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The College of Medicine

The Drexel University College of Medicine

Drexel University College of Medicine (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, with over 1,100 medical students, Drexel University College of Medicine has one of the largest medical student enrollment of any private medical school in the country. More than 175 students are pursuing doctoral or master's degrees in biomedical graduate studies, and almost 600 students are enrolled in professional studies in the health sciences. There are some 570 residents, 650 clinical and basic science faculty, and more than 2,000 affiliate and other non-compensated 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, 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.

DUCOM's clinical 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 founded one of the leading centers for malaria study in the nation. The College is also the first medical center worldwide to perform Single Port Access (SPA ™) Surgery, a laparoscopic procedure that allows for hidden scars. Additionally, the College is also 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. 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 website.

Biochemistry

About the MS 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 PhD Program
The average duration of study for a PhD 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, PhD 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.

MS in Biochemistry

48.0 credits.

PhD 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. 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.

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 MS Program
MS 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 MS degree. In all semesters, MS students must attend seminars and journal clubs.

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

MS in Microbiology and Immunology

48.0 credits.

PhD 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. 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.

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 MS, and PhD 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 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 the fast-expanding field.

About the PhD Program
PhD 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.

MS in Molecular and Cell Biology and Genetics

48.0 credits.

PhD 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. 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.

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 Medicine

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 dissertation 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.
For additional information about the program, view the MS in Molecular Medicine page on the College of Medicine's website.

MS in Molecular Medicine

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, see the MS in Molecular Medicince Sequence page.

Required courses:		**21.0 Credits**
IDPT500S	**Scientific Integrity and Ethics**	2.0
IDPT 501S	**Biostatistics**	2.0
MIIM 502S	**Microbiology and Immunology Journal**	1.0
MIIM 512S	**Molecular Pathogenisis I**	3.0
MIIM 513S	**Molecular Pathogenisis II**	3.0
MIIM 527S	**Immunology, Immunopathology and Infectious Diseases**	3.0
MIIM 530S	**Fundamentals of Molecular Medicine I**	3.0
MIIM 531S	**Fundamentals of Molecular Medicine II**	3.0
MIIM 606S	**Microbiology and Immunology Seminar**	1.0

Electives

To complete the 36.0 credits total, students select from a menu of additional electives, and complete their required research component.

MIIM 521S	**Biotechniques I**	2.0
MIIM 522S	**Biotechniques II**	3.0
MIIM 523S	**Molecular Virology**	3.0
MIIM 524S	**Vaccines and Vaccine Development**	2.0
MIIM 525S	**Principles and Practices of Biocontainment**	1.0
MIIM 526S	**The Use of Animal Models in Biological Research**	1.0
MIIM 555S	**Advanced Bacterial Pathogenesis**	2.0
MIIM 613S	**Emerging Infectious Diseases**	2.0

MIIM 615S	**Experimental Therapeutics**	2.0
MIIM 621S	**Biotechniques and Laboratory Research I**	3.0
MIIM 622S	**Biotechniques and Laboratory Research II**	3.0
MIIM 650S	**Research Internship in Molecular Medicine**	6.0

MS in Molecular Medicine

36.0 credits.

Curriculum

First Year

Fall

MIIM 502S	**Microbiology and Immunology Journal Club**	1.0
MIIM 512S	**Molecular Pathogenisis I**	3.0
MIIM 527S	**Immunology, Immunopathology and Infectious Diseases**	3.0
MIIM 530S	**Fundamentals of Molecular Medicine I**	3.0
MIIM 606S	**Microbiology and Immunology Seminar**	1.0
	Total credits	11.0

Spring

IDPT500S	**Scientific Integrity and Ethics**	2.0
IDPT 501S	**Biostatistics**	2.0
MIIM 502S	**Microbiology and Immunology Journal Club**	1.0
MIIM 513S	**Molecular Pathogenisis II**	3.0
MIIM 531S	**Fundamentals of Molecular Medicine II**	3.0
MIIM 606S	**Microbiology and Immunology Seminar**	1.0
	Total credits	11.0

Summer

MIIM 650S	**Research Internship in Molecular Medicine**	6.0
	Total credits	6.0

Second Year

Fall

MIIM 502S	**Microbiology and Immunology Journal**	1.0
MIIM 521S	**Biotechniques I**	2.0
MIIM 523S	**Molecular Virology**	3.0
MIIM 606S	**Microbiology and Immunology Seminar**	1.0
MIIM 613S	**Emerging Infectious Diseases**	2.0
MIIM 621S	**Biotechniques and Laboratory Research I**	3.0
	Total credits	13.0

Spring

MIIM 502S	**Microbiology and Immunology Journal**	1.0
MIIM 522S	**Biotechniques II**	3.0
MIIM 524S	**Vaccines and Vaccine Development**	2.0
MIIM 526S	**The Use of Animal Models in Biological Research**	1.0
MIIM 606S	**Microbiology and Immunology Seminar**	1.0

MIIM 622S	**Biotechniques and Laboratory Research II**	3.0
	Total credits	11.0

Molecular Pathobiology

General Information
The Graduate Program in Molecular Pathobiology offers coursework and research opportunities leading to the PhD, M.D. /PhD and MS 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.

MS in Molecular Pathobiology

48.0 credits.

PhD 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. 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.

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 MS Program
The MS 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 MS degree requirements may apply to the PhD program, and their credits may be applied to the doctoral program.

About the PhD Program
The PhD 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.

MS in Neuroscience
48.0 credits.

PhD in Neuroscience
96.0 credits.

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 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

ANAT 602S	**Medical Neuroscience**	4.0
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 500S	**Statistics for Neuroscience/Pharmacology Research**	2.0
NEUR 504S	**Neuroscience 2nd Lab Rotation**	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. 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.

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 PhD and MS 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 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 studies 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 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 PhD requirements is five years.

For more information, visit the College of Medicine's Pharmacology and Physiology page.

MS in Pharmacology and Physiology

48.0 credits.

PhD 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 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.

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 electives in the Fall:
NEUR 607S Advanced Neuroscience 4.0
PHRM 525S Drug Discovery and Development 3.0

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. 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.

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

Academic Medicine

General Information
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.

Students pursuing an MS in Academic Medicine must designate a concentration. At this time the first available concentration is the field of otolaryngology.

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.

Program requirements
MS students in Academic Medicine will follow the residency curriculum that is standard for residents throughout the US. In addition they will:

1. Engage in a formal year-long course that will provide training relevant to careers in academic medicine;
2. Attend journal clubs overseen by the faculty;
3. Pass in-service training examinations at the 70th percentile or better, or receive board certification;
4. Complete a research requirement.

Course work
A minimum of thirty six 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 (see the curriculum) plus the requirement of a research based, first authored publication.

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.

Academic Medicine : Otolaryngology

About the Curriculum
A minimum of thirty six 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

Required courses for MS in Academic Medicine:		**36.0 Credits**
ACMD 600S	**Academic Medicine: Core Knowledge I**	3.0
ACMD 601S	**Academic Medicine: Core Knowledge II**	3.0
ACMD 602S	**Academic Medicine Thesis Research**	4.0
IDPT500S	**Scientific Integrity and Ethics**	2.0
IDPT 600S	**Thesis Defense**	9.0
IDPT 600S	**Thesis Defense**	9.0
	Additional didactic courses included in the Associated Residency Program	9.0

Required courses for concentration in Otolaryngology		**13.0 Credits**
OTO 600S	**General Otolaryngology**	3.0
OTO 601S	**Otology**	3.0
OTO 602S	**Head and Neck Oncology**	3.0
OTO 603S	**Pediatric Otolaryngology, Introduction**	3.0
OTO 604S	**Journal Club in Otolaryngology**	1.0

Students select two Otolaryngology electives from the following:		**6.0 Credits**
OTO 605S	**Laryngology - Voice, Introduction**	3.0
OTO 606S	**Laryngology - Voice, Advanced**	3.0
OTO 607S	**Laryngology - Swallowing**	3.0
OTO 608S	**Temporal Bone Dissection**	3.0

OTO 609S	**Neurotology**	3.0
OTO 610S	**Audiology**	3.0
OTO 611S	**Endocrine Surgery**	3.0
OTO 612S	**Allergy and Immunology**	3.0
OTO 613S	**Radiology of the Head and Neck**	3.0
OTO 614S	**Pathology and Histology**	3.0
OTO 615S	**Pediatric Otolaryngology, Advanced**	3.0
OTO 616S	**Otolaryngology Practice**	3.0
OTO 617S	**Research Methodology and Publication**	3.0
OTO 618S	**Facial Plastic and Reconstructive Surgery**	3.0
OTO 619S	**Sleep Disorders**	3.0
OTO 620S	**Taste and Smell**	3.0
OTO 621S	**Rhinosinusology**	3.0
OTO 622S	**Bronchoesophagology**	3.0

Students select one Otolaryngology surgery elective from the following:	**6.0 Credits**

OTO 700S	**General Otolaryngologic Surgery**	6.0
OTO 701S	**Otologic Surgery**	6.0
OTO 702S	**Head and Neck Oncologic Surgery**	6.0
OTO 700S	**General Otolaryngologic Surgery**	6.0
OTO 703S	**Pediatric Otolaryngologic Surgery**	6.0
OTO 704S	**Neurotologic Surgery**	6.0
OTO 705S	**Laryngologic Surgery**	6.0
OTO 706S	**Rhinologic Surgery**	6.0
OTO 707S	**Surgery of the Sinuses**	6.0
OTO 708S	**Bronchoesophagology**	6.0
OTO 709S	**Cosmetic Plastic and Reconstructive Surgery**	6.0

Master of Biological Science (M.BS) Program

Master of Biological Science (M.BS)
Students who complete the one-year Medical Science Preparatory Certificate (MSP) program with a B average or higher and receive a 27 on the MCAT are guaranteed admission to the program for the following year and can take additional courses, leading to the Master of Biological Science (M.BS) degree.

Summer Research Project		
MSPP 550S	**Research Project**	2.0

Fall Semester		
IMSP 502S	**Medicine and Society I**	3.0
IMSP 510S	**Medical Biochemistry I**	7.5
IMSP 520S	**Medical Physiology I**	3.5
IMSP 540S	**Cell Biology and Microanatomy I**	5.0
IMSP 550S	**Medical Nutrition**	1.0
IMSP 570S	**Medical Immunology**	3.0

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

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

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 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, 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

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 Science in Clinical Research for Health Professionals

About the Program
The MS in Clinical Research for Health Professions is a unique program, addressing the desires of residents, fellows and young clinicians to attain knowledge in how to conduct translational/pharmaceutical research 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
The MS in Clinical Research for Health Professionals is a non-thesis program. However, it is consistent with a master's level education that students be challenged to clearly express well-organized thoughts in written form. The collection, analysis and refinement of scientific information to produce a professional-level written document 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 9 hours research/week for 3 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 advisor must be submitted with the student's application for evaluation by the PSC admissions committee and the program's director. The appropriateness of the mentor will be evaluated by an ad hoc committee whose members come from both the Office of Professional Studies and the Drexel University College of Medicine clinical 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, visit the Professional Studies at the Drexel University College of Medicine site.

Master of Science in Clinical Research for Health Professionals

36.0 credits.

The MS in Clinical Research for Health Professionals requires completing a minimum of 15 semester credits, comprised of three required courses and two clinical research electives.

In addition, students will register for a total of 21 research credits.

Curriculum

Students select three of the following courses:		**9.0 Credits**
CR 505S	**Epidemiology**	3.0
CR 515S	**Introduction to Clinical Trials**	3.0
CR 520S	**Applications of Clinical Research Biostatitics**	3.0
CR 525S	**Scientific Writing and the Interpretation of Medical Literature**	3.0
CR 612S	**Fundaments of Compliance**	3.0
CR 545S	**Pharmaceutical Law**	3.0

Students select two of the following courses:		**6.0 Credits**
CR 505S	**Ethical Issues for Clinical Research**	3.0
CR 511S	**History of Misconduct in Biomedical Research**	3.0
CR 515S	**Introduction to Clinical Trials**	3.0
CR 520S	**Applications of Clinical Research Biostatistics**	3.0
CR 525S	**Scientific Writing and the Interpretation of Medical Literature**	3.0
CR 535S	**Current Federal Regulatory Issues in Biomedical Research**	3.0
CR 545S	**Pharmaceutical Law**	3.0
CR 565S	**Contemporary Issues in Human Research Protection**	3.0
CR 570S	**Principles and Practice of Pharmacovigilance**	3.0
CR 600S	**Designing the Clinical Trial**	3.0
CR 609S	**Innovative Product Development**	3.0
CR 612S	**Fundaments of Compliance**	3.0
CR 616S	**The Introduction of Therapeutic Products**	3.0
CR 617S	**Informatics in Pharm Research and Development**	3.0
CR 620S	**Biotechnology: Principles, Practices and Regulations**	3.0
CR 625S	**Health Policy and Economics**	3.0

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 502S	**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

***** 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 advisor must be submitted with the student's application for evaluation by the PSC admissions committee and the CRHP program director. The appropriateness of the mentor will be evaluated by an Ad Hoc committee whose members come from both the Office of Professional Studies and the Drexel College of Medicine clinical 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 CRHP program director for additional requirements.

Master of Science in Criminalistic Science

About the program
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.

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.

Master of Science in Criminalistic Science

48.0 credits.

Curriculum

Required Courses

First Year

FCA 501	**Anatomy for the Criminal Justice Practitioner**	3.0
FCA 502	**Medicolegal Death Investigation**	3.0
MFSP 502	**Biological Aspects of the Forensic Sciences**	3.0
MFSP 507	**Forensic Anthropology and Topics in Human Identification I**	3.0
MFSP 511	**Criminal Law and the Court: Use of Evidence I**	3.0
MFSP 512	**Criminal Law and the Court: Use of Evidence II**	3.0
MFSP 516	**Techniques in Crime Scene Investigation**	3.0
MFSP 528	**Introduction to Criminal Law and Trial Process**	3.0
MFSP 529	**Ethics for the Forensic Sciences**	3.0
MFSP 530	**Forensic Taphonomy**	3.0

Second Year

Students select 9.0 credits of electives from the following options:		
MFSP 515	**Cyber Crime**	3.0
MFSP 517	**Arson and Explosion Analysis**	3.0
MFSP 518	**Latent Fingerprint Analysis**	3.0
MFSP 521	**Interview, Interrogation and Criminal Personality Profiling**	3.0
MFSP 531	**Forensic Photography**	3.0

Students select 9.0 credits of electives from the following options:		
MFSP 520	**Firearms & Tool Mark Analysis**	3.0
MFSP 522	**Trace Materials Analysis**	3.0
MFSP 523	**Vehicle Accident Recognition**	3.0
MFSP 524	**Footwear/Tire Track Analysis**	3.0
MFSP 525	**N. B. C. Terrorism**	3.0
MFSP 526	**Bloodstain Pattern**	3.0

Master of Science in Histotechnology

About the Program
Drexel's MS in Histotechnology, a one-year (12-month) program, is designed to offer the necessary didactic coursework as well as the practical experience needed to function as a histotechnologist. Coursework includes laboratory management and leadership skills as well as advanced histotechnology courses.

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.

For more information about this program, visit the College of Medicine's Professional Studies programs page.

Master of Science in Histotechnology

42.0 credits.

Curriculum

Fall

MHPP 511S	**Concepts and Techniques in Biochemistry and Cell Biology**	4.0
MLAS 545S	**Fundamentals of Histology**	2.0
MSPA 540S	**Histotechnology I**	3.0
MSPA 520S	**Medical Terminology**	3.0
MSPA 590S	**Leadership Skills for the Medical Profession**	3.0
	Total credits	15.0

Spring

MHPP 500S	**Advanced Histotechnology**	4.0
MHPP 501S	**Anatomy for Histotechnologists**	4.0
MHPP 502S	**Histotechnology Capstone Project**	3.0
MSPA 581S	**Medical Microbiology I**	3.0
	Total credits	14.0

Summer

MSPA 510S	**Laboratory Management**	2.0
MSPA 560S	**Medical Ethics**	2.0
MHPP 503S	**Histotechnology Practicum**	9.0
	Total credits	13.0

MS in Interdisciplinary Health Sciences (MIHS) Program

About the Program
Students already participating in the Interdisciplinary Health Science (IHS) Certificate program who qualify (see admissions guidelines) and wish to obtain additional, more focused education within the medically related health sciences can earn a Master of Science degree. Having obtained a broad exposure to a variety of health care and medically related sciences during the first year, the MIHS year will permit students to refine their knowledge and further explore closely related subjects in their chosen area of focus in greater depth.

During their participation in the MIHS year of the program, students will complete 24 additional credit hours of graduate course work (for a total minimum of 48 hours in entire 2 year program) including a final research 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.
For more information about this program, visit the College of Medicine's Professional Studies programs page.

Master of Science in Interdisciplinary Health Sciences (MIHS) Program

24.0 additional credits for a total minimum of 48.0 credits in the two-year program

After completing the Interdisciplinary Health Science Certificate requirements, students complete 24 additional credit hours of graduate course work. Students select a concentration track, and complete a final research paper. For additional guidance on the research paper requirements, students should contact the MIHS Program Director.

Curriculum

Fall		**Credits**
IHS 504S	**Research Project and paper**	3.0
	Concentration track courses*	9.0

Spring		
MLAS 530S	**Biostatistics**	3.0
	Concentration track courses*	9.0

***Concentration Tracks:**

Clinical Research, Management and Laboratory Skills

Students select concentration courses from the following list:

CR 620S	**Principles, Practice, and Regulation of Biotechnology**	3.0
CR 625S	**Health Policy and Economics**	3.0
CR 614S	**Applications of Pharmacotherapy in Research and Development**	3.0
MLAS 520S	**Financial Management of Laboratory Animal Facilities**	3.0
MLAS 523S	**Organizational Management I**	3.0
MSPA 510S	**Laboratory Management**	2.0
MSPA 520S	**Medical Terminology**	3.0
MSPA 590S	**Leadership Skills in the Health Sciences**	3.0
MSPA 560S	**Medical Ethics**	2.0
MLAS 535S	**Biology and Care of Laboratory Animals**	4.0
MLAS 536S	**Animal Models in Biomedical Research**	1.0
PHRM 525S	**Drug Discovery and Development**	3.0

Biochemical and Pharmacologic Principles

Students select concentration courses from the following list:

MFSP 502	**Biological Aspects of Forensic Science**	3.0
MFSP 509	**Forensic Toxicology I**	3.0
MFSP 510	**Forensic Toxicology II**	3.0
MFSP 532	**Forensic Microbiology**	3.0
MLAS 513S	**Biochemical Basis of Disease**	2.0

MLAS 529S	**Molecular Genetics**	2.0
MMSP 530S	**Selected Topics in Pharmacology**	7.0
MSPP 511S	**Concepts in Biochemistry and Cell Biology**	4.0
MSPP 515S	**Biological Function and Regulation**	4.0
PHRM 512S	**Graduate Pharmacology**	3.0
PHRM 525S	**Drug Discovery and Development**	3.0
PHYS 503S	**Graduate Physiology**	4.0

Concepts in Anatomy and Pathology

Students select concentration courses from the following list:

MFSP 505	**Forensic Pathology I**	3.0
MFSP 506	**Forensic Pathology II**	3.0
MFSP 507	**Forensic Anthropology**	3.0
MFSP 534	**Human Osteology and Calcified Tissue Biology**	3.0
MLAS 513S	**Biochemical Basis of Disease**	2.0
MLAS 531S	**Embryology**	4.0
MLAS 536S	**Animal Models in Biomedical Research**	1.0
MLAS 545S	**Fundamentals of Histology**	2.0
MSPA 550S	**Applied Anatomic Pathology**	4.0
MSPA 570S	**Medical Pathology I**	6.0
MSPA 571S	**Medical Pathology II**	4.0
MSPP 513S	**Special Topics in Anatomy**	4.0

Laboratory Techniques

Students select concentration courses from the following list:

MFSP 507	**Forensic Anthropology**	3.0
MFSP 531	**Forensic Photography**	3.0
MFSP 532	**Forensic Microbiology**	3.0
MFSP 546	**Forensic DNA Analysis**	3.0
MLAS 535S	**Biology and Care of Laboratory Animals**	4.0
MLAS 536S	**Animal Models in Biomedical Research**	1.0
MLAS 545S	**Fundamentals of Histology**	2.0
MSPA 520S	**Medical Terminology**	3.0
MSPA 540S	**Histotechnology I**	3.0
MSPA 580S	**Medical Microbiology I**	4.0
MSPA 581S	**Medical Microbiology II**	3.0
MSPA 560S	**Medical Ethics**	2.0

Medical Sciences

Students in this concentration must take all of the following required courses:

IMSP 502S	**Medicine and Society I**	3.0
IMSP 503S	**Medicine and Society II**	2.0
IMSP 510S	**Medical Biochemistry I**	7.5
IMSP 511S	**Medical Biochemistry II**	.5
IMSP 520S	**Medical Physiology I**	3.5
IMSP 521S	**Medical Physiology II**	3.5
IMSP 540S	**Cell Biology and Microanatomy I**	5.0
IMSP 541S	**Cell Biology and Microanatomy II**	3.0
IMSP 560S	**Medical Neuroscience**	6.0

Medical Technology

(Concentration is under development)

Master of Science in 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 Science in Forensic Sciences 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 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 Science in Forensic Science web page.

Master of Science in Forensic Science

60.0 credits.

Curriculum

Core Courses

Fall

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 and Topics 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 the Court: 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**	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 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	**Criminal Profiling**	3.0
MFSP 523	**Forensic Engineering and Accident Reconstruction**	3.0

Winter

MFSP 517	**Forensic Aspects of Arson and Explosion Analysis**	3.0
MFSP 520	**Principles of Firearms & Tool Mark Analysis**	3.0
MFSP 521	**Criminal Profiling**	3.0
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**	3.0
MFSP 527	**Research Project**	3.0

*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**	3.0
BIO 501	**Biochemistry Laboratory I**	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
ENVS 865	**Special Topics in Environmental Science: Bioterrorism**	3.0
MFSP 527	**Research Project**	3.0

*Offered every quarter.

Master of Laboratory Animal Science Program

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

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

Master of Laboratory Animal Science Program

48.0 Credits

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 48 credit hours for graduation. A minimum grade point average of 3.0 is required for graduation as well as grades of "C" or better.

First Year: Fall Semester

Required Courses		Credits
MLAS 505S	**Microbiology with Laboratory**	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 525S	**Animal Anatomy**	2.0
MLAS 531S	**Embryology**	3.0
MLAS 606S	**Clinical Laboratory Techniques and Concepts**	1.0
MLAS 610S	**Diseases of Laboratory Animals**	3.0

Electives		
PHRM 512S	**Graduate Pharmacology**	3.0
MLAS 513S	**Biochemical Basis of Disease (UPENN)**	2.0
MLAS 514S	**Hematopoiesis (UPENN)**	1.5

MLAS 545S	**Fundamentals of Histology**	2.0

Second Year: Spring Semester

Required Courses

MLAS 501S	**Laboratory Animal Science Seminar**	2.0
MLAS 521S	**Architecture, Engineering, and Planning of Laboratory Animal Facilities**	4.0
MLAS 530S	**Biostatistics in Veterinary Science**	3.0

Second Year: Summer Session

Required Course

MLAS 801S	**Laboratory Animal Practicum**	12.0

Master of Science in Medical Sciences

The Master of Science in Medical Science Program is the second year of the IMS program. Students cannot directly apply to the MS in Medical Science program.

Those students completing the first year of the Interdepartmental Medical Sciences Certificate program 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 Science in Medical Science. The degree can be completed in one additional year and requires research (non-thesis).

Students not meeting the minimum 3.0 GPA will be evaluated by the program director on an individual basis for admission into the MS in Medical Science program.

To fulfil requirements for the MS in Medical Science, 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 Science in Medical Science.

Required Courses		Credits
Fall Semester		
	Research in Medical Science	6.0
	Research Seminar	2.0
	Medical Pathology*	6.0
	Medical Pharmacology*	7.0

*Option between the two medical school courses.

Spring Semester		
	Laboratory Techniques	6,0
	Research in Medical Science	6.0
	Research Seminar	2.0

After successful completion of the program, the student is awarded Master of Science degree.

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
Telephone: 215-762-4692
Email: medicalsciences@drexelmed.edu

Master of Science in 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 Science in 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 and is currently in the review process for future reaccreditation. 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. 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 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 website at www.ascp.org/bor 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 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 Science in Pathologists' Assistant program web page.

Master of Science in Pathologists' Assistant

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 Master's Degree 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. The applicants will be notified of the Committee's decision on a rolling basis.
Candidates for admission must provide the following credentials:

1. Completed application form
2. Resume
3. Transcript of college academic record
4. Graduate Record Examination (GRE) scores
5. Three letters of evaluation
6. 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?

For further information, contact:

James W. Moore, MHS, PA (ASCP)
Pathologists' Assistant (FAAPA)
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
james.moore@drexelmed.edu

Tina Rader, MHS, PA (ASCP)
Pathologists' Assistant (FAAPA)

Master of Science in 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 520S	**Medical Terminology**	3.0
	Total credits	15.0

Fall		
MSPA 530S	**Biomedical Photography**	4.0
MSPA 540S	**Histotechnology I**	3.0
MSPA 580S	**Medical Microbiology I**	4.0
MSPA 570S	**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 560S	**Medical Ethics**	2.0
MSPA 600S	**Surgical Pathology I**	6.0
MSPA 610S	**Autopsy Pathology I**	6.0
	Total credits	14.0

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

Master of Science in Pathologists' Assistant

Clinical Placement Sites

The Master of Science in Pathologists' Assistant program has an extensive network of clinical placement sites, including:

Albert Einstein Medical Center (Philadelphia)
Abington Memorial Hospital
Bryn Mawr Hospital
Chester County Hospital
The Children's Hospital of Philadelphia
Emory University Hospital
Geisinger Medical Center
Hahnemann University Hospital
Lancaster General Hospital
Lankenau Hospital
Memorial Sloan Kettering Cancer Center
The Philadelphia Medical Examiner's Office
The Reading Hospital and Medical Center
St. Luke's Hospital and Health Network
Thomas Jefferson University Hospital
Virtua Health
York Hospital

The Doctor of Medicine (MD) 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 MD Program web site.

MD 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 MPH, MBA or PhD 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.

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 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.

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.

MD/MBA

The MD/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

15.0 Credits

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		
CR 515S	**Introduction to Clinical Trials**	3.0
CR 545S	**Pharmaceutical Law**	3.0
CR 612S	**Fundamentals of Compliance**	3.0

Electives		
CR 565S	**Contemporary Issues in Human Research Protection**	3.0
CR 570S	**Principles and Practice of Pharmacovigilance**	3.0
CR 525S	**Scientific Writing and the Interpretation of Medical Literature**	3.0
CR 609S	**Innovative Product Development**	3.0
CR 620S	**Principles, Practices, and Regulations of Biotechnology**	3.0
CR 625S	**Health Policy and Economics**	3.0

Drexel Pathway 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 Pathway 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 2.75 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 2.75 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
IMSP 570S	**Medical Immunology (Track 2 students for pass/fail)**	3.0
or		
	MCAT Review (Track 1 students)	
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 Science 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 (All students for letter grade)**	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 Spring 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

32.0 semester credits

The Office of Professional Studies in the Health Sciences 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 or other health program. 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 curriculum includes science prerequisite courses for application to most medical and other health profession schools.

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 sequence, in the summer and fall semesters. Outside of the program, the opportunity for students to take additional courses through Drexel University is available.

Required Courses		Credits
PMED 111S	**General Chemistry I**	3.0
PMED 112S	**General Chemistry I Lab**	1.0
PMED 121S	**General Physics I**	3.0
PMED 122S	**General Physics I Lab**	1.0
PMED 131S	**General Chemistry II**	3.0
PMED 132S	**General Chemistry II Lab**	1.0
PMED 141S	**General Physics II**	3.0
PMED 142S	**General Physics II Lab**	1.0
PMED 211S	**General Biology I**	3.0
PMED 212S	**General Biology I Lab**	1.0
PMED 221S	**Organic Chemistry I**	3.0
PMED 222S	**Organic Chemistry I Lab**	1.0
PMED 231S	**General Biology II**	3.0
PMED 232S	**General Biology II Lab**	1.0
PMED 241S	**Organic Chemistry II**	3.0
PMED 242S	**Organic Chemistry II Lab**	1.0

Interdepartmental Medical Science (IMS) Certificate Program

The IMS program is an interdisciplinary curriculum that integrates basic science courses and presents them through clinical system based modules. 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. 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 IMS 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 IMS program are afforded the opportunity to take actual first-year medical school courses. Applicants to the IMS 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.

Interdepartmental 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**	3.0
IMSP 570S	**Medical Immunology***	3.0
IMSP 550S	**Medical Nutrition***	1.0

*** Although optional for students pursuing the certificate, these courses are required for students who desire the M.MS 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

Master of Science in Medical Science 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 Science in Medical Science. The degree can be completed in one additional year and requires research (non-thesis).

The Master of Science in Medical Science Program is the second year of the IMS program. Students cannot directly apply to the MS in Medical Science program. After successful completion of the IMS year (minimum 3.0 GPA in IMS) students are guaranteed admission into the MS in Medical Science program.

Students also have the option of transferring to other graduate programs after completing the Interdepartmental Medical Science Certificate program.

Certificate of Interdisciplinary Health Science

24.0 credits

The Certificate of Interdisciplinary Health Science is designed to give students an opportunity to learn about the many professional venues through which medicine is practiced and health care delivered in this country, while taking graduate electives in a variety of medical and health related-sciences. Through rigorous coursework, students will be able to prepare for a broad spectrum of professional opportunities within the health sciences.

Applicants to the program are required to have a bachelor's degree from a US accredited institution, or its equivalent. The student should have successfully completed the minimum science courses required for application to medical school and have a minimum GPA of approximately 2.75 or better. In addition, students should have approximately a 20 or better on the MCAT exam with no science section below 7, or have scores in the 50th percentile on the general GRE.

Students take 12-18 credits per semester for a minimum of 24 total credits, working with an advisor to select the courses that best suit their career goals.

Curriculum

Fall

Required Course		Credits
IHS 500S	**Career Counseling in the Health Sciences Seminar I**	1.0

Working with an advisor, students select courses from the following:

CR 505S	**Ethical Issues in Research**	3.0
CR 515S	**Introduction to Clinical Trials**	3.0
CR 525S	**Scientific Writing and Medical Literature**	3.0
CR 535S	**Current Federal Regulatory Issues in Biomed Resarch**	3.0
CR 545S	**Pharmaceutical Law**	3.0
CR 550S	**Leadership Skills in the Health Sciences**	3.0
CR 612S	**Fundamentals of Compliance**	3.0
CR 617S	**Informatics in Pharmaceutical Research and Development**	3.0
MFSP 516	**Techniques: Crime Scene Investigation**	3.0
MFSP 518	**Latent Fingerprint Analysis**	3.0
MFSP 521	**Techniques of Interview and Interrogation**	3.0
MLAS 505S	**Microbiology with Laboratory**	4.0
MLAS 523S	**Organizational Management I**	3.0
MLAS 525S	**Animal Anatomy**	2.0
MLAS 531S	**Embryology**	3.0
MLAS 536S	**Animal Models for Biomedical Research**	1.0
MSPA 545S	**Fundamentals of Histotechnology**	2.0
MFSP 502	**Biological Aspects of Forensic Science**	3.0
MFSP 528	**Introduction to Criminal Law/Trial Process**	3.0

MSPA 540S	**Histotechnology I**	2.0
MSPA 580S	**Medical Microbiology I**	4.0
MLAS 531S	**Embryology**	3.0
MLAS 500S	**Bionucleonics**	3.0
PHRM 512S	**Graduate Pharmacology**	3.0
MSPP 511S	**Concepts in Biochemistry and Cell Biology**	4.0

Spring

Required Courses		
IHS 501S	**Career Counseling in the Health Sciences Seminar II**	1.0
IHS 502S	**Neuropharmacology**	3.0
MSPP 525S	**Community Dimensions in Medicine**	2.0

Working with an advisor, students select additional courses from the following:

PBHL 530	**Epidemiology**	3.0
MFSP 526	**Bloodstream Pattern Analysis**	3.0
MLAS 535S	**Biology and Care of Laboratory Animals**	3.0
MSPA 581S	**Medical Microbiology II**	3.0
MSPP 513S	**Special Topics in Anatomy**	4.0
MSPP 515S	**Biological Functions and Regulation**	4.0
CR 545S	**Pharmaceutical Law**	3.0

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

Quantitative Principles for Clinical Research Certificate

9.0 credits

This Certificate of Study addresses the needs of residents and fellows to attain knowledge in the conduct of clinical research while developing their clinical careers. 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 or the Clinical Research for Health Professionals program to obtain an MS degree.

Required Courses		
CR 500S	**Epidemiology**	3.0
CR 520S	**Applications of Clinical Research Biostatistics**	3.0
CR 525S	**Scientific Writing and the Interpretation of Medical Literature**	3.0

Medical Science Preparatory (MSP) Certificate

The Medical Science Preparatory (MSP) 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.BS) Option
Those who complete the program with a B average or higher and receive a 27 on the MCAT are guaranteed admission to the IMS program for the following year. Those who complete the degree requirements during this second year receive a Master of Biological Science (M.BS) 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 Master of Biological Science 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 VMS 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.

VMS Certificate Required Courses

Fall

IMSP 510S	**Medical Biochemistry I**	7.5
IMSP 520S	**Medical Physiology I**	3.5
MLAS 505S	**Microbiology with Laboratory**	4.0
MLAS 525S	**Animal Anatomy**	2.0
MLAS 606S	**Clinical Laboratory Techniques and Concepts**	1.0

Spring

IMSP 511S	**Medical Biochemistry II**	0.5
IMSP 521S	**Medical Physiology II**	3.5
MLAS 529S	**Molecular Genetics**	2.0
MLAS 530S	**Biostatistics in Veterinary Science**	3.0
MSPP 513S	**Special Topics in Anatomy**	4.0

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.