDPT 529S Cell Signaling and Cell Cycle	

	- IDPT 530S Cells to Systems	
MCBG 506S	**Advanced Cell Biology**	2.0
MCBG 512S	**Molecular and Cell Biology and Genetics Journal Club**	1.0
MCBG 502S	**Molecular and Cell Biology and Genetics 2nd Lab Rotation**	4.0
MCBG 513S	**Molecular and Cell Biology and Genetics Seminar**	1.0
	Total credits	19.0

Second Year

Fall

MCBG 503S	**Molecular and Cell Biology and Genetics 3rd Lab Rotation**	4.0
MCBG 512S	**Molecular and Cell Biology and Genetics Journal Club**	1.0
MCBG 513S	**Molecular and Cell Biology and Genetics Seminar**	1.0
MCBG 600S	**Molecular and Cell Biology and Genetics Thesis Research**	9.0
	Total credits	15.0

*Additional electives:
BIOC 508S Experimental Approaches to Biochemical Problems 4.0
BIOC 510S Cancer Biology

Spring*

IDPT 500S	**Scientific Integrity and Ethics**	3.0
MCBG 512S	**Molecular and Cell Biology and Genetics Journal Club**	1.0
MCBG 513S	**Molecular and Cell Biology and Genetics Seminar**	1.0
MCBG 600S	**Molecular and Cell Biology and Genetics Thesis Research**	9.0
	Total credits	14.0

*Additional electives may include:
BIOC 509S Biochemical Basis of Disease 3.0
MIIM 630S Advanced Molecular Biology 2.0
MCBG 507S Macromolecular Structure and Function 2.0
MCBG 514S Cell Cycle and Apoptosis

Third Year and Beyond*

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. Ph.D. 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.

MCBG 512S	**Molecular and Cell Biology and Genetics Journal Club**	1.0
MCBG 513S	**Molecular and Cell Biology and Genetics Seminar**	1.0
MCBG 600S	**Molecular and Cell Biology and Genetics Thesis Research**	9.0

Total credits	11.0

*Additional electives may include:
IDPT 600S Thesis Defense (non-billable) 9.0
IDPT 800S Registered for Degree Only 9.0

Molecular Pathobiology

General Information

The Graduate Program in Molecular Pathobiology offers coursework and research opportunities leading to the Ph.D., M.D./Ph.D. and M.S. degrees. The goal of the program is to provide students with the the education necessary to conduct the research that leads to advances in the understanding of the etiology of the diseases processes and development of novel and therapeutic interventions.

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.

Substantial extramural 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.

For more information, visit the College of Medicine's Molecular Pathobiology Program web site.

M.S. in Molecular Pathobiology

48.0 credits.

Ph.D. in Molecular Pathobiology

96.0 credits.

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.

Curriculum

First Year

Fall

IDPT 521S	**Core Curriculum I**	9.0
	- IDPT 522S Molecular Structure and Metabolism	
	- IDPT 523S Molecular Biology and Genetics	
PATH 503S	**Pathobiology Journal Club**	1.0
PATH 502S	**Pathobiology: 1st Lab Rotation**	4.0
	Total credits	14.0

Spring

IDPT 501S	**Biostatistics I**	2.0
IDPT 526S	**Core Curriculum II**	9.0
	- IDPT 527S Cell Biology I	
	- IDPT 528S Cell Biology II	
	- IDPT 529S Cell Signaling and Cell Cycle	
	- IDPT 530S Cells to Systems	
PATH 503S	**Pathobiology Journal Club**	1.0
PATH 505S	**Pathobiology 2nd Lab Rotation**	4.0
PATH 513S	**Molecular Pathobiology Seminar**	1.0
	Total credits	17.0

Second Year

Fall*

PATH 506S	**Pathobiology 3rd Lab Rotation**	4.0
PATH 503S	**Pathobiology Journal Club**	1.0
PATH 509S	**Pathoblogic Processes**	3.0
PATH 600S	**Molecular Pathobiology Thesis Research**	9.0
	Total credits	18.0

*Students may consider the following electives:
NEUR 508S Principles in Neuroscience 2.0
PHYS 503S Graduate Physiology 4.0

Spring*

IDPT 500S	**Scientific Integrity and Ethics**	3.0
PATH 503S	**Pathobiology Journal Club**	1.0
PATH 601S	**Cell and Molecular Pathobiology of Cancer: Angiogenesis**	4.0
PATH 600S	**Molecular Pathobiology Thesis Research**	9.0
	Total credits	17.0

*Additional electives may include:
ANAT 602S Medical Neuroscience 4.0

Third Year and Beyond*

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. Ph.D. 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.

PATH 503S	**Pathobiology Journal Club**	1.0
PATH 600S	**Molecular Pathobiology Thesis Research**	9.0
	Total credits	10.0

*Additional electives may include:
IDPT 600S Thesis Defense (non-billable) 9.0
IDPT 800S Registered for Degree Only 9.0

Neuroscience

About the M.S. Program
The M.S. program gives students a broad background in neuroscience and the techniques used in neuroscience research. A master's thesis based on a laboratory research project is a requirement for the degree. Students who wish to continue their graduate training after completing the M.S. degree requirements may apply to the Ph.D. program, and their credits may be applied to the doctoral program.

About the Ph.D. Program
The Ph.D. program trains individuals to conduct independent research and to teach in the neurosciences. The program includes two years of coursework followed by original research leading to a thesis. Laboratory rotations begin in the fall of the first year.

For more information, visit the College of Medicine's Neuroscience Program web site.

M.S. in Neuroscience
48.0 credits.

Ph.D. in Neuroscience
96.0 credits.

About the Curriculum
Students in both the Ph.D. and M.S. 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 Ph.D. candidacy.

There are three rotations in the curriculum for which the student will be assigned a grade. The purpose of these rotations is 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.

Curriculum

First Year

Fall

IDPT 521S	**Core Curriculum I**	9.0
	- IDPT 522S Molecular Structure and Metabolism	
	- IDPT 523S Molecular Biology and Genetics	
NEUR 501S	**Neuroscience 1st Lab Rotation**	4.0
NEUR 508S	**Neuroscience Principles and Techniques**	2.0
	Total credits	15.0

Spring

IDPT 501S	**Biostatistics I**	2.0
IDPT 526S	**Core Curriculum II**	9.0
	- IDPT 527S Cell Biology I	
	- IDPT 528S Cell Biology II	
	- IDPT 529S Cell Signaling and Cell Cycle	
	- IDPT 530S Cells to Systems	
NEUR 504S	**Neuroscience 2nd Lab Rotation**	4.0
ANAT 602S	**Medical Neuroscience**	4.0
	Total credits	19.0

Second Year

Fall*

NEUR 503S	**Neuroscience 3rd Lab Rotation**	4.0
NEUR 609S	**Advanced Neuroscience**	4.0
NEUR 600S	**Neuroscience Thesis Research**	9.0
ANAT 501S	**Neurobiology Topics**	2.0
	Total credits	19.0

*Additional elective courses that students may consider in the Fall include:
PHRM 512S Graduate Pharmacology 3.0
PHYS 503S Graduate Physiology 4.0
MCBG 506S Advanced Cell Biology 2.0

Spring*

IDPT 500S	**Scientific Integrity and Ethics**	2.0
PHRM 507S	**Principles of Neuropharmacology, Behavior and Phys**	4.0
NEUR 600S	**Neuroscience Thesis Research**	9.0
ANAT 504S	**Neurobiology Topics**	2.0

Students must select one of the following Advanced Neuroscience courses:

NEUR 511S	**Advanced Cellular and Developmental Neuroscience**	2.0
NEUR 512S	**Advanced Cellular and Systems Neurophysiology**	2.0
NEUR 634S	**Motor Systems**	4.0
	Total credits	19.0 - 21.0-

*An additional elective course students may consider in the Spring is
PHRM 502S Current Topics in Pharmacology& Physiology 1.0

Third Year and Beyond*

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. Ph.D. 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.

ANAT 501S	**Neurobiology Topics**	2.0
NEUR 600S	**Neuroscience Thesis Research**	9.0
	Total credits	11.0

*Additional electives may include:
IDPT 600S Thesis Defense (non-billable) 9.0
IDPT 800S Registered for Degree Only 9.0

Pharmacology and Physiology

General Information
Students in both the Ph.D. and M.S. programs begin their coursework with a core curriculum in biomedical sciences, and immediately start laboratory rotations. Intensive graduate-level pharmacology and physiology courses round out the core programmatic courses. Specialization in ion channel physiology, smooth-muscle physiology, neuropharmacology, 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 M.S. Program
The M.S. 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 studies after the M.S. degree may apply to the Ph.D. program, and their course credits may be applied to the doctoral program.

About the Ph.D. Program
Ph.D. candidates must pass a qualifying examination in the middle of their third year and also 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 Ph.D. requirements is five years.

For more information, visit the College of Medicine's Department of Pharmacology and Physiology web site.

M.S. in Pharmacology and Physiology

48.0 credits.

Ph.D. in Pharmacology and Physiology

96.0 credits.

About the Curriculum

The core curriculum is a comprehensive interdisciplinary program of study for all first-year research master's and Ph.D. 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.

Curriculum

First Year

Fall

IDPT 521S	**Core Curriculum I**	9.0
	- IDPT 522S Molecular Structure and Metabolism	
	- IDPT 523S Molecular Biology and Genetics	
PHYS 503S	**Graduate Physiology**	4.0
PHRM 502S	**Current Topics in Pharmacology and Physiology**	1.0
PHRM 503S	**Pharmacology and Physiology 1st Lab Rotation**	4.0
PHRM 516S	**Pharmacology and Physiology: Special Topics**	2.0
	Total credits	20.0

Spring

IDPT 501S	**Biostatistics I**	2.0
IDPT 526S	**Core Curriculum II**	9.0
	- IDPT 527S Cell Biology I	
	- IDPT 528S Cell Biology II	
	- IDPT 529S Cell Signaling and Cell Cycle	
	- IDPT 530S Cells to Systems	
PHRM 504S	**Pharmacology and Physiology 2nd Lab Rotation**	4.0
PHRM 507S	**Principles of Neuropharmacology, Behavior and Physiology**	4.0
PHRM 502S	**Current Topics in Pharmacology and Physiology**	1.0
	Total credits	20.0

Second Year

Fall*

PHRM 502S	**Current Topics in Pharmacology and Physiology**	1.0
PHRM 505S	**Pharmacology and Physiology 3rd Lab Rotation**	4.0
PHRM 512S	**Graduate Pharmacology**	3.0
PHRM 516S	**Pharmacology and Physiology: Special Topics**	2.0
PHRM 600S	**Pharmacology and Physiology Thesis Research**	9.0
	Total credits	19.0

*Students may consider the following elective in the Fall:
NEUR 607S Advanced Neuroscience 4.0

Spring*

IDPT 500S	**Scientific Integrity and Ethics**	3.0
PHRM 502S	**Current Topics in Pharmacology and Physiology**	1.0
PHRM 600S	**Pharmacology and Physiology Thesis Research**	9.0
	Total credits	14.0

*Students may consider the following electives in the Spring:
NEUR 607S Advanced Neuroscience 4.0
PATH 601S Cell and Molecular Biology of Cancer 4.0
PHYS 502S Ion Channels in Cellular Physiology 2.0
MIIM 640 Effective Teaching Skills 1.0

Third Year and Beyond*

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. Ph.D. 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.

PHRM 502S	**Current Topics in Pharmacology and Physiology**	1.0
PHRM 516S	**Pharmacology and Physiology: Special Topics**	2.0
PHRM 600S	**Pharmacology and Physiology Thesis Research**	9.0
	Total credits	12.0

*Students may consider the following electives:
IDPT 600S Thesis Defense (non-billable) 9.0
IDPT 800S Registered for Degree Only 9.0
MCBG 506S Advanced Cell Biology 2.0
MCBG 507S Macromolecular Structure and Function 2.0
MIIM 630S Advanced Molecular Biology 2.0

Master of Science in Clinical Research Organization and Management

About the Program

The Master of Science in Clinical Research Organization and Management offers students a rigorous graduate education taught by leaders from the pharmaceutical, biotechnology and medical device industry, as well as by clinicians representing various therapeutic specialties actively pursued by the clinical research industry.

The program provides online courses that include scientific rationale related to the design and analysis of clinical trials, biostatistics, ethics-based reasoning for the conduct of research, clinical trial management 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
- Understand the scientific and clinical research literature to effectively interpret the results of clinical research, thereby enhancing the decision-making process.

Students have the ability to custom-tailor their learning by enrolling in programs and courses in a variety of medical topics.

For more information about the program, visit the Drexel e-Learning site.

Master of Science in Clinical Research Organization and Management

36.0 credits.

The Master of Science in Clinical Research Organization and Management consists of 12 courses. The program combines five areas of study devoted to clinical research and related administrative and regulatory issues. Students take courses within their preferred area of study, as well as a cross-section of courses within the other areas of study.

Curriculum

Track #1 New Product Research and Development		
CR 513S	**Pharmaceutical R & D Business Process and Information Flow**	3.0
CR 514S	**World Wide Regulatory Submissions**	3.0
CR 515S	**Introduction to Clinical Trials**	3.0
CR 609S	**Innovative Product Development**	3.0
CR 620S	**Biotechnology: Principles, Practices and Regulations**	3.0
CR 620S	**Biotechnology: Principles, Practices and Regulations**	3.0
Track #2 Regulatory Compliance, Ethics and Law		
CR 505S	**Ethical Issues for Clinical Research**	3.0
CR 511S	**History of Misconduct in Biomedical Research**	3.0
CR 535S	**Current Federal Regulatory Issues in Biomedical Research**	3.0
CR 555S	**Issues in Compliance and Monitoring**	3.0
CR 565S	**Contemporary Issues in Human Research Protection**	3.0
CR 633S	**Quality Assurance Audits**	3.0
CR 612S	**Fundamentals of Compliance**	3.0
CR 545S	**Pharmaceutical Law**	3.0
Track #3 Biostatistics and Data Management		
CR 500S	**Epidemiological Methods for Clinical Research**	3.0
CR 520S	**Applications of Clinical Research Biostatistics**	3.0
CR 560S	**Special Topics**	3.0
CR 600S	**Designing the Clinical Trial**	3.0

Track #4 Clinical Research Management and Safety Surveillance

CR 512S	**Fundamentals of Academic Research Administration**	3.0
CR 525S	**Scientific Writing and the Interpretation of Medical Literature**	3.0
CR 625S	**Health Policy and Pharmacoeconomics**	3.0

Track #5 New Therapeutic Product Business and Strategic Planning

CR 530S	**Technology Transfer and Intellectual Property**	3.0
CR 635S	**Strategic Planning**	3.0
CR 550S	**Leadership Skills**	3.0

Master of Forensic Science

General Information

In the past few years film and television has introduced our entire society to the once closed world of forensic science. One of the elements that the entertainment industry has correctly identified as shedding light into the field is that a multidisciplinary approach is necessary to allow our criminal justice system to run properly.

The Master of Forensic Sciences (MFS) Program is designed to provide a thorough introduction to both the scientific and legal aspects of the field, which will then be followed by more in-depth study of specific forensic science fields, such as forensic pathology, forensic anthropology, and a variety of sub-disciplines within the field of criminalistics. Students will be exposed to both the intricacies of problem solving as well as to the real-world application of the related disciplines within the field of forensic science. A collaborative network of municipal agencies, private enterprise and allied professional programs within the University has been built to prepare professionals who can confront the forensic challenges of the new millennium.

The program is not limited to only those students with undergraduate degrees in criminal justice and topic related fields. The MFS program is designed to attract students at a multidisciplinary level. Students with coursework in the natural sciences, pre-medicine, engineering, computer science, psychology and the social sciences are only a few of the disciplines which will find this program beneficial.

For more information about this program, visit the College of Medicine's Master of Forensic Science web page.

Master of Forensic Science

60.0 credits.

Curriculum

Core Courses

Fall

MFSP 501	**Physical Aspects of the Forensic Sciences**	3.0
MFSP 502	**Biological Aspects of the Forensic Sciences**	3.0
MFSP 528	**Introduction to Criminal Law and Trial Process**	3.0

Winter

MFSP 503	**Anatomy and Physiology for the Forensic Scientist I**	3.0
MFSP 505	**Principles of Forensic Pathology I**	3.0
MFSP 507	**Forensic Anthropology andTopics in Human Identification I**	3.0
MFSP 509	**Forensic Toxicology and instrumental Analysis I**	3.0
MFSP 511	**Criminal Law and the Court: Use of Evidence I**	3.0

Spring

MFSP 504	**Anatomy and Physiology for the Forensic Scientist II**	3.0
MFSP 506	**Principles of Forensic Pathology II**	3.0
MFSP 508	**Forensic Anthropology and Topics in Human Identification II**	3.0
MFSP 510	**Forensic Toxicology and Instrumental Analysis II**	3.0
MFSP 512	**Criminal Law and theCourt: Use of Evidence II**	3.0

Summer

MFSP 513	**Summer Practicum**	4.0
MFSP 514	**Statistics for the Forensic Scientist**	3.0
MFSP 515	**Cyber Crime and Questioned Document Examination**	3.0

Concentration Courses

After completing the core requirements and summer practicum, students choose to concentrate in one of two tracks: ***Criminalistics*** or ***Molecular Biology***.

Criminalistics Track

The criminalistics concentration 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.

Students elect to take a minimum of 26.0 credits over the remaining two terms:

Fall

MFSP 516	**Techniques in Crime Scene Investigation**	3.0
MFSP 517	**Forensic Aspects of Arson and Explosion Analysis**	3.0
MFSP 518	**Latent Fingerprint Analysis**	3.0
MFSP 519	**Introduction to Basic Forensic Engineering**	3.0
MFSP 520	**Principles of Firearms & Tool Mark Analysis**	3.0
MFSP 521	**Interview, Interrogation and Criminal Personality Profiling**	3.0

Winter

MFSP 522	**Trace Material and Forensic Geology and Botany**	3.0
MFSP 523	**Forensic Engineering and Accident Reconstruction**	3.0
MFSP 524	**Principles of Footwear and Tire Track Analysis**	3.0
MFSP 525	**NBC Terrorism**	3.0
MFSP 526	**Bloodstain Pattern Analysis and Serological Techniques**	3.0
MFSP 527	**Independent Study***	1.0-2.0

*Offered every quarter.

Molecular Biology Track

The molecular biology concentration offers courses in biochemistry; cell biology, human genetics; medical microbiology; immunology; forensic DNA analysis; bioterrorism; histology; virology; population genetics and eukaryotic genetics.

Students elect to take a minimum of 26.0 credits over the remaining two terms:

Fall

BIO 500	**Biochemistry I**	3.0
BIO 501	**Biochemistry I Laboratory**	2.0
BIO 520	**Cell Physiology**	3.0
BIO 670	**Medical Microbiology**	3.0
BIO 644	**Human Genetics**	3.0
BIO 650	**Virology**	3.0

Winter

BIO 680	**Special Topics in Biology: Histology Laboratory**	2.0
BIO 675	**Advanced Immunology**	3.0
BIO 530	**Techniques of Microbial Genetics**	5.0
BIO 635	**Advanced Genetics and Molecular Biology**	3.0
BIO 680	**Special Topics in Biology: Population Genetics**	3.0
ENVR 865	**Special Topics in Environmental Science: Bioterrorism**	3.0
MFSP 527	**Independent Study***	1.0-2.0

*Offered every quarter.

Master of Laboratory Animal Science Program

The M.L.A.S 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. Graduates of the MLAS degree program can hold supervisory positions in biotechnology, pharmaceutical companies, and institutions of higher learning. The M.L.A.S degree is also a powerful means to boost students' credentials for admission to veterinary school.

For more information about the program, visit Drexel's Master of Laboratory Animal Science web page.

Master of Laboratory Animal Science Program

48.0 Credits

The M.L.A.S. 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 48 credit hours for graduation. A minimum grade point average of 3.0 is required for graduation.

First Year: Fall Semester

Required Courses		Credits
MLAS 505S	**Microbiology & Immunology**	4.0
MLAS 510S	**Clinical Orientation to Laboratory Animal Facilities**	1.0
MLAS 523S	**Organizational Management I**	3.0
MLAS 536S	**Animal Models in Biomedical Research**	1.0

Electives		
PHYS 503S	**Graduate Physiology**	4.0
PHRM 512S	**Graduate Pharmacology**	3.0

First Year: Spring Semester

Required Courses

MLAS 520S	**Financial Management in Laboratory Animal Science**	3.0
MLAS 535S	**Biology and Care of Laboratory Animals**	4.0
MLAS 529S	**Molecular Genetics**	2.0

Second Year: Fall Semester

Required Courses

MLAS 531S	**Embryology**	4.0
MLAS 606S	**Clinical Laboratory Techniques and Concepts**	1.0
MLAS 610S	**Diseases of Laboratory Animals**	3.0
RAD 500	**Bionucleonics**	4.0

Electives

PHRM 512S	**Graduate Pharmacology**	3.0
MLAS 545S	**Histology**	2.0

Second Year: Spring Semester

Required Courses

MLAS 501S	**Journal Club**	1.0
MLAS 521S	**Architecture, Engineering, and Planning of Laboratory Animal Facilities**	4.0
CR 500S	**Epidemiological Methods for Clinical Research**	3.0
IDPT 501S	**Biostatistics I**	2.0

Second Year: Summer Session

Required Course

MLAS 801S	**Laboratory Animal Practicum**	12.0

Master of Pathologists' Assistant

General Information

A 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.

About the Program

The Master of Pathologists' Assistant program at Drexel offers traditional and non-traditional post-baccalaureate 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 rotations offering progressively responsible experience in autopsy and surgical pathology. These rotations are supplemented with informal classroom education.

Program Accreditation

***The Commission on Higher Education of the Middle States Association of Colleges and Schools (MSACHE)*:** The Commission on Higher Education is the unit of the Middle States Association of Colleges and Schools that accredits degree-granting colleges and universities in the Middle States region. It examines the institution as a whole, rather than specific programs within the institution. Drexel University is accredited by MSACHE, last reaffirmed in 2002. Visit the MSACHE website at www.msache.org to read more about the professional activities of this organization.

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. As such, the program joins seven other accredited Pathologists' Assistant programs in the United States (Duke University, Quinnipiac University, Wayne State University, Ohio State University, University of Maryland, Indiana University, and Rosalind Franklin University of Medicine and Science. Visit the NAACLS website at www.naacls.org to read more about the professional activities of this organization.

National Accrediting Agency for Clinical Laboratory Sciences

8410 W. Bryn Mawr Ave., Suite 670, Chicago, IL, 60631,773-714-8880.

Professional Certification

The American Society for Clinical Pathology Board of Registry (ASCP BOR): The ASCP BOR, in conjunction with the AAPA, has established a national certification program for Pathologists' Assistants. In 2005, the ASCP BOR first offered a national certification examination for Pathologists' Assistants. In order to be eligible for the BOR examination, applicants must be graduates of a pathologists' assistant educational program accredited by the National Accrediting Agency for Clinical Laboratory Science (NAACLS) or be able to demonstrate that they meet specific training and work experience requirements. Visit the ASCP BOR website at www.ascp.org/bor to read more about the certification program and the professional activities of t his organization.

Professional Affiliation

***The American Association of Pathologists' Assistants (AAPA)*:** The AAPA is the only national professional organization for pathologists' assistants. The mission of the AAPA is to provide appropriately educated and trained professionals to become an integral part of the anatomic pathology team, assisting the pathologist to provide appropriate, high quality, cost effective, comprehensive pathology and laboratory medicine services to the consumer. Further, the AAPA serves as the main vehicle for supporting, promoting, and maintaining the highest educational training, professional and ethical standards for its members, and for sustaining the pathologists' assistant as an established allied health professional.

Visit the AAPA website at www.pathologistsassistants.org to read more about the professional activities of 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 Pathologists' Assistant web page.

Master of Pathologists' Assistant

91.0 credits.

Curriculum

First Year

Summer

MSPA 500S	**Gross Anatomy**	5.0
MLAS 545S	**Histology**	2.0
MLAS 531S	**Embryology**	3.0
MSPA 510S	**Laboratory Management**	2.0
MSPA 560S	**Medical Ethics**	2.0
MSPA 520S	**Medical Terminology**	3.0
	Total credits	17.0

Fall

MSPA 530S	**Biomedical Photography**	4.0
MSPA 540S	**Histotechnology I**	3.0
MSPA 580S	**Medical Microbiology I**	4.0
MSPA 571S	**Medical Pathology I**	6.0
MSPA 590S	**Leadership Skills for the Medical Profession**	3.0
	Total credits	20.0

Spring

MSPA 550S	**Applied Anatomic Pathology**	4.0
MSPA 541S	**Histotechnology II**	3.0
MSPA 581S	**Medical Microbiology II**	3.0
MSPA 571S	**Medical Pathology II**	4.0
MSPP 515S	**Biological Function and Regulation**	4.0
	Total credits	18.0

Second Year

The second year consists of several hospital-based clinical rotations.

Summer

MSPA 600S	**Surgical Pathology I**	6.0

MSPA 610S	**Autopsy Pathology I**	6.0
	Total credits	12.0

Fall

MSPA 601S	**Surgical Pathology II**	6.0
MSPA 611S	**Autopsy Pathology II**	6.0
	Total credits	12.0

Spring

MSPA 602S	**Surgical Pathology III**	6.0
MSPA 612S	**Autopsy Pathology III**	6.0
	Total credits	12.0

The Doctor of Medicine (M.D.) Program

General Information

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 (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 (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 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. Students' assignments for the third year are based on the results of a lottery system.

The fourth-year curriculum 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 M.D. Program web site.

M.D. Dual Degree Programs

Drexel College of Medicine offers several programs that let students earn dual degrees at the graduate level. Applicants to dual degree programs proceed with their application to either the M.P.H, MBA or Ph.D. programs separately from their medical school application. Applicants must be accepted to the medical school in order to be considered for a dual degree program.

M.D./Ph.D. Program
The M.D./Ph.D. 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 a specific field of research. 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.

M.D./M.P.H.
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 M.D. 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.

M.D./MBA
The M.D./MBA degree meets a growing demand by physicians who wish to manage corporate medical practices, hospitals, and related organizations and contribute to the development of health policy. The joint program prepares physicians to apply management principles to individual or group practices or to move into management positions at many types of organizations. Students receive training at both the College of Medicine and at Drexel's A.A.C.S.B.-accredited LeBow College of Business. The program lets students earn both degrees in five years.

For additional information, visit the College's Dual Degrees page.

Certificate in the Study of Clinical Research

This 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 medical field 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.

This program requires the successful completion of five graduate courses. With the assistance of a curriculum advisor, students will choose from a variety of specialized courses depending on their educational objectives and employment-related experiences. Graduate credit will not be given for work-related experience.

Visit the Drexel University e-Learning site for additional information about the Certificate in the Study of Clinical Research.

Curriculum

Requirements		Credits
CR 609S	**Innovative Product Development**	3.0
CR 515S	**Introduction to Clinical Trials**	3.0
CR 612S	**Fundamentals of Compliance**	3.0

Electives		
CR 505S	**Ethical Issues for Clinical Research**	3.0
CR 600S	**Designing the Clinical Trial**	3.0
CR 525S	**Scientific Writing and the Interpretation of Medical Literature**	3.0

Drexel Pathways to Medical School (DPMS) Program

The Drexel Pathway to Medical School (DPMS) Program is an early assurance program that provides students from lower socioeconomic/disadvantaged backgrounds a unique opportunity to prove their ability to succeed in a medical school program. Students take a combination of graduate and medical school courses as well as additional courses that prepare them for taking the MCAT in the spring semester. If successful in the DPMS program, the student will be granted automatic admission into the College of Medicine following completion of the program.

See the Drexel Pathways to Medical School (DPMS) page on the College of Medicine's web site for application information.

About the Curriculum
The DPMS program is a one-year graduate level certificate program. A minimum 2.5 GPA is required to receive the Certificate of Program Completion.

The program begins with a mandatory 6-week Academic Assessment and Counseling Enrichment Session beginning the last week of June and continuing throughout the month of July. Students take the 1-credit Medical Science Preparation course as pass/fail. Students are not charged tuition or fees for this session of the program.

A minimum 2.5 GPA is required to receive the Certificate of Program Completion. In order to retain final acceptance with the College of Medicine, students are required to have at least a 3.0 GPA, a minimum 8 on the Physical and the Biological Sciences and 7 on the Verbal Reasoning section of the MCAT, satisfactory participation in the Academic Assessment and Counseling Enrichment Session, and a program recommendation.

Required Courses		Credits
Summer Enrichment Program		
DPMS 500S	**Medical Science Preparation**	1.0
Fall Semester		
IMSP 520S	**Medical Physiology I**	3.5
IMSP 510S	**Medical Biochemistry I**	7.5
PHRM 512S	**Graduate Pharmacology**	3.0
	MCAT Review	
Spring Semester		

IMSP 521S	**Medical Physiology II**	3.5
IMSP 511S	**Medical Biochemistry II**	0.5
IMSP 530S	**Medicine and Society II**	2.0
MSPP 513S	**Special Topics in Anatomy**	4.0
	MCAT Review	

After completion of the certificate portion of the program, students desiring to continue on to pursue the Master of Biological Science (M.B.S.) degree take the following additional courses:

Summer Research Project

MSPP 550S	**Research Project**	2.0

Fall Semester

IMSP 540S	**Cell Biology and Microanatomy I**	5.0
IMSP 570S	**Medical Immunology**	3.0
IMSP 550S	**Medical Nutrition**	1.0
IMSP 502S	**Medicine and Society I**	2.0
MSPP 505S	**Laboratory Techniques in Biochemistry and Molecular Biology***	2.0

***Alternately, students can choose to take MSPP 505S in the Fall semester.**

Spring Semester

IMSP 541S	**Cell Biology and Microanatomy II**	3.0
IMSP 560S	**Medical Neuroscience**	6.0
IDPT 501S	**Biostatistics I**	2.0

Evening Post-Baccalaureate Pre-Medical Certificate Program

The Medical Science Programs at Drexel University's College of Medicine offer the Evening Post-Baccalaureate Pre-Medical (PMED) program for individuals who wish to pursue a career in medicine. This unique 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.

The program is the equivalent of five semesters and takes two years to complete. The curr iculum includes science prerequisite courses for application to most medical schools.

The curriculum offers the prerequisite science courses required by most health professional schools. During the first year, General Inorganic Chemistry and General Physics with laboratories are offered. During the second year, students take Organic Chemistry and General Biology, in sequence, in the summer and fall semesters. Outside of the program, the opportunity for students to take additional courses through Drexel University is available.

For more information, visit Drexel's College of Medicine Evening Post-Baccalaureate Pre-Medical Certificate Program web page.

Interdepartmental Medical Science (IMS) Certificate Program

The I.M.S. program is an interdisciplinary curriculum that integrates basic science courses and presents them through clinical system based modules. Applicants to the I.M.S. 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. The program has been designed for college graduates who wish to enhance their academic credentials required for entry into U.S. medical school programs. However, the I.M. S. program can also assist students interested in applying to dental, optometry, podiatry, or chiropractic schools.

Interdepartmental Medical Science Curriculum
Considered as a special master's program, students in the I.M.S. program are afforded the opportunity to take actual first-year medical school courses. Applicants to the I.M.S. program must have already fulfilled undergraduate premedical requirements and demonstrated mastery of the material at a minimum grade of "C." These prerequisites include a year of biology, chemistry, physics and organic chemistry including respective laboratory sections. Students who feel that they have overcome their previous academic performance and can prove to medical schools that they can perform at a higher level are appropriate applicants to this program.

For more information, visit Drexel's College of Medicine Interdepartmental Medical Science Program web page.

Master of Medical Science (M.M.S.) Option
Those who have at least a B average and wish to receive a graduate degree may continue for another year of training to complete the requirements for the Master of Medical Science (M.M.S.) degree that the program offers. The M.M.S. degree can be completed in one additional year and requires research (non-thesis).

The Master in Medical Science Program is the second year of the I.M.S. program. Students cannot directly apply to the M.M.S. program. After successful completion of the I.M.S. year (minimum 3.0 GPA in I.M.S.) students are guaranteed admission into the M.M.S. program. During the M.M.S. year students take one second-year medical school course and conduct either bench-top or clinical research with a Primary Investigator. After successful completion of the program, the student is awarded a non-thesis Master of Medical Science degree. After successfully completing the program, a Certificate of Program Completion is awarded. Students wishing to pursue a master's degree in medical science may do so by completing an additional year of study. Students also have the option of transferring to other graduate

programs after completing one year of study.

Interdisciplinary Medical Science Required Courses		Credits
Fall Semester		
IMSP 520S	**Medical Physiology I**	3.5
IMSP 510S	**Medical Biochemistry I**	7.5
IMSP 540S	**Cell Biology and Microanatomy I**	5.0
IMSP 502S	**Medicine and Society I**	2.0
MSPP 550S	**Research Project***	2.0
IMSP 570S	**Medical Immunology***	3.0

*** Although optional for students pursuing the certificate, these courses are required for students who desire the M.M.S. degree. Students receive their grade for this course in the spring.**

Spring Semester		
IMSP 521S	**Medical Physiology II**	3.5
IMSP 511S	**Medical Biochemistry II**	0.5
IMSP 530S	**Medicine and Society II**	2.0
IMSP 541S	**Cell Biology and Microanatomy II**	3.0
IMSP 560S	**Medical Neuroscience**	6.0

Medical Science Preparatory (M.S.P.) Certificate / Master of Biological Science (M.B.S.) Program

The Medical Science Preparatory (M.S.P). program is a one-year certificate program designed to help students enhance their credentials for application to medical school by improving their science background and MCAT scores. Students in the MSP program have completed the premedical science requirements but need to enhance their science preparation in order to take or retake the MCAT. Those students who successfully complete the program will receive a Certificate of Program Completion.

Medical Science Preparatory Curriculum

Students in the Medical Science Preparatory program take four graduate level courses in anatomy/histology, biochemistry/cell biology, pharmacology, and physiology. Also included are undergraduate level review courses in physics and chemistry, a laboratory component, and participation in community service activities. In addition, there are weekly reviews in the verbal reasoning, biological science, and physical science sections of the MCAT. Mock MCATs are given during the year. Students are required to take the April MCAT.

For more information, visit Drexel's College of Medicine Medical Science Preparatory Program web page.

Master of Biological Science (M.B.S.) Option

Those who complete the program with a B average or higher and receive a 27 on the MCAT are guaranteed admission to the I.M.S. program for the following year. Those who complete the degree requirements during this second year receive a Master of Biological Science (M.B.S.) degree. Although students in good academic standing have the option of returning for the second year, they are not required to do so.

Medical Science Preparatory Required Courses

Fall Semester		
MSPP 500S	**Advanced Topics in Chemistry I**	4.0
MSPP 503S	**Advanced Topics in Physics I**	4.0
MSPP 505S	**Lab Techniques in Biochemistry and Molecular Biology**	2.0
MSPP 511S	**Concepts in Biochemistry and Cell Biology**	4.0
PHRM 512S	**Graduate Pharmacology**	3.0

MSPP 525S	**Community Dimension of Medicine**	2.0
	MCAT Preparatory Course	
	Total credits	19.0

Spring Semester

MSPP 501S	**Advanced Topics in Chemistry II**	4.0
MSPP 504S	**Advanced Topics in Physics II**	4.0
MSPP 513S	**Special Topics in Anatomy**	4.0
MSPP 515S	**Biological Function and Regulation**	4.0
	MCAT Preparatory Course	
	Total credits	16.0

For more information about continuing on to the Master's of Biological Science, visit Drexel's College of Medicine MBS web page.

Veterinary Medical Science (VMS) Post-Baccalaureate Certificate

30.0 Credits

This one-year, full-time program was developed in consultation with the Office of Admissions of several veterinary schools in the nation. After earning the V.M.S. certificate, qualified students have the option to continue their studies in our Master of Laboratory Animal Science Program (MLAS).

The curriculum has been designed to augment the student's understanding of the basic sciences which would ensure success in their professional careers as clinical veterinarians.

V.M.S. Certificate Required Courses

Fall

PHYS 503S	**Graduate Physiology**	4.0
PHRM 512S	**Graduate Pharmacology**	3.0
MLAS 545S	**Histology**	2.0
MSPP 511S	**Concepts and Techniques in Biochemistry and Cell Biology**	4.0

Spring

MLAS 505S	**Microbiology & Immunology**	4.0
MLAS 529S	**Molecular Genetics**	2.0
MLAS 531S	**Embryology**	4.0
MSPP 513S	**Special Topics in Anatomy**	4.0
CR 500S	**Epidemiological Methods for Clinical Research**	3.0

Upon completion of the VMS certificate, students have the option to continue their studies in the Master of Laboratory Animal Science program, pending a 3.0 GPA during their VMS year. To be awarded the MLAS degree, an additional 30 credits of coursework and 12 credits of practicum must be completed in two consecutive semesters and one summer session.