



DREXEL UNIVERSITY

College of
Medicine

School of Biomedical Sciences and Professional Studies

CATALOG

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About the School of Biomedical Sciences & Professional Studies

Overview

Renowned for its innovative, student-centered educational programs, Drexel University College of Medicine School of Biomedical Sciences and Professional Studies (<http://www.drexelmed.edu>) is the consolidation of two venerable medical schools with rich and intertwined histories: Hahnemann Medical College and Woman's Medical College of Pennsylvania. Established in 1848 and 1850, respectively, they were two of the earliest medical colleges in the United States, and Woman's was the very first medical school for women in the nation.

Today, there are more than 165 students pursuing doctoral or master's degrees in biomedical graduate studies, and more than 700 students enrolled in professional studies in the health sciences. There are some 625 residents, 700 clinical and basic science faculty, and more than 2,000 affiliate and other non-compensated faculty.

Majors

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Certificates

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Mission Statement

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

About the College

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

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

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

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

Master of Science in Academic Medicine

Master of Science: 36.0 semester credits minimum + research-based publication

Additional 25.0 credits for concentration in otolaryngology

About the Program

Exceptional residents often pursue scholarly activities in addition to fulfilling their other residency requirements. This program is designed for those residents who publish research and pursue scholarly activities in addition to their typical residency training, and who desire to pursue careers in clinical education in their field of interest.

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

The MS in Academic Medicine is designed to address topics of value to the academic physician, including training in leadership, education, ethics, professionalism, public health, health accreditation, statistics, bioepidemiology, research techniques, medical writing and editing, grant writing, research regulations, public speaking and academic health center management. These are topics typically important to educators, but not commonly covered in depth during residency training.

Goals and Objectives

The MS in academic medicine provides a structured pathway for physicians planning careers as clinical educators to acquire specialized knowledge and to demonstrate a special expertise in teaching. The objectives of the MS in Academic Medicine include:

- training young physicians to be skilled clinical educators;
- providing students with core knowledge about academic medicine that is not included systematically in residency training programs;
- encouraging research;
- exposing students to the process of supervising and mentoring research;
- encouraging life-long continued study of materials and methods for clinical education.

Examinations

All residents are required to take in-service training examinations annually. This is a national, standardized test provided for each clinical specialty. Performance at the 70th percentile or better in this examination is considered a passing grade for the MS. Alternatively, board certification would be sufficient to acknowledge that the student has mastered a body of knowledge suitable for the MS degree. Each clinical specialty has its own (very rigorous) requirements for board certification, supervised by the American Board of Medical Specialties.

Admission Requirements

Applications are reviewed by the department in which the degree is offered (for example: otolaryngology - head and neck surgery).

Recommendations for acceptance are presented to the Biomedical Graduate Education Committee of the College of Medicine for final approval. The requirements for admission include but are not limited to:

- enrollment in an ACGME approved residency program;
- satisfactory completion of at least one year of residency;
- a letter of recommendation from the applicant's Department Chair or Program Director;
- an interview in person;

- medical school transcript.

Visit the Office of Biomedical Graduate Studies Admissions (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Admissions/MastersandDoctoral.aspx>) website for more detailed information about applying to the program, including important application dates.

Degree Requirements

A minimum of thirty-six semester credits are required with a B average or better. Thus, the course of study for the MS in Academic Medicine will be in addition to the standard curriculum for residents plus the requirement of a research based, first authored publication.

Research Requirements

Each candidate for the MS will conduct a research project under the guidance of his/her advisory committee. In most cases this project will encompass clinical or bench research that will result in a first author publication in a peer-reviewed journal. (Case reports are not sufficient for fulfilling this requirement) However if the student is involved in scholarly activity of another nature that is deemed sufficiently rigorous by the advisory committee, flexibility to recognize and accept other activities is intended. For example, such activities might include writing a book or developing the curriculum for a new academic program.

Curriculum

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
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 600S	Thesis Defense	9.0
Total Credits		21.0

A minimum of ten elective credits are required for completion of the MS in Academic Medicine. Additional electives are encouraged. Electives may be selected from among the following courses. Other courses may be used to fulfill this requirement, with the approval of the candidates' advisory committee.

FIN 301	Introduction to Finance	4.0
COM 270 [WI]	Business Communication	3.0
ORGB 300 [WI]	Organizational Behavior	4.0
CAT 302	Customer Service Theory and Practice	3.0
CT 230	Web Development I	3.0
CT 240	Web Development II	3.0
COM 340	Desktop Publishing	3.0
CR 500S	Epidemiology	3.0
CR 511S	The History of Misconduct in Biomedical Research	3.0
CR 515S	Intro to Clinical Trials	3.0
CR 520S	Applications of Clinical Research Biostatistics	3.0
CR 525S	Scientific Writing and 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 600S	Designing the Clinical Trial	3.0
CR 609S	INNOVATIVE PRODUCT DEVELOPMENT	3.0
CR 625S	Health Policy and Economics	3.0
PHRM 525S	Drug Discovery and Development I	3.0
PBHL 520	Principles of Biostatistics	4.0
PBHL 530	Principles of Epidemiology	4.0
PBHL 540	Prevention Principles and Practices	4.0
PBHL 600	Management, Leadership, Assurance and Health Services	3.0
PBHL 601	Management Health Care Systems	3.0
PBHL 605	Change Management in Public Health	3.0
PBHL 607	Evolution of United States Health Policy	3.0
PBHL 609	Issues in United States Health Policy	3.0
PBHL 622	Statistical Inference I	3.0
PBHL 650	Public Policy and Advocacy	3.0
PBHL 629	Design & Analysis of Clinical Trials	3.0

Biochemistry

Master of Science: 36.0 - 48.0 semester credits

Doctor of Philosophy: 96.0 semester credits

About the Program

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

MS in Biochemistry

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

PhD in Biochemistry

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

About the Curriculum

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

students participate in student seminars and are encouraged to attend seminars in the department and University.

Courses Repeatable for Credit

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

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

MS Degree Requirements Non-Thesis Option

MS without Thesis: 36.0 semester credits

Required Courses

BIOC 502S	Biochemistry 1st Lab Rotation	4.0
BIOC 503S	Biochemistry 2nd Lab Rotation	4.0
BIOC 506S	Biochemistry Journal Club	1.0
BIOC 507S	Biochemistry Seminar Series	1.0
MCBG 506S	ADVANCED CELL BIOLOGY	2.0
BIOC 508S	Experimental Approaches to Biochemical Problems	3.0
BIOC 603S	Advanced Topics in Biochemistry and Molecular Biology	2.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
MCBG 507S	MACROMOLECULAR STRUCT & FUNCTI	2.0
BIOC 511S	Writing for Researchers: Grants and Papers	1.0

Suggested Electives*

Select one of the following:		2.0-4.0
BIOC 503S	Biochemistry 2nd Lab Rotation	
BIOC 504S	Biochemistry 3rd Lab Rotation	
BIOC 510S	Cancer Biology	
MIIM 555S	Molec. Mech. Of Micro. Path	
MIIM 604S	Special Topics in Virology	
NEUR 609S	Graduate Neuroscience II	
MIIM 630S	Advanced Molecular Biology	
PATH 601S	CELL MOL PATHBIO CANCER ANGIOG	
PHGY 503S	GRADUATE PHYSIOLOGY	
PHRM 512S	Graduate Pharmacology	
PHRM 525S	Drug Discovery and Development I	

Total Credits 40.0-42.0

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

MS Degree Requirements Thesis Option

MS with thesis: 48.0 semester credits

Required Courses

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

Suggested Electives *

Select one of the following: 2.0-4.0

BIOC 503S	Biochemistry 2nd Lab Rotation
BIOC 504S	Biochemistry 3rd Lab Rotation
BIOC 510S	Cancer Biology
MIIM 555S	Molec. Mech. Of Micro. Path
MIIM 604S	Special Topics in Virology
MIIM 630S	Advanced Molecular Biology
NEUR 609S	Graduate Neuroscience II
PATH 601S	CELL MOL PATHBIO CANCER ANGIOG
PHGY 503S	GRADUATE PHYSIOLOGY
PHRM 512S	Graduate Pharmacology
PHRM 525S	Drug Discovery and Development I

Total Credits 50.0-52.0

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

PhD Requirements

The program requires the completion 96.0 semester credits. During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student's Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After concluding their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

Required Courses

BIOC 502S	Biochemistry 1st Lab Rotation	4.0
BIOC 503S	Biochemistry 2nd Lab Rotation	4.0

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

Suggested Electives *

Students are required to take a minimum of one of the courses 2.0-4.0 from the following list:

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

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

Master of Science in Biological Science

83.0 graduate semester credits total

34.0 graduate semester credits + 47.0 MSP certificate credits (both undergraduate and graduate)

About the Program

There are two routes of entry into the Master of Biological Science (MBS) program. US citizens or permanent residents are required to first successfully complete the Medical Science Preparatory program and then may transition into the MBS program. International students are required to enter the Master of Biological Science program directly, which consists of the MSP year followed by the MBS year.

The Master Science in Biological Science year is identical to the Interdepartmental Medical Science certificate program and all the benefits to the student that program offers. The MBS year is offered at both the Philadelphia and Sacramento campus locations.

Additional Information

For more information about the program, visit the College of Medicine Master of Science in Biological Science (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PreMedicalPrograms/MasterofBiologicalScienceMBSProgram.aspx>) web page.

Required Medical Science Preparatory Certificate Courses

MSPP 400S	Advanced Topics in Chemistry I	4.0
MSPP 401S	Advanced Topics in Chemistry II	4.0
MSPP 402S	Advanced Topics in Physics I	4.0
MSPP 403S	Advanced Topics in Physics II	4.0
MSPP 404S	Concepts in Science and Verbal Reasoning I	6.0
MSPP 405S	Concepts in Science and Verbal Reasoning II	6.0
MSPP 505S	Lab Tech in Bioch & Molec Biol	2.0
MSPP 511S	Concepts in Bioch & Cell Biolo	4.0
MSPP 513S	Special Topics in Anatomy	4.0
MSPP 525S	Community Dimensions of Medici	2.0
MSPP 515S	Biological Function & Regulati	4.0
PHRM 512S	Graduate Pharmacology	3.0

Required MS 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	0.5
IMSP 520S	Medical Physiology I	3.5
IMSP 521S	Medical Physiology II	3.5
IMSP 540S	Cell Biology & Microanatomy I	5.0
IMSP 541S	Cell Biology and Microanatomy II	3.0
IMSP 560S	Medical Neuroscience	6.0

Summer Research Project

MSPP 550S	Research Project	2.0
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Optional Courses

IMSP 570S	Medical Immunology *	
IMSP 550S	Medical Nutrition *	

Total Credits 83.0

* These courses are optional.

MS in Biotechnology

40.0 semester credits

About the Program

The MS in Biotechnology program is designed to train laboratory personnel in the theory and practice of state-of-the art technologies for biochemical analysis. The program is targeted to individuals who will be seeking employment in biotechnology/pharmaceutical firms or academic laboratories and is appropriate for recent college graduates or experienced technicians. Graduates of this program will possess a set of technical skills that will make them very competitive for laboratory jobs in the academic or industrial sectors, or, if they are already employed, enhance their potential for advancement.

The program length is three semesters plus one summer session and includes both classes and hands-on practica.

About the Curriculum

The program consists of two parts:

1. A set of required didactic courses designed to provide students with the theoretical underpinnings of modern Biochemistry and Biotechnology. This knowledge will form a foundation for the hands-on aspects of the second portion of the curriculum.
2. A set of four hands-on practica providing detailed exposure and experience in four different aspects of biochemistry/biotechnology. Each practica will be conducted under the close supervision of a faculty member with expertise in the area, and will progress from an initial set of experiments in which the results are already known (allowing students to become familiar with techniques) then progressing to a project tightly associated with the ongoing research in the mentor's laboratory.

Practica during the fall and spring semesters will be 4.0 semester credit hours. The summer practicum will be 8.0 semester credit hours, and will include preparation of a scholarly paper that reviews a topic related to the techniques associated with that particular practicum. Possible practica themes include: protein expression and purification; crystallography; mass spectroscopy; protein-protein and protein-ligand interaction with SPR and/or calorimetry; and imaging/microscopy.

Required Courses

BIOC 507S	BIOCHEMISTRY SEMINAR SERIES *	3.0
BIOC 508S	Experimental Approaches to Biochemical Problems	4.0
BIOC 603S	SPECIAL TOPICS: BIOCHEM. & NUT	1.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0

Required Practica

BIOC 513S	Biotechnology Practicum I	4.0
BIOC 514S	Biotechnology Practicum II **	8.0
BIOC 515S	Biotechnology Practicum III	4.0
BIOC 516S	Biotechnology Practicum IV	4.0

Total Credits 40.0

* Taken for one credit each term in fall, spring and summer for a total of 3.0 credits.

** The 8.0 credit Practicum is taken in the summer.

Admission Requirements

For acceptance to the program, the applicant must have completed a four-year biology or chemistry-based bachelor's degree program, or equivalent, with at least a 3.0 GPA. Students must fulfill all requirements for consideration as defined by the Drexel University College of Medicine Biomedical Graduate Education Committee:

- official transcripts from all colleges and universities attended;
- official copies of entrance test scores and official test scores from the Graduate Record Examination (GRE);
- references from at least three instructors or professionals;
- an application fee, made payable to Drexel University is required for application processing (online application is free);
- International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States.

Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS.

Students applying to the program will be expected to have undergraduate experience in chemistry, cell biology, biochemistry, and mathematics--including, at a minimum--two semesters each of inorganic chemistry, organic chemistry, physics, calculus and biology. Visit Drexel University's Graduate Admissions (<http://www.drexel.edu/grad/programs/ducom>) site for additional information regarding specific requirements for applying to the College of Medicine as well as important application dates.

Master of Science in Cancer Biology

Master of Science: 40.0-43.0 semester credits

About the Program

The goal of the MS in Cancer Biology program is to provide a master's degree focused on the fundamentals of cancer from an interdisciplinary perspective, including:

- biology and molecular biology of cancer initiation;
- metastasis;
- treatment; and
- bioinformatics/systems biology.

The program is designed to meet the needs of two groups of individuals: (1) new or recent college graduates who wish to increase their marketability for jobs in academic or industrial laboratories through the acquisition of knowledge and skills more developed than obtained through a standard college curriculum; and (2) currently employed technical staff in the pharmaceutical or biotechnology industry (or academia) who wish to advance their position.

Consisting of both classroom and laboratory instruction, the program fills a need to train laboratory personnel in cancer theory and research. Graduates of this program will possess knowledge in both the theoretical as well as the practical level.

Additional Information

Mauricio Reginato, PhD
Program Director
Department of Biochemistry + Molecular Biology
Drexel University College of Medicine
mauricio.reginato@drexelmed.edu

Admission Requirements

For acceptance to the program, the applicant must have completed a four-year biology or chemistry-based bachelor's degree program, or equivalent, with at least a 3.0 GPA. Students must fulfill all requirements for consideration as defined by the Drexel University College of Medicine Biomedical Graduate Education Committee:

- official transcripts from all colleges and universities attended;
- official copies of entrance test scores and official test scores from the Graduate Record Examination (GRE);
- references from at least three instructors or professionals;

- an application fee, made payable to Drexel University is required for application processing (online application is free);
- International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS.

Students applying to the program will be expected to have undergraduate experience in chemistry, cell biology, biochemistry, and mathematics--including, at a minimum--two semesters each of inorganic chemistry, organic chemistry, physics, calculus and biology.

Visit Drexel University's Graduate Admissions (<http://www.drexel.edu/grad/programs/ducom>) site for additional information regarding specific requirements for applying to the College of Medicine as well as important application dates.

Degree Requirements: Thesis Option

43.0 semester credits

Each semester, throughout the two years, there will be a weekly Cancer Journal Club. Students will also attend the Molecular & Cell Biology & Genetics (MCBG) Seminar series. Each semester contains a research component.

The Thesis Option of this program based on research can be initiated at the end of the first year.

Required Courses

BIOC 510S	Cancer Biology	3.0
BIOC 512S	Advanced Cancer Biology	2.0
CBIO 500S	Core Cancer Topics	2.0
CBIO 503S	Cancer Biology Journal Club	1.0
CBIO 504S	Cancer Biology 1st Lab Rotation	4.0
CBIO 505S	Cancer Biology 2nd Lab Rotation	2.0
CBIO 506S	Cancer Biology Thesis Research	9.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	BIostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
MCBG 513S	MOLEC & CELL BIOLOGY SEMINAR	1.0

Suggested Electives *

Select a minimum of 5.0 credits of electives:		5.0
BIOC 508S	Experimental Approaches to Biochemical Problems	
CBIO 501S	Infection, Inflammation and Cancer	
CBIO 508S	Cancer Biomarkers and Therapeutics	
MCBG 506S	ADVANCED CELL BIOLOGY	
MCBG 514S	Cell Cycle and Apoptosis	
PHRM 525S	Drug Discovery and Development I	
PBHL 633	Epidemiology of Cancer	

Total Credits 43.0

Degree Requirements: Non-Thesis Option

40.0 semester credits

Required Courses

BIOC 510S	Cancer Biology	3.0
BIOC 512S	Advanced Cancer Biology	2.0
CBIO 500S	Core Cancer Topics	2.0
CBIO 503S	Cancer Biology Journal Club (May be repeated for credit)	1.0
CBIO 504S	Cancer Biology 1st Lab Rotation	4.0
CBIO 505S	Cancer Biology 2nd Lab Rotation	2.0
CBIO 507S	Special Topics in Cancer Biology	9.0
IDPT 501S	BIostatISTICS I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
MCBG 513S	MOLEC & CELL BIOLOGY SEMINAR	1.0
	Suggested Electives*	4.0

Select a minimum of 4.0 credits of electives.

BIOC 508S	Experimental Approaches to Biochemical Problems
CBIO 501S	Infection, Inflammation and Cancer
CBIO 508S	Cancer Biomarkers and Therapeutics
MCBG 506S	ADVANCED CELL BIOLOGY
MCBG 514S	Cell Cycle and Apoptosis
PHRM 525S	Drug Discovery and Development I
PBHL 633	Epidemiology of Cancer
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Total Credits	40.0

* Students can select a course from the list of suggested electives or by approval from the Program Director.

Master of Science in Clinical Research for Health Professionals

Master of Science: 36.0 semester credits

About the Program

The MS in Clinical Research for Health Professionals program is a non-thesis curriculum designed for residents, fellows, and clinicians seeking knowledge in the conduct of translational and pharmaceutical research. The degree often acts as an advanced preparation for independent investigators and other practicing researchers familiar with the industry, while developing their clinical careers.

The program is also available to other clinical health professionals such as nurses (with a minimum of a bachelor's degree required), audiologists, etc. to help these individuals advance their professional opportunities.

Online course work coupled with supervised research activities will allow health care professionals in any academic hospital setting throughout the US to receive an MS degree from Drexel University College of Medicine (DUCoM).

Research Project

While the MS in Clinical Research for Health Professionals program does not require a thesis, the program is consistent with a master's level

education that challenges students to clearly express well-organized thoughts in written form. The collection, analysis and refinement of scientific information to produce a professional-level written document are crucial skills for those in the health professions. This requirement will expose students to the entire process of developing a research project and reporting on that research project up to and including experiencing a facsimile of the peer review and re-submission process.

It is anticipated that each student will conduct a minimum of nine hours research per week for 3.0 credits per semester. Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/techniques; or, development/evaluation of new clinical devices. Research mentors must be established researchers with a doctoral degree. A curriculum vitae of the proposed research mentor must be submitted with the student's application for evaluation by the admissions committee and the program'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 Drexel University Online (<http://drexel.com/crhp>) site.

Degree Requirements

The MS in Clinical Research for Health Professionals program requires completing a minimum of 15.0 semester credits, comprised of three required courses and two clinical research electives. In addition, students will register for a total of 21.0 research credits.

Curriculum

Select three of the following:		9.0
CR 500S	Epidemiology	
CR 515S	Intro to Clinical Trials	
CR 520S	Applications of Clinical Research Biostatistics	
CR 525S	Scientific Writing & Med Lit	
CR 612S	Fundamentals of Compliance	
CR 545S	PHARMACEUTICAL LAW	
Select two of the following:		6.0
CR 500S	Epidemiology	
CR 501S	Emerging Trends in Medical Device History	
CR 505S	Ethical Issues in Research	
CR 511S	The History of Misconduct in Biomedical Research	
CR 512S	Fundamentals of Academic Research Administration	
CR 515S	Intro to Clinical Trials	
CR 520S	Applications of Clinical Research Biostatistics	
CR 525S	Scientific Writing & Med Lit	
CR 535S	Current Federal Regulatory Issues in Biomedical Research	
CR 545S	PHARMACEUTICAL LAW	
CR 565S	Contemporary Issues in Human Research Protection	
CR 570S	Principles and Practice of Pharmacovigilance	

CR 600S	Designing the Clinical Trial
CR 609S	INNOVATIVE PRODUCT DEVELOPMENT
CR 612S	Fundamentals of Compliance
CR 614S	Pharmacotherapy in New Drug R&D
CR 616S	Intro to Therapeutic Products
CR 617S	Informatics in Pharm Res & Development
CR 620S	Biotech/Research
CR 625S	Health Policy and Economics
CR 999S	Special Topics

Research/Journal-type paper requirement (min 21.0 credits)

Each student conducts a minimum of 9 hours research/week for 3 credits per semester *

CRHP 501S	Research Health Professions I	3.0
CRHP 502S	Research Health Professions II	3.0
CRHP 503S	Research Health Professions III	3.0
CRHP 504S	Research Health Professions IV	3.0
CRHP 505S	Research Health Professions V	3.0
CRHP 506S	Research Health Professions VI	3.0
CRHP 507S	Research Health Professions VII	3.0
Total Credits		36.0

* Research may include a broad spectrum of clinical studies such as: retrospective studies; bench-top studies in conjunction or not with pharmaceutical companies; development of new clinical methodologies/ techniques; or, development/evaluation of new clinical devices.

Research mentors must be established researchers with a doctoral degree. A curriculum vitae of the proposed research 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 Clinical Research Organization and Management

Master of Science: 36.0 semester credits

About the Program

The Master of Science in Clinical Research Organization and Management is an online program designed both for individuals already trained in the area of clinical sciences, as well as for others who desire focused training in the proper conduct of clinical research.

The Master of Science in Clinical Research Organization and Management program offers students a rigorous graduate education taught by leaders from the pharmaceutical, biotechnology and medical device industries, as well as from academic research centers.

The program provides online courses that include scientific rationale related to the design and analysis of clinical trials, epidemiology and biostatistics, ethics-based reasoning for the conduct of research, clinical trial management and monitoring processes, and federal regulatory rules and policies essential to the development of a broadly-educated and well-prepared professional in clinical research and new therapeutic product investigation.

The program is designed so that graduates will be able to:

- Successfully apply the framework and philosophies of research to the management of clinical trials, employing quality principles of current good clinical practice to produce valid and useful data;
- Ensure that sound ethical principles and values are always recognized and upheld in research involving a human population;
- Use current statistical knowledge and methods in the design, implementation, conduct, and assessment of clinical trial management; and
- Understand the scientific and clinical research literature to effectively interpret the results of clinical research, thereby enhancing the decision-making process.

Students work with advisors to customize their course plans to meet their career goals.

Program Delivery Options

All Clinical Research (CR) courses are offered solely online. Visit the Drexel University Online site for details.

Additional Information

For more information about the program, visit the Master of Science in Clinical Research Organization and Management (<http://drexel.com/crom>) page on the Drexel University Online site.

For information about applying to the program, visit the Drexel University Online Admissions Criteria (<http://www.drexel.com/online-degrees/biomedical-degrees/ms-crom/admissions.aspx>) web page.

Degree Requirements

The Master of Science in Clinical Research Organization and Management program consists of 12 courses (36.0 credits). Any courses offered by the Clinical Research Organization Management program may be applied to fulfill the requirements of this major. No master's thesis is required.

The program is organized into five areas of study devoted to clinical research and related administrative and regulatory issues. Students may take courses within their preferred area of study, a cross-section of courses within other areas of study, or any other Clinical Research (CR) courses being offered.

New Product Research and Development

CR 513S	Pharmaceutical R&D: Business Process and Information Flow	3.0
CR 514S	World Wide Regulatory Submissions	3.0
CR 515S	Intro to Clinical Trials	3.0
CR 609S	INNOVATIVE PRODUCT DEVELOPMENT	3.0
CR 620S	Biotech/Research	3.0

Regulatory Compliance, Ethics and Law

CR 505S	Ethical Issues in Research	3.0
CR 511S	The History of Misconduct in Biomedical Research	3.0
CR 535S	Current Federal Regulatory Issues in Biomedical Research	3.0
CR 555S	COMPLIANCE & MONITORING ISSUES	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

Biostatistics and Data Management

CR 500S	Epidemiology	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

Clinical Research Management and Safety Surveillance

CR 512S	Fundamentals of Academic Research Administration	3.0
CR 525S	Scientific Writing & Med Lit	3.0
CR 625S	Health Policy and Economics	3.0

New Therapeutic Product Business and Strategic Planning

CR 530S	TECH TRANSFER	3.0
CR 635S	STRATEGIC PLANNING	3.0
CR 550S	Leadership Skills	3.0

Master of Science in Criminalistic Science

About the Program

Master of Science: 58.0 semester credits

The School of Biomedical Sciences and Professional Studies offers the Master of Science in Criminalistic Science. The Master of Science in Criminalistic Science is designed to introduce students to the basic principles of Criminalistic Science while also providing opportunities to pursue either more traditional and/or more innovative concentrations of study.

Criminalistics is defined as the scientific study and analysis of crime scenes and the evidence within those scenes to solve a crime and apprehend the perpetrator of the crime. The disciplines within criminalistics are science based, with most using multiple combinations of the natural sciences to conduct examinations and analysis of evidence and crime scenes.

In addition to required courses in criminal law, trial process and the use of evidence, the Master of Science in Criminalistic Science program offers courses in fingerprint science, forensic engineering, motor vehicle crash reconstruction, firearms and tool mark analysis, fire and explosion analysis, footwear and tire track analysis, bloodstain pattern analysis, trace materials and forensic geology and botany, and nuclear, biological, chemical terrorism/mass disaster management.

Admission Requirements

Applicants must have a bachelor's degree from an accredited US college or university or its equivalent. Official general GRE and/or MCAT scores

are required for admission. Typical applicants would have a minimum 2.5 GPA.

Selection is based upon academic qualifications, standardized test scores, references, an evaluation of the candidate's goals and commitment, and a telephone interview.

Each applicant's academic record will be evaluated based upon its individual merits. Since consideration for employment within the field of criminalistic science necessitates the absence of a criminal background, it is expected that all individuals applying to this program will have no history of criminal behavior, including prior illicit drug and/or prescription drug abuse.

For additional information on how to apply for this program, contact:

Ms. Thelicia Hill
215.762.4674
thelicia.hill@drexelmed.edu

Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
Master of Criminalistic Science Program
Mail Stop 344, 245 North 15th Street
Philadelphia, PA 19102-1192

Degree Requirements

Year One: Fall Semester

FCA 505S	Physical Aspects of Forensic Science	3.0
FCA 507S	Gross Human Skeleton I	1.0
IHS 999S	Special Topics (Introduction to Scientific Writing)	2.0
MFSP 553S	Human Structure Lab	1.0
MFSP 550S	Biological Aspects of the Forensic Sciences	2.0
MFSP 552S	Structure of the Human Body	3.0
MFSP 561S	Techniques of Crime Scene Investigation	3.0
MFSP 575S	Introduction to Criminal Law and Trial Process	3.0

Year I: Spring Semester

FCA 506S	Medico-legal Death Investigation	2.0
FCA 508S	Gross Human Skeleton II	3.0
MFSP 556S	Forensic Anthropology and Topics in Human Identification	3.0
MFSP 559S	Criminal Law and the Court: Use of Evidence I	3.5
MFSP 560S	Criminal Law and the Court: Use of Evidence II	3.5
MFSP 576S	Ethics for the Forensic Scientist	3.0

Year 2: Fall Semester

Ten credits chosen from the following electives:	10.0
MFSP 593S	Cyber Crime
MFSP 563S	Latent Fingerprint Analysis
MFSP 578S	Forensic Photography
MFSP 590S	Homicide Investigation
MFSP 571S	Bloodstain Pattern Analysis
MFSP 568S	Vehicle Accident Reconstruction and Analysis

Year 2: Spring Semester

Twelve credits chosen from the following electives:	12.0
MFSP 562S	Arson and Explosive Analysis
MFSP 565S	Firearms and Tool Mark Analysis

MFSP 566S	Techniques of interview and interrogation
MFSP 569S	Footwear and Tire Track Analysis
MFSP 570S	Nuclear/Biological/Chemical Terrorism
MFSP 591S	Criminal Investigative Analysis
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Total Credits	58.0

Master of Science in Drug Discovery and Development

Master of Science: 38.0 semester credits

About the Program

The MS in Drug Discovery and Development program provides in-depth exposure to the multiple elements involved in drug discovery and development. This program has been designed to prepare students for a smooth transition into an enduring and productive research career within the pharmaceutical and biotechnology industry. It covers all aspects of drug discovery and development ranging from the discovery and characterization of drug targets through to regulatory approval and commercialization. Students will also be exposed to business aspects as well as to other areas of biotechnology as well as to the basic sciences of pharmacology and physiology.

The MS in Drug Discovery and Development is available to individuals who have already obtained a BS or BA degree in some field of the biomedical or health sciences who may wish to pursue an industry-focused master's-level degree. This may include individuals who wish to pursue a career in the pharmaceutical or biotechnical industries.

This program is also intended for individuals from other disciplines who wish to have a broader base of information about drug discovery and development, those who may wish to transition into the industry, or those who are already active in the industry and seek to increase their knowledge. The curriculum has been designed with the recognition that the complex pharmaceutical and biotechnical industries require a diversity of personnel experience.

For more information about this program, visit the College of Medicine's Biomedical Graduate Studies (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms.aspx>) page.

Admission Requirements

For acceptance to the program, the applicant must have completed a four-year biology or chemistry-based bachelor's degree program, or equivalent, with at least a 3.0 GPA. Students must fulfill all requirements for consideration as defined by the Drexel University College of Medicine Biomedical Graduate Education Committee:

- official transcripts from all colleges and universities attended;
- official copies of entrance test scores and official test scores from the Graduate Record Examination (GRE);
- references from at least three instructors or professionals;
- an application fee, made payable to Drexel University is required for application processing (online application is free);
- International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. Applicants whose native language is not English must demonstrate

the ability to speak, write, and understand the English language by submitting an acceptable score on the Test of English as a Foreign Language (TOEFL), or IELTS.

Students applying to the program will be expected to have undergraduate experience in chemistry, cell biology, biochemistry, and mathematics--including, at a minimum--two semesters each of inorganic chemistry, organic chemistry, physics, calculus and biology.

Visit Drexel University's Graduate Admissions (<http://www.drexel.edu/grad/programs/ducom>) site for additional information regarding specific requirements for applying to the College of Medicine as well as important application dates.

For additional information on how to apply, visit Drexel's Admissions page for Biomedical Graduate Studies (<http://www.drexel.edu/grad/programs/ducom/apply>).

Degree Requirements

The curriculum is designed to provide students with a detailed core focusing on the many facets of the drug discovery and development process, while simultaneously providing students with multiple options to pursue related areas of interest.

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
or IDPT 501S	Biostatistics I	
PHRM 512S	Graduate Pharmacology	3.0
PHRM 525S	Drug Discovery and Development I	3.0
PHRM 526S	Drug Discovery and Development II	3.0
PHRM 605S	Research in Drug Discovery and Development	4.0
PHGY 503S	GRADUATE PHYSIOLOGY	4.0
PHRM 502S	Current Topics i Pharm & Phys	1.0
PHRM 516S	Advanced Topics in Physiology	1.0
PHRM 517S	Advanced Topics in Pharmacology	1.0
Electives *		8.0

Students take additional electives from the following two lists to reach a minimum of 38.0 credits total for graduation.

Semester Elective Course Options:

MIIM 521S	Biotechniques I	2.0
MIIM 524S	Vaccines and Vaccine Development	3.0
MIIM 530S	Fundamentals of Molecular Medicine I	3.0
MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MLAS 536S	Animal Models for Biomedical Research	1.0
NEUR 508S	Graduate Neuroscience I	2.5
MIIM 508S	Immunology I	3.0
BIOC 510S	Cancer Biology	3.0
PATH 601S	CELL MOL PATHBIO CANCER ANGIOG	4.0
PHRM 503S	Pharm & Phys 1st Lab Rotation	4.0
PHRM 507S	Prin of Neuropharmacology	3.0
PHRM 518S	New Frontiers in Therapy	1.0
PHRM 519S	Methods in Biomedical Research	1.0
Quarter Elective Course Options:		
BIO 631	Bioinformatics I	3.0

MGMT 685	Implementing Strategies Using Project Teams	3.0
MGMT 910	Readings in Strategic Management	3.0
PROJ 501	Introduction to Project Management	3.0
PROJ 535	International Project Management	3.0
PBHL 530	Principles of Epidemiology	4.0
BMES 604	Pharmacogenomics	3.0
MGMT 940	Seminar in Organizational Behavior	3.0
ORGB 625	Leadership and Professional Development	3.0
Total Credits		92.5

* Courses that are not listed above may be taken as electives only with the approval of the program director.

Master of Science in Drexel Pathway to Medical School

64.0 semester credits

About the Program

Curriculum: Certificate to Master's Degree

After completion of the Certificate in Drexel Pathway to Medicine requirements, some students may desire to pursue a Master of Science degree.

The following course list indicates the two portions of the program: the initial certificate requirements, as well as the following 27.0 credits required to be awarded an MS in Drexel Pathway to Medical School.

Required Courses

Summer Enrichment Program

DPMS 500S	Medical Science Preparation	1.0
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Fall Semester

IMSP 510S	Medical Biochemistry I	7.5
IMSP 520S	Medical Physiology I	3.5
PHRM 512S	Graduate Pharmacology	3.0
Select one of the following, depending on Track:		3.0-6.0
MSPP 404S	Concepts in Verbal Reasoning I (Track I students)	
IMSP 570S	Medical Immunology (Track II students)	

Spring Semester

IMSP 503S	Medicine and Society II	2.0
IMSP 511S	Medical Biochemistry II	0.5
MSPP 513S	Special Topics in Anatomy	4.0
IMSP 521S	Medical Physiology II	3.5
MSPP 405S	Concepts in Verbal Reasoning II (For Track I students)	6.0

Total Credits		34.0-37.0
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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:

Required Courses

Summer Research Project

MSPP 550S	Research Project	2.0
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Fall Semester

IMSP 502S	Medicine and Society I	3.0
IMSP 540S	Cell Biology & Microanatomy I	5.0
IMSP 550S	Medical Nutrition	1.0
IMSP 570S	Medical Immunology (For letter grade)	3.0

Spring Semester

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

Laboratory Techniques Requirement

Select one of the following: 2.0

MSPP 505S Lab Tech in Bioch & Molec Biol (Offered in fall)

MMSPP 510S Lab Tech In Bioc & Molec Biol (Offered in spring)

Total Credits		27.0
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Master of Science in Forensic Science

About the Program

Master of Science: 67.5 semester credits

The School of Biomedical Sciences and Professional Studies offers the Master of Science in Forensic Science. The MS in Forensic Science is designed to provide students with a solid foundation within the forensic sciences, while at the same time encouraging growth and leadership in new and emerging applications within the field. The program offers students the opportunity to concentrate within one of three major areas of forensic science: criminalistics; molecular biology; or (under development) cyber crime.

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 program provides an 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. The program progresses to allow students the study of one of three current areas of concentration: molecular biology, criminalistics, or clinical forensic medicine. Opportunities for overlapping study within these disciplines are also available. 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 (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/>)

ForensicScienceProfessionalPrograms/
MasterofForensicScienceMFSPProgram.aspx) web page.

Admission Requirements

Admission into the program requires that the student have a strong background in the sciences. Students are required to have an academic year in each of the following sciences: biology; chemistry; organic chemistry and physics. A minimum 3.0 undergraduate GPA is desired, however, all supplemental materials and overall experience will be factored into the acceptance process. Additional course work to strengthen areas of weakness will be reviewed. The following submissions will be necessary for admission to the program:

- An application along with \$65.00 fee
- Official transcripts for each College or University where coursework was attempted or taken
- Three letters of evaluation
- Official MCAT and/or GRE test scores

Contact information

For additional information on how to apply for this program, contact:

Ms. Thelicia Hill
215.762.4674
thelicia.hill@drexelmed.edu

Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
Forensic Science Program
Mail Stop 344, 245 North 15th Street
Philadelphia, PA 19102-1192

Degree Requirements

Requirements

Year I: Fall Semester

IHS 999S	Special Topics (Introduction to Scientific Writing)	2.0
MFSP 550S	Biological Aspects of the Forensic Sciences	2.0
MFSP 551S	Human Function	3.0
MFSP 552S	Structure of the Human Body	3.0
MFSP 553S	Human Structure Lab	1.0
MFSP 561S	Techniques of Crime Scene Investigation	3.0
MFSP 575S	Introduction to Criminal Law and Trial Process	3.0
MFSP 581S	Human Osteology and Calcified Tissue Biology I	3.0

Year I: Spring Semester

MFSP 554S	Principles of Forensic Pathology	4.0
MFSP 556S	Forensic Anthropology and Topics in Human Identification	3.0
MFSP 557S	Drug Chemistry	2.0
MFSP 558S	Instrumental Analysis	2.0
MFSP 559S	Criminal Law and the Court: Use of Evidence I	3.5
MFSP 560S	Criminal Law and the Court: Use of Evidence II	3.5
MFSP 582S	Human Osteology and Calcified Tissue Biology II	3.0

Year I: Summer Semester

MFSP 555S	Forensic Sciences Summer Practicum	3.0
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MFSP 572S	Forensic Research Project I	3.0
MFSP 576S	Ethics for the Forensic Scientist	3.0
Select 3 credits from the following electives:		3.0

MFSP 569S	Footwear and Tire Track Analysis
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MFSP 578S	Forensic Photography
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MFSP 593S	Cyber Crime
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Year 2, Fall Semester

MFSP 592S	Forensic Graduate Seminar	1.5
MFSP 572S	Forensic Research Project I	3.0

Select four credits of electives. Suggested electives include:		4.0
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MFSP 578S	Forensic Photography
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MFSP 593S	Cyber Crime
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Concentration Electives

Students select six credits from the categories below. Not all credits must be from the same concentration. 6.0

Criminalistic Concentration

MFSP 562S	Arson and Explosive Analysis
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MFSP 563S	Latent Fingerprint Analysis
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MFSP 565S	Firearms and Tool Mark Analysis
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MFSP 566S	Techniques of interview and interrogation
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MFSP 568S	Vehicle Accident Reconstruction and Analysis
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MFSP 569S	Footwear and Tire Track Analysis
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MFSP 570S	Nuclear/Biological/Chemical Terrorism
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MFSP 571S	Bloodstain Pattern Analysis
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MFSP 590S	Homicide Investigation
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MFSP 591S	Criminal Investigative Analysis
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Molecular Biology Concentration

MFSP 567S	Basic Techniques for the Analysis of Biomolecules
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MFSP 577S	Genetics for the Forensic Scientist
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MFSP 579S	Forensic Microbiology
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MFSP 580S	Principles of Immunology
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MFSP 588S	Special Topics in Cell Biology
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MFSP 589S	Forensic DNA Analysis
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Clinical Forensic Science Concentration

MFSP 583S	The Autopsy in Clinical Forensic Medicine
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MFSP 584S	Introduction to Forensic Radiology
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MFSP 585S	Clinical Forensic Emergency Medicine and Traumatology
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MFSP 586S	Introduction to Forensic Pediatrics
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MFSP 587S	Introduction to Forensic Psychology
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Total Credits		67.5
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Master of Science in Histotechnology

About the Program

Master of Science: 47.0 semester credits

The School of Biomedical Sciences and Professional Studies offers the Master of Science in Histotechnology program. This one-year (12-month) program combines academic studies with a clinical practicum to prepare the students to perform complex tissue specimen preparations

in the histology laboratory. The program provides advanced training and is designed to enable graduates to work as highly qualified histotechnologists under the supervision of pathologists.

Coursework includes histology, biochemistry, advanced histotechnology, anatomy, physiology, microbiology, medical ethics, laboratory management and leadership skills. In addition to the course work, students complete a three-month practicum designed to allow students to apply the knowledge and techniques learned during their didactic courses in a clinical hospital setting. The practicum allows the student the opportunity to perform routine as well as specialized, histotechnology techniques under the supervision of a qualified histotechnologist.

For more information about this program, visit the College of Medicine's Master of Science in Histotechnology (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/AlliedHealthProfessionPrograms/HistotechnologyProgram.aspx>) page.

Admission Requirements

A bachelor's degree in a biological or allied health science, with a cumulative GPA of approximately 2.75, is the minimum requirement for acceptance into the Master's Degree Program. Prerequisite course work includes mathematics, English composition, general chemistry, organic and/or biochemistry and biological science. microbiology, anatomy and histology are recommended but not required.

All candidates will be required to have a formal interview with the Selection Committee prior to final acceptance. Deadline for submission of the application is the second Friday in June of the year in which the students plan to enroll.

Candidates for admission must provide the following credentials:

- Completed application form
- Resume
- Official Transcripts from all schools attended or where coursework was attempted or taken
- Official General Graduate Record Examination (GRE) scores
- Three letters of evaluation
- Self-assessment essays:
 - A. Discuss personal goals, conditions, or career aspirations that motivate you to pursue graduate study at Drexel University.
 - B. What are your most important accomplishments?
 - C. What do you expect to achieve through this program?

The application and supporting material must be received no later than the program deadline date.

For further information, contact:

Tina Rader,
Master of Histotechnology Program Co-Director
Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
245 N. 15th Street, Mail Stop 344
Philadelphia, PA 19102-1192
(215) 762-4113
tina.rader@drexelmed.edu

Degree Requirements

Required Courses

MFSP 551S	Human Function	3.0
MFSP 552S	Structure of the Human Body	3.0
MFSP 553S	Human Structure Lab	1.0
MHPP 500S	Advanced Histotechnology	4.0
MHPP 502S	Histotechnology Capstone Project	3.0
MHPP 503S	Histotechnology Practicum	9.0
MLAS 545S	Fundamentals of Histology	3.0
MSPA 510S	Laboratory Management	2.0
MSPA 520S	Medical Terminology	3.0
MSPA 540S	Histotechnology I	3.0
MSPA 560S	Medical Ethics	2.0
MSPA 580S	Medical Microbiology I	4.0
MSPA 590S	Leadership Skills for the Medical Profession	3.0
MSPP 511S	Concepts in Bioch & Cell Biolo	4.0
Total Credits		47.0

Sample Plan of Study

First Year

Fall		Credits
MLAS 545S	Fundamentals of Histology	3.0
MSPA 520S	Medical Terminology	3.0
MSPA 540S	Histotechnology I	3.0
MSPA 590S	Leadership Skills for the Medical Profession	3.0
MSPP 511S	Concepts in Bioch & Cell Biolo	4.0
Term Credits		16.0

Spring

MFSP 551S	Human Function	3.0
MFSP 552S	Structure of the Human Body	3.0
MFSP 553S	Human Structure Lab	1.0
MHPP 500S	Advanced Histotechnology	4.0
MHPP 502S	Histotechnology Capstone Project	3.0
MSPA 580S	Medical Microbiology I	4.0
Term Credits		18.0

Summer

MHPP 503S	Histotechnology Practicum	9.0
MSPA 510S	Laboratory Management	2.0
MSPA 560S	Medical Ethics	2.0
Term Credits		13.0

Total Credit: 47.0

Master of Science in Immunology

Master of Science: 36.0 semester credits

About the Program

The MS in Immunology is designed to prepare students for careers in basic discovery, translational, and clinical research pertaining to infectious and inflammatory disease and other immunologic problems pursued in government, industry and academic environments.

The focus of the program will be to train participants in various aspects of research related to immunology and inflammatory disease, in particular, research and development relevant to new immunodiagnosics, immunotherapeutics, and vaccines to prevent and/or treat infectious diseases such as HIV/AIDS, hepatitis, influenza, malaria, and other viral, bacterial, parasitic, and fungal pathogens.

Special attention will be given to the study of:

- immunotherapeutic and vaccine target identification;
- immune response mechanisms;
- immunomodulators and immune response modifiers;
- vaccine discovery and development;
- immunologic redundancy; and
- innate and adaptive immune escape mechanisms.

Expertise in animal model development and use, basic discovery, and biological containment laboratories will also be emphasized.

The MS in Immunology encompasses two years of required and elective courses and a comprehensive research internship completed during the two-year training program. The internship will encompass three specific areas of research:

- the basic discovery of innate and adaptive immune response mechanisms;
- the translational research centered in therapeutic and prevention vaccine development or the development of immunomodulatory strategies; and
- the clinical immunology research arena.

The program is designed for applicants from a number of different academic and career backgrounds, allowing for flexibility for incoming students at a variety of levels. Most course work is offered in the late-afternoon or evenings. In addition to the standard pathway, students may complete their degree requirements in a more compact time frame, or they may select a part-time pathway to permit the simultaneous pursuit of other activities.

Admission Requirements

For acceptance into the Master of Science in Immunology program, the applicant must have completed a four-year biology or chemistry-based BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

- Official transcripts from all colleges and universities attended
- A current Curriculum Vitae (C.V.) or resume
- References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or

Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant's undergraduate curriculum, cumulative GPA, GRE/MCAT scores, recommendation letters, and relevant research and professional experience.

For additional information regarding application deadlines, the online application process, and specific requirements for applying to the College of Medicine, visit Drexel University's Graduate Admissions (<http://www.drexel.edu/grad/programs/ducom>) site.

Admission Requirements

For acceptance into the Master of Science in Immunology program, the applicant must have completed a four-year biology or chemistry-based BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

- Official transcripts from all colleges and universities attended
- A current *curriculum vitae* (CV) or resume
- References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant's undergraduate curriculum, cumulative GPA, GRE/MCAT scores, recommendation letters, and relevant research and professional experience.

For additional information regarding application deadlines, the online application process, and specific requirements for applying to the College of Medicine, visit Drexel University's Graduate Admissions (<http://www.drexel.edu/grad/programs/ducom/immunology>) site.

Degree Requirements

Courses encompass the fundamental requirements to establish a solid grounding in microbiology and infectious disease, immunology, biochemistry, genetics, and molecular biology.

Research experiences will form a large component of the training program, with the possibility of completing the degree with or without a thesis document.

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	BIostatistics I	2.0
MIIM 527S	Immunology, Immunopathology & Infectious Diseases	3.0
MIIM 530S	Fundamentals of Molecular Medicine I	3.0
MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MIIM 532S	Fund. Mol. Med. III	2.0
MIIM 533S	Fundamentals in Molecular Medicine V	1.0
MIIM 534S	Fund. Molecular Med. VI	1.0
MIIM 606S	MICRO & IMMUNO SEMINAR	1.0
MIIM 546S	Introduction to Immunology	2.0
MIIM 651S	Research Internship in Immunology	6.0
MIIM 654S	Clinical Correlations in Immunology	3.0
To complete the MS in Immunology degree, 36.0 credits must be accrued. Students may choose from a menu of additional electives, depending on their academic goals.		8.0

Possible Electives

MIIM 502S	MICRO & IMMUNO. JOURNAL CLUB	
MIIM 521S	Biotechniques I	
MIIM 522S	Biotechniques II	
MIIM 524S	Vaccines and Vaccine Development	
MIIM 525S	Principles of Biocontainment	
MIIM 526S	Animal Models in Biotechnology	
MIIM 527S	Immunology, Immunopathology & Infectious Diseases	
MIIM 540S	Viruses and Viral Infections	
MIIM 541S	Bacteria and Bacterial Infections	
MIIM 542S	Mycology, Fungal Infections and Antibiotics	
MIIM 543S	Parasitology and Parasitic Diseases	
MIIM 555S	MOLEC. MECH. OF MICRO. PATH.	
MIIM 607S	IMMUNOLOGY II	
MIIM 612S	MOLEC MECH OF VIRAL PATHOGENSI	
MIIM 615S	EXPERIMENTAL THERAPEUTICS	
MIIM 630S	Advanced Molecular Biology	
MIIM 613S	Emerging Infectious Diseases	

Total Credits 36.0

Master of Science in Infectious Disease

Master of Science: 36.0 semester credits

About the Program

The Master of Science in Infectious Disease program provides graduate-level training in various aspects of basic, translational, and clinical research related to infectious disease. Emphasis is placed on research and development efforts focused on new diagnostics, therapeutics, and vaccines used to prevent and/or treat infectious diseases such as HIV/AIDS, hepatitis, influenza, malaria, and other diseases caused by viral, bacterial, parasitic, and fungal pathogens.

Special attention is given to the study of therapeutic and vaccine target identification, the discovery and development of drugs and vaccines, and a greater understanding of resistance and immune escape mechanisms that reduce treatment effectiveness.

The program encompasses two years of required and elective graduate courses as well as a comprehensive research internship to be completed during the course of the training program. The internship encompasses three specific areas of research in the field of infectious disease:

- basic discovery involving infectious bacterial, viral, fungal, or parasitic pathogens that cause human disease;
- translational research focused on the development of new approaches to diagnose, prevent, or treat infectious diseases; and
- clinical infectious disease research.

Elective courses available to students in the program provide knowledge and expertise in areas relevant to infectious disease research, such as animal model use in biotechnology, emerging infectious diseases, vaccines and vaccine development, biotechniques and laboratory research, and principles of biocontainment.

The program is designed to prepare students for careers in infectious disease in government, industry, and academic environments. The program is ideally suited for enhancing the scientific credentials of recent college graduates, early career scientists, premedical students, industrial employees, and clinical laboratory technicians.

Although most students will complete the program in two years, some may opt to enroll on a part-time basis, taking up to four years to complete the degree program. While the program can be completed without a dissertation, a thesis option is available. Most courses are offered during the late afternoon or early evening to accommodate students who may be employed in the biotechnology, pharmaceutical, and biomedical arenas and want to enroll on a part-time basis. Selected courses are offered both live and online, providing the student the flexibility to enroll in one or the other.

Admission Requirements

For acceptance into the Master of Science in Infectious Disease program, the applicant must have completed a four-year biology or chemistry-related BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

- Official transcripts from all colleges and universities attended
- A current *curriculum vitae* (cv) or resume
- References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant's undergraduate curriculum, cumulative GPA, GRE/MCAT scores, recommendation letters, and relevant research or professional experiences.

Visit the Master of Science in Infectious Disease (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/InfectiousDisease.aspx>) program website for more detailed information. For additional information regarding application deadlines, the online application process, and specific requirements for applying to the College of Medicine, visit Drexel University's Graduate Admissions (<http://www.drexel.edu/grad/programs/ducom/infectious-diseases>) site.

Degree Requirements

Required Courses

IDPT 501S	BIOSTATISTICS I	2.0
IDPT 500S	Responsible Conduct of Research	2.0
MIIM 527S	Immunology, Immunopathology & Infectious Diseases	3.0
MIIM 530S	Fundamentals of Molecular Medicine I	2.0-3.0
MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MIIM 532S	Fund. Mol. Med. III	2.0
MIIM 533S	Fundamentals in Molecular Medicine V	1.0
MIIM 545S	Introduction to Infectious Diseases	5.0
MIIM 534S	Fund. Molecular Med. VI	1.0
MIIM 606S	MICRO & IMMUNO SEMINAR	1.0
MIIM 652S	Research Internship in Infectious Diseases	6.0
MIIM 653S	Clinical Correlations in Infectious Disease	3.0

Electives 6.0-15.0

MIIM 521S	Biotechniques I
MIIM 522S	Biotechniques II
MIIM 523S	Molecular Virology
MIIM 524S	Vaccines and Vaccine Development
MIIM 525S	Principles of Biocontainment
MIIM 526S	Animal Models in Biotechnology
MIIM 540S	Viruses and Viral Infections
MIIM 541S	Bacteria and Bacterial Infections
MIIM 542S	Mycology, Fungal Infections and Antibiotics

MIIM 543S	Parasitology and Parasitic Diseases
MIIM 555S	MOLEC. MECH. OF MICRO. PATH.
MIIM 613S	Emerging Infectious Diseases
MIIM 615S	EXPERIMENTAL THERAPEUTICS
MIIM 621S	Biotechniques and Laboratory Research I
MIIM 622S	Biotechniques and Laboratory Research II

Total Credits

36.0-46.0

Master of Science in Interdisciplinary Health Sciences

About the Program

The School of Biomedical Sciences and Professional Studies offers the Master of Science degree in Interdisciplinary Health Sciences. After successful completion of the Interdisciplinary Health Sciences, Medical Science Preparatory, or Drexel Pathway to Medical School programs, students complete a research project and elect coursework primarily from a declared area of specialization in the biomedical sciences. The program's advanced educational experience confers a unique perspective that is well-suited to understanding the numerous complexities and professional interrelationships of the current health care system. Upon completion, students will have a strong, integrated view of the medical sciences—providing numerous advantages to graduates, whether utilizing the degree as a springboard for further professional education or subsequently entering the healthcare workforce.

Students already participating in the Interdisciplinary Health Science (IHS) Certificate program who qualify (see admissions guidelines (<http://www.drexelmed.edu/Home/Admissions/ProfessionalStudiesintheHealthSciences/InterdisciplinaryHealthSciences.aspx>)) 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 24.0 additional credit hours of graduate course work (for a total minimum of 48 hours in entire 2 year program) including a final research project and paper. The Master of Science (MS) will be awarded contingent upon satisfactory completion of all program requirements, including an earned GPA of no less than 3.0.

For more information about the program, visit the College of Medicine's MS in Interdisciplinary Health Sciences (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PremedicalPrograms/MasterofScienceInterdisciplinaryHealthScience.aspx>) page.

Admission Requirements

There are two routes of entry into the Master of Interdisciplinary Health Sciences (MIHS) program. US citizens or permanent residents are required to first successfully complete the Interdisciplinary Health Science or Medical Science Preparatory program and then may transition into the MIHS program. International students are required to enter the Master of

Interdisciplinary Health Sciences program directly, which consists of the IHS year followed by the MIHS year.

Upon admission to the MIHS year, students will be required to declare a concentration track. See the College's curriculum (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PremedicalPrograms/MasterofScienceInterdisciplinaryHealthScience.aspx>) page for more details about the concentrations.

For more information about applying to the program, visit the College of Medicine's MS in Interdisciplinary Health Science Admissions (<http://www.drexelmed.edu/Home/Admissions/ProfessionalStudiesintheHealthSciences/InterdisciplinaryHealthSciences.aspx>) page.

Degree Requirements

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

After completing the Interdisciplinary Health Science Certificate requirements, students complete 24.0 additional credit hours of graduate course work. Students select a concentration track, and complete a final research paper. Students may take courses from other areas that are relevant to their concentration. For additional guidance on the research paper requirements, students should contact the MIHS Program Director.

Fall

Interdisciplinary Health Science Core Course	3.0
Concentration Track Courses (See Below)	9.0

Spring

MLAS 530S	Biostats In Vet Science	3.0
Concentration Track Courses (See Below)		9.0
Total Credits		24.0

Concentration Tracks

Clinical Research, Management and Laboratory Skills 18.0

Select six from the following:

CR 620S	Biotech/Research	
CR 625S	Health Policy and Economics	
CR 614S	Pharmacotherapy in New Drug R&D	
MLAS 520S	Financial Mgmt In Lab Anim Sci	
MLAS 523S	Organizational Management	
MSPA 510S	Laboratory Management	
MSPA 520S	Medical Terminology	
MSPA 590S	Leadership Skills for the Medical Profession	
MSPA 560S	Medical Ethics	
MLAS 535S	Biology & Care Of Lab Animals	
MLAS 536S	Animal Models for Biomedical Research	
PHRM 525S	Drug Discovery and Development I	
Total Credits		18.0

Biochemical and Pharmacologic Principles 18.0

Select six of the following:

MFSP 510	Forensic Toxicology II	
MFSP 532	Forensic Microbiology	

MLAS 513S	Biochemical Basis of Disease (Upenn)	
MLAS 529S	Molecular Genetics	
MMSP 530S	Selected Topic in Pharmacology	
MSPP 511S	Concepts in Bioch & Cell Biolo	
MSPP 515S	Biological Function & Regulati	
MFSP 550S	Biological Aspects of the Forensic Sciences	
PHRM 512S	Graduate Pharmacology	
PHRM 525S	Drug Discovery and Development I	
PHGY 503S	GRADUATE PHYSIOLOGY	
Total Credits		18.0

Concepts in Anatomy and Pathology 18.0

Select six of the following:

MFSP 556S	Forensic Anthropology and Topics in Human Identification	
MFSP 554S	Principles of Forensic Pathology	
MFSP 582S	Human Osteology and Calcified Tissue Biology II	
MLAS 513S	Biochemical Basis of Disease (Upenn)	
MLAS 531S	Embryology	
MLAS 536S	Animal Models for Biomedical Research	
MLAS 545S	Fundamentals of Histology	
MSPA 550S	Applied Anatomic Pathology	
MSPA 570S	Medical Pathology I	
MSPA 571S	Medical Pathology II	
MSP 513S	Special Topics in Anatomy	
Total Credits		18.0

Laboratory Techniques 18.0

Select six of the following:

MFSP 532	Forensic Microbiology	
MFSP 578S	Forensic Photography	
MFSP 546	Forensic DNA Analysis	
MLAS 535S	Biology & Care Of Lab Animals	
MLAS 536S	Animal Models for Biomedical Research	
MLAS 545S	Fundamentals of Histology	
MSPA 520S	Medical Terminology	
MSPA 540S	Histotechnology I	
MSPA 580S	Medical Microbiology I	
MSPA 571S	Medical Pathology II	
MSPA 560S	Medical Ethics	
Total Credits		18.0

Medical Science

Required Courses for this Concentration

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	0.5
IMSP 520S	Medical Physiology I	3.5
IMSP 521S	Medical Physiology II	3.5
IMSP 540S	Cell Biology & Microanatomy I	5.0
IMSP 541S	Cell Biology and Microanatomy II	3.0

IMSP 560S	Medical Neuroscience	6.0
Total Credits		34.0

Medical Technology (Concentration is under development)

For more information, visit the College of Medicine's Professional Studies (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/Programs.aspx>) programs page.

Master of Laboratory Animal Science Program

About the Program

Master of Laboratory Animal Science (MLAS): 48.0 semester credits
The School of Biomedical Sciences and Professional Studies offers the Master of Laboratory Animal Science (MLAS) degree. The MLAS program is designed for individuals who have a bachelor's degree in animal science or a related field and who are seeking advanced career positions in laboratory animal science and laboratory animal facility management. 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 enhance students' credentials for admission to veterinary medical school.

Additional Information

Erin Vogelsong, MS
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Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
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Philadelphia, PA 19102
215.762.7968
Erin.Vogelsong@DrexelMed.edu

Drexel College of Medicine also maintains a Master of Laboratory Animal Science (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/AnimalSciencePrograms/MasterofLaboratoryAnimalScienceMLASProgram.aspx>) website.

Admission Requirements

Candidates for admission must possess a bachelor's degree from an accredited US college or university or its equivalent. In addition to the completed application, applicants must submit three letters of evaluation (two from science professors and one from a veterinarian or past employer), a personal statement, and official transcripts from all colleges or universities attended or where coursework was attempted or taken. Applicants must also submit official scores from the General Graduate Record Examination (GRE).

The deadline for submission of applications is the second Friday in July of the year the student seeks admission.

Contact Information:

Erin Vogelsong, MS
Academic Administrator, Assistant Professor
Drexel University College of Medicine
Office of Professional Studies in the Health Sciences

245 N. 15th St., Room 15305
Philadelphia, PA 19102
215.762.7968
Erin.Vogelsong@DrexelMed.edu

Degree Requirements

The MLAS degree can be completed full-time in two years and one summer practicum, or part-time in four or less years. Students must successfully complete a minimum of 48.0 credit hours for graduation. A minimum grade point average of 3.0 is required for graduation as well as grades of "C" or better.

Required Courses

MLAS 501S	Laboratory Animal Seminar	2.0
MLAS 510S	Clinical Orientation In Laboratory Animal Facilities	1.0
MLAS 520S	Financial Mgmt In Lab Anim Sci	3.0
MLAS 521S	Arch Eng & Plan For Anim Fac	4.0
MLAS 523S	Organizational Management	3.0
MLAS 525S	Animal Anatomy	2.0
MLAS 530S	Biostats In Vet Science	3.0
MLAS 535S	Biology & Care Of Lab Animals	4.0
MLAS 536S	Animal Models for Biomedical Research	1.0
MLAS 606S	Clinical Laboratory Techniques and Concepts	1.0
MLAS 610S	Diseases of Laboratory Animals	3.0
MLAS 801S	Laboratory Animal Practicum	12.0
MSPA 580S	Medical Microbiology I	4.0

Electives

Students must select 6.0 credits from the following:		6.0
MLAS 500S	Animal Nutrition	
MLAS 513S	Biochemical Basis of Disease (Upenn)	
MLAS 514S	Hematopoiesis (Upenn)	
MLAS 529S	Molecular Genetics	
MLAS 531S	Embryology	
MLAS 545S	Fundamentals of Histology	
PHGY 503S	GRADUATE PHYSIOLOGY	
PHRM 512S	Graduate Pharmacology	

Total Credits 49.0

Master of Science in Medical Science

About the Program

There are two routes of entry into the Master of Medical Science (MMS) program. US citizens or permanent residents are required to first successfully complete the Interdepartmental Medical Science program and then may transition into the MMS program. International students are required to enter the Master of Medical Science program directly, which consists of the IMS year followed by the MMS year.

The first year of the Master Science in Medical Science year is identical to the Interdepartmental Medical Science (p. 29) certificate program and all the benefits to the student that program offers.

The Master of Science degree requires non-thesis clinical or bench-top research. This program is offered at both the Philadelphia and Sacramento campus locations.

Additional Information

Drexel University College of Medicine
Office of Professional Studies in the Health Sciences
245 North 15th Street, Mail Stop 344, Room 4104 NCB
Philadelphia, PA 19102
215.762.4692
medicalsciences@drexelmed.edu

Degree Requirements

Students begin the program by successfully completing the first year (34.0 credits) of the Interdepartmental Medical Science Certificate program.

To fulfill requirements for the MS in Medical Science, students conduct either bench-top or clinical research with a Primary Investigator. Students who have a 3.00 or higher GPA may take one second-year medical school course and students whose GPA falls below a 3.00 are required to take 6 credits of graduate level biological science coursework. After successful completion of the program, the student is awarded a Master of Science degree.

MMSP 501S	Research in Medical Science I	6.0
MMSP 502S	Research in Medical Science II	6.0
MMSP 503S	Research Seminar I	1.0
MMSP 504S	Research Seminar II	1.0
Students select 6.0 additional credits of graduate level science courses* with the approval of the Program.		6.0
Select one of the following:		2.0-3.0
CR 520S	Applications of Clinical Research Biostatistics	
IDPT 501S	Biostatistics I	
MLAS 530S	Biostats In Vet Science	
Total Credits		22.0-23.0

* Students select 6.0 credits in biological science coursework at the graduate level. IMSP 550S and IMSP 570S cannot be counted toward these credits since these courses are optional in the Interdepartmental Medical Science Certificate portion of the program.

Microbiology and Immunology

Master of Science: 36.0-48.0 semester credits
Doctor of Philosophy: 96.0 semester credits

About the Program

The Department of Microbiology and Immunology offers students the MS and PhD degrees. The programs are designed to promote understanding of the molecular mechanisms of infectious diseases. The department has research programs in the areas of parasitic, viral, and opportunistic infections; bacterial pathogenesis and biodefense; immunology; and drug development driven by investigators with national and international

reputations and with extended histories of extramural funding from the NIH, as well as other sources of funding.

In the first year, students complete both required courses in the core curriculum, and research laboratory rotation requirements. All students must pass an examination at the end of the first year, while also attending seminars and journal clubs.

MS in Microbiology and Immunology

MS students are required to successfully complete the core curriculum and the first year program-specific 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.

PhD in Microbiology and Immunology

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.

Courses Repeatable for Credit

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

For more information, including scheduling a plan of study, visit the College of Medicine's Microbiology and Immunology Program (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/MicrobiologyImmunology.aspx>) website.

MS Degree Requirements: Non-Thesis Option

MS without thesis: 36.0 semester credits

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
MIIM 502S	Micro & Immuno. Journal Club	1.0
MIIM 508S	Immunology I	3.0
MIIM 512S	Molecular Pathogenesis I	3.0

MIIM 513S	MOLECULAR PATHOGENSIS II	3.0
MIIM 606S	Micro & Immuno Seminar	1.0

Suggested Electives*

Select three of the following: 9.0

MIIM 504S	Micro. & Immuno. 1st Rotation	
MIIM 524S	Vaccines and Vaccine Development	
MIIM 555S	Molec. Mech. Of Micro. Path	
MIIM 604S	Special Topics in Virology	
MIIM 607S	IMMUNOLOGY II	
MIIM 613S	Emerging Infectious Diseases	
MIIM 615S	EXPERIMENTAL THERAPEUTICS	
MIIM 630S	Advanced Molecular Biology	

Total Credits 38.0

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

MS Degree Requirements: Thesis Option*MS with thesis: 48.0 semester credits***Required Courses**

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 600S	Thesis Defense	9.0
MIIM 502S	Micro & Immuno. Journal Club	1.0
MIIM 504S	Micro. & Immuno. 1st Rotation	4.0
MIIM 508S	Immunology I	3.0
MIIM 512S	Molecular Pathogenesis I	3.0
MIIM 513S	MOLECULAR PATHOGENSIS II	3.0
MIIM 600S	Micro.&Immuno Thesis Research	9.0
MIIM 606S	Micro & Immuno Seminar	1.0

Suggested Electives*

MIIM 505S	Micro. & Immuno. 2nd Rotation	
MIIM 524S	Vaccines and Vaccine Development	
MIIM 555S	Molec. Mech. Of Micro. Path	
MIIM 604S	Special Topics in Virology	
MIIM 607S	IMMUNOLOGY II	
MIIM 613S	Emerging Infectious Diseases	
MIIM 615S	EXPERIMENTAL THERAPEUTICS	
MIIM 630S	Advanced Molecular Biology	

Total Credits 47.0

* No electives are required for the MS with Thesis option. This list includes suggested electives, however additional courses from the Biograduate Medical programs may also be taken. Students should check with the College of Medicine's Biomedical Graduate Studies (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies.aspx>) programs.

PhD Degree Requirements*PhD: 96.0 semester credits***Required Courses**

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	Biostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 600S	Thesis Defense	9.0
MIIM 502S	Micro & Immuno. Journal Club	1.0
MIIM 504S	Micro. & Immuno. 1st Rotation	4.0
MIIM 505S	Micro. & Immuno. 2nd Rotation	4.0
MIIM 506S	Micro. & Immuno. 3rd Rotation	4.0
MIIM 508S	Immunology I	3.0
MIIM 512S	Molecular Pathogenesis I	3.0
MIIM 513S	MOLECULAR PATHOGENSIS II	3.0
MIIM 600S	Micro.&Immuno Thesis Research	9.0
MIIM 606S	Micro & Immuno Seminar	1.0

Suggested Electives*

Select two of the following:

MIIM 555S	Molec. Mech. Of Micro. Path	
MIIM 604S	Special Topics in Virology	
MIIM 607S	IMMUNOLOGY II	
MIIM 613S	Emerging Infectious Diseases	
MIIM 615S	EXPERIMENTAL THERAPEUTICS	
MIIM 630S	Advanced Molecular Biology	

Total Credits 61.0

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

Molecular and Cell Biology and Genetics*Master of Science: 36.0-48.0 semester credits**Doctor of Philosophy: 96.0 semester credits***About the Program**

The interdisciplinary, research-oriented Molecular and Cell Biology and Genetics program offers both MS and PhD degrees. Its strength is derived from the combined research expertise of the faculty in various departments, including Neurobiology and Anatomy, Biochemistry and Molecular biology, Microbiology and Immunology, Medicine, Pathology, and Pharmacology and Physiology. Faculty members conduct research on a broad array of topics, including cell, molecular, and cancer biology as well as genetics, infectious diseases and immunology.

About the MS Program

In the MS program, the focus is on strengthening the student's grasp of molecular biology and biotechnology and on providing a knowledge of research methods available in this fast-expanding field.

About the PhD Program

This program is research focused, with the ultimate goal of training students to become leaders of scientific research in academics and industry. In addition to completing the curriculum requirements, PhD students must pass a qualifying exam at the end of their second year.

Additional Information

For more information about the program, contact:

Caitlin Kaltenbach
Academic Coordinator
Biomedical Graduate and Postgraduate Studies
Drexel University College of Medicine
2900 Queen Lane Suite G24
Philadelphia, PA 19129-1096
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Admission Requirements

Drexel University College of Medicine has a rolling admissions policy, which means that complete applications are reviewed as they are received. Applicants are therefore advised to apply early, as decisions to accept or deny admission may be made before the official deadlines.

To learn more about applying to Drexel College of Medicine programs visit the Drexel College of Medicine's Biomedical Studies Admissions (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Admissions/MastersandDoctoral.aspx>) website.

About the 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 during the first year. This exposure to research not only gives the student broad research training, but also helps the student to select a thesis advisor at the end of the first academic year. In the second year, the student begins thesis research and takes several advanced courses, tailored to the student's individual interests.

The program offers a weekly seminar series with invited external and intramural speakers who address the program's broad research interests. Journal Club members meet weekly in their own informal setting to present results of interest from the current literature.

Courses Repeatable for Credit

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

For more information, including scheduling a plan of study, visit the College of Medicine's Molecular and Cell Biology and Genetics

Program (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/MolecularCellBiologyGenetics.aspx>) website.

MS Degree Requirements: Thesis Option

48.0 semester credits

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	BIostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
BIOC 603S	SPECIAL TOPICS: BIOCHEM. & NUT	2.0
IDPT 600S	THESIS DEFENSE	9.0
MCBG 501S	MCBG 1ST LAB ROTATION	4.0
MCBG 506S	ADVANCED CELL BIOLOGY	2.0
MCBG 512S	MCBG JOURNAL CLUB	1.0
MCBG 513S	MOLEC & CELL BIOLOGY SEMINAR	1.0
MCBG 600S	MCBG THESIS RESEARCH	9.0

Advanced Electives

6.0

In consultation with the Advisory Committee and according to the area of selected research, the student must select a minimum of 2 advanced elective courses from a diverse range of topics that complement the core curriculum and provide relevant, in-depth knowledge.

Total Credits 48.0

MS Degree Requirements: Non-Thesis Option

36.0 semester credits

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	BIostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
BIOC 603S	SPECIAL TOPICS: BIOCHEM. & NUT	2.0
IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
MCBG 501S	MCBG 1ST LAB ROTATION	4.0
MCBG 502S	MCBG 2ND LAB ROTATION	4.0
MCBG 506S	ADVANCED CELL BIOLOGY	2.0
MCBG 512S	MCBG JOURNAL CLUB	1.0
MCBG 513S	MOLEC & CELL BIOLOGY SEMINAR	1.0

Advanced Electives

4.0

In consultation with the Advisory Committee and according to the area of selected research, the student may replace laboratory rotations with advanced elective courses from a diverse range of topics that complement the core curriculum and provide relevant, in-depth knowledge.

Total Credits 36.0

PhD Degree Requirements

During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student's Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After concluding their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

96.0 semester hours

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	BIostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
BIOC 603S	SPECIAL TOPICS: BIOCHEM. & NUT	2.0
IDPT 526S	Cells to Systems	5.0
IDPT 600S	THESIS DEFENSE	9.0
MCBG 501S	MCBG 1ST LAB ROTATION	4.0
MCBG 502S	MCBG 2ND LAB ROTATION	4.0
MCBG 503S	MCBG 3RD LAB ROTATION	4.0
MCBG 506S	ADVANCED CELL BIOLOGY	2.0
MCBG 512S	MCBG JOURNAL CLUB	1.0
MCBG 513S	MOLEC & CELL BIOLOGY SEMINAR	1.0
MCBG 600S	MCBG THESIS RESEARCH	9.0

Advanced Electives

In consultation with the Advisory Committee and according to the area of selected research, the student must select a minimum of 3 advanced elective courses from a diverse range of topics that complement the core curriculum and provide relevant, in-depth knowledge.

Total Credits 50.0

Molecular Medicine

Master of Science: 36.0 semester credits

About the Program

The Master of Science in Molecular Medicine program provides training in the academic, research and entrepreneurial aspects of the biomedical sciences with an emphasis on translational research in the development of therapeutics and vaccines. This flexible program, offered in the early evening, has been designed to both enhance the academic credentials of individuals currently employed in industrial or educational pursuits, and to offer an opportunity for an *entré* degree for individuals interested in following a career in the biomedical industrial sciences.

The Master of Science in Molecular Medicine program is designed to provide academic and practical biotechnological knowledge in translational research, particularly in the areas of molecular therapeutics and vaccine development.

The program is ideally suited for enhancing the scientific credentials of the following target groups:

- industrial employees
- high school biology teachers

- new college graduates
- college undergraduates
- pre-medical students

The degree encompasses the fundamental requirements to establish a sound grounding in microbiology, biochemistry, genetics, and molecular biology. The program is designed with two years of required and elective graduate courses, and a research internship in the summer session of the first or second year. The flexibility of the curriculum enables students to complete the degree requirement within 18 months on a full-time basis, and up to 4 years on a part-time basis. The successful completion of the degree will be determined by grades obtained in the graduate courses, participation in seminars and journal clubs, and performance in the research component.

The research component of the curriculum can be fulfilled by two alternative approaches: (1) a research internship in which a 12 week research program will be undertaken in the summer session of either the first or second year of the program; or (2) as a combination of a 6 week research rotation in the laboratory of a participating faculty member in combination with the taking of one or more elective courses which focus on state-of-the-art biotechniques. A thesis is not required.

Classes can be attended at any of three Drexel College of Medicine locations: Center City and Queen Lane campuses in Philadelphia, and the Pennsylvania Biotechnology Center in nearby Doylestown. State-of-the-art video conferencing provides real-time interactive learning at all three locations.

Admission Requirements

For acceptance into the Master of Science in Molecular Medicine program, the applicant must have completed a four-year biology or chemistry-based BA or BS degree program with undergraduate coursework in biology, microbiology, immunology, chemistry, biochemistry, mathematics, and/or other related subjects. Although a minimum cumulative grade point average (GPA) of 3.00 is strongly desired, an applicant with a lower cumulative GPA will be considered if other strengths are apparent in the application.

To be considered for acceptance, an applicant must provide the following as part of a complete online application for admission:

- Official transcripts from all colleges and universities attended
- A current *curriculum vitae* (CV) or resume
- References from at least three instructors or professionals

Although standardized test scores are not required for admission, official copies of scores from the Graduate Record Examination (GRE) or Medical College Admission Test (MCAT) will be considered if submitted as part of the application.

International applicants (non-United States citizens) must meet the same requirements for admission as students from the United States. In addition to the above requirements, applicants whose native language is not English must demonstrate the ability to speak, write, and understand the English language by submitting an acceptable score from the Test of English as a Foreign Language (TOEFL) or International English Language Testing System (IELTS).

Acceptance into the program will be decided by considering the sum of the applicant's undergraduate curriculum, cumulative GPA, GRE/MCAT

scores, recommendation letters, and relevant research or professional experiences.

For additional information about the program, view the MS in Molecular Medicine (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/MolecularMedicine.aspx>) page on the College of Medicine's website.

Degree Requirements

About the Curriculum

Through the combination of required and elective courses, a total of 36.0 credits is required to successfully obtain the degree of Masters of Science in Molecular Medicine. In order to maintain full-time student status, a minimum of 9.0 credits must be taken in any given academic semester. Students should work with their program advisors to plan their course of study.

Research Requirements

The research component can be fulfilled by two approaches: (1) a research internship in which a 12-week research program will be undertaken in the summer session of either the first or second year of the program. (The internship can be undertaken in a laboratory of a participating faculty member, or in a laboratory of one of the Industrial Partners when necessary research training plans of longer duration and depth can be developed with the approval of the Program Advisory Committee); or (2) as a combination of a 6-week research rotation in the laboratory of a participating faculty member in combination with the taking of one or more elective courses which focus on state-of-the-art biotechniques.

For a plan of study listing the sequence of how courses should be completed, students should work with their program advisor.

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	BIostatistics I	2.0
MIIM 540S	Viruses and Viral Infections	2.0
MIIM 541S	Bacteria and Bacterial Infections	2.0
MIIM 542S	Mycology, Fungal Infections and Antibiotics	2.0
MIIM 543S	Parasitology and Parasitic Diseases	2.0
MIIM 527S	Immunology, Immunopathology & Infectious Diseases	3.0
MIIM 530S	Fundamentals of Molecular Medicine I	2.0
MIIM 531S	Fundamentals of Molecular Medicine II	2.0
MIIM 532S	Fund. Mol. Med. III	2.0
MIIM 533S	Fundamentals in Molecular Medicine V	1.0
MIIM 534S	Fund. Molecular Med. VI	1.0
MIIM 606S	MICRO & IMMUNO SEMINAR	1.0

Electives

To complete the 36.0 credits total, students select from a menu of 12.0 additional electives, and complete their required research component.

MIIM 521S	Biotechniques I
MIIM 522S	Biotechniques II
MIIM 523S	Molecular Virology
MIIM 524S	Vaccines and Vaccine Development
MIIM 525S	Principles of Biocontainment

MIIM 526S	Animal Models in Biotechnology	
MIIM 555S	MOLEC. MECH. OF MICRO. PATH.	
MIIM 613S	Emerging Infectious Diseases	
MIIM 615S	EXPERIMENTAL THERAPEUTICS	
MIIM 621S	Biotechniques and Laboratory Research I	
MIIM 622S	Biotechniques and Laboratory Research II	
MIIM 650S	Research Internship	
Total Credits		36.0

Molecular Pathobiology

MS without thesis: 36.0-48.0 semester credits

Doctor of Philosophy: 96.0 semester credits

About the Programs

The Molecular Pathobiology program provides a thorough education in contemporary knowledge of pathophysiological mechanisms and prepares students for careers in research as well as teaching in academic and corporate institutions. Students entering without advanced standing should complete the MS program in two to three years and the PhD program in four to five years.

The program has a large faculty, drawn from many basic science and clinical departments within the University. Active research programs involve HIV neuropathology, cancer biology and therapeutics, inhibition of tumor angiogenesis, ulcerative colitis, pathophysiology of apoptosis, tissue engineering, transplant immunology, and diseases of the cardiovascular, respiratory, biliary, and gastrointestinal systems.

Funding for these programs provides an opportunity for research training in such diverse areas as the cellular and molecular biology of cancer; tumor immunology and virology; molecular genetics; neurobiology; pathophysiology of cardiovascular, biliary, and gastrointestinal diseases; and contemporary advances in epithelial ion transport, signal transduction, tissue engineering, and apoptosis.

To learn more about applying to Drexel College of Medicine programs visit the Drexel College of Medicine's Biomedical Studies (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Admissions/MastersandDoctoral.aspx>) website.

About the Curriculum

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

Courses Repeatable for Credit

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

For more information, including a scheduling a plan of study, visit the College of Medicine's Molecular Pathobiology Program (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/MolecularPathobiology.aspx>) website.

MS Degree Requirements: Thesis Option

MS with thesis: 48.0 semester credits

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	BIostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 600S	THESIS DEFENSE	9.0
PATH 502S	PATHOLOGY 1ST LAB ROTATION	4.0
PATH 503S	PATHOLOGY JOURNAL CLUB	1.0
PATH 509S	PATHOLOGIC PROCESSES	3.0
PATH 600S	PATHOLOGY THESIS RESEARCH	9.0
PATH 601S	CELL MOL PATHBIO CANCER ANGIOG	4.0

Suggested Electives *

Select at least one of the following: 4.0

ANAT 602S	MEDICAL NEUROSCIENCE	
BIOC 510S	Cancer Biology	
MIIM 500S	MEDICAL MICROBIOLOGY	
NEUR 508S	Graduate Neuroscience I	
NEUR 607S	INTEGRATED NEUROSCIENCE	
PATH 505S	PATHOLOGY 2ND LAB ROTATION	
PATH 506S	PATHOLOGY 3RD LAB ROTATION	
PHGY 503S	GRADUATE PHYSIOLOGY	

Total Credits 48.0

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

MS Degree Requirements: Non-Thesis Option

MS without thesis: 39.0 semester credits

Required Courses

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	BIostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
PATH 503S	PATHOLOGY JOURNAL CLUB	1.0
PATH 509S	PATHOLOGIC PROCESSES	3.0
PATH 601S	CELL MOL PATHBIO CANCER ANGIOG	4.0

Suggested Electives * 10.0

Select three of the following:

ANAT 602S	MEDICAL NEUROSCIENCE	
BIOC 510S	Cancer Biology	
MIIM 500S	MEDICAL MICROBIOLOGY	
NEUR 508S	Graduate Neuroscience I	
NEUR 607S	INTEGRATED NEUROSCIENCE	
PATH 502S	PATHOLOGY 1ST LAB ROTATION	
PATH 505S	PATHOLOGY 2ND LAB ROTATION	
PATH 506S	PATHOLOGY 3RD LAB ROTATION	
PHGY 503S	GRADUATE PHYSIOLOGY	
Total Credits		36.0

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

PhD Degree Requirements

During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student's Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After concluding their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

96.0 semester credits

During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student's Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After concluding their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

IDPT 500S	Responsible Conduct of Research	2.0
IDPT 501S	BIostatistics I	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
IDPT 526S	Cells to Systems	5.0
IDPT 600S	THESIS DEFENSE	9.0
PATH 502S	PATHOLOGY 1ST LAB ROTATION	4.0
PATH 503S	PATHOLOGY JOURNAL CLUB	1.0
PATH 505S	PATHOLOGY 2ND LAB ROTATION	4.0
PATH 506S	PATHOLOGY 3RD LAB ROTATION	4.0
PATH 509S	PATHOLOGIC PROCESSES	3.0
PATH 600S	PATHOLOGY THESIS RESEARCH	9.0
PATH 601S	CELL MOL PATHBIO CANCER ANGIOG	4.0

Suggested Electives *

Select a minimum of two courses from the following: 44.0

ANAT 602S	MEDICAL NEUROSCIENCE	
BIOC 510S	Cancer Biology	
MIIM 500S	MEDICAL MICROBIOLOGY	
NEUR 508S	Graduate Neuroscience I	

NEUR 607S	INTEGRATED NEUROSCIENCE
PHGY 503S	GRADUATE PHYSIOLOGY
Total Credits	
96.0	

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

Neuroscience

Master of Science: 36.0-48.0 semester credits

Doctor of Philosophy: 96.0 semester credits

About the Program

To meet the need for research scientists with broad backgrounds in neuroscience, the College of Medicine School of Biomedical Sciences and Professional Studies offers an interdepartmental neuroscience program leading to MS and PhD degrees. The program provides a core curriculum of integrated courses related to the neurosciences. In addition, elective courses are aimed at helping students amplify and add specialization to their educational experience. Upon completing these programs, students pursue careers in academic, governmental, or industrial settings.

The MS in Neuroscience Program

The MS program provides students a broad background in neuroscience and the techniques used in neuroscience research. Drexel offers both an MS degree with a requirement of a laboratory research project for a thesis-based degree and a non-thesis degree program in which students can earn the degree by taking additional classes and writing a literature review paper. Students who wish to continue their graduate training after the MS degree may apply to the PhD program, and their credits may be applied to the doctoral program.

The PhD in Neuroscience Program

The PhD program trains individuals to conduct independent 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 (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Programs/MastersDoctoralPrograms/Neuroscience.aspx>) web site.

Admission Requirements

Students interested in cellular, systems (including neuro-engineering) and behavioral neuroscience are encouraged to apply. There are no minimal requirements but applicants should be competitive with regard to grades, GRE scores, research experience, and letters of recommendation. Applicants are encouraged to use email to contact any of the faculty of the program with whom they may share scientific interests to discuss their suitability to the program and/or potential projects in relevant laboratories.

The Drexel University College of Medicine: School of Biomedical Sciences and Professional Studies has a rolling admissions policy, which means that complete applications are reviewed as they are received. Applicants

are therefore advised to apply early, as decisions to accept or deny admission may be made before the official deadlines.

To learn more about applying to Drexel College of Medicine programs visit the College of Medicine's Biomedical Studies (<http://www.drexelmed.edu/Home/AcademicPrograms/BiomedicalGraduateStudies/Admissions/MastersandDoctoral.aspx>) website.

About the Curriculum

Students in both the PhD and MS programs begin their coursework with a core curriculum. The curriculum consists of a series of core courses that are shared by all of the biomedical graduate programs in the medical school, and a series of programmatic courses. All students in the Neuroscience Program must take the core curriculum, although the possibility exists for students to be excused from a particular course if they are able to prove that they already have the necessary knowledge required of the particular course.

During the second year, students select elective courses and begin their thesis research in consultation with the Advisory-Examination Committee. At the end of the second year, students take a comprehensive examination to qualify for PhD candidacy.

There are three rotations in the curriculum for which the student will be assigned a grade. The purpose of these rotations is enable the student to select the most appropriate Graduate Advisor to supervise the research project for the student. The Neuroscience Program Director and Steering Committee will advise each student on the selection of rotations, as well as on the progress and outcome of rotations. Flexibility will be afforded in certain situations in which the student may be able to select an advisor before completing all three rotations, or in situations wherein it is advisable to terminate a particular rotation early in favor of another choice.

Courses Repeatable for Credit

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

MS Degree Requirements: Non-Thesis Option

MS without Thesis: 36.0 semester credits

Required Courses

ANAT 501S	Neurobiology Topics I	2.0
ANAT 602S	MEDICAL NEUROSCIENCE	6.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
or IDPT 550S	Biochemistry and Biophysics	
IDPT 526S	Cells to Systems	5.0
IDPT 850S	Literature Review Non-Thesis MS	4.0
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
NEUR 609S	Graduate Neuroscience II	4.0
NEUR 508S	Graduate Neuroscience I	2.5

Advanced Neuroscience Course

Select at least one of the following: 1.0-4.0

NEUR 511S	Advanced Cellular and Developmental Neuroscience	
NEUR 512S	Advanced Systems and Behavioral Neuroscience	
NEUR 634S	MOTOR SYSTEMS	
Additional Suggested Electives		
Suggested Electives (min. 2.5 credits) *		2.5
MCBG 506S	ADVANCED CELL BIOLOGY	
PHRM 512S	Graduate Pharmacology	
PHGY 503S	GRADUATE PHYSIOLOGY	
Total Credits		36.0-39.0

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

MS Degree Requirements: Thesis Option

MS with thesis: 48.0 minimum semester credits

Required Courses

ANAT 501S	Neurobiology Topics I	2.0
or PHRM 502S	Current Topics i Pharm & Phys	
ANAT 602S	MEDICAL NEUROSCIENCE	6.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
or IDPT 550S	Biochemistry and Biophysics	
IDPT 526S	Cells to Systems	5.0
IDPT 600S	Thesis Defense	9.0
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
NEUR 501S	Neuroscience 1st Lab Rotation	4.0
NEUR 502S	Neuroscience 2nd Lab Rotation	4.0
NEUR 508S	Graduate Neuroscience I	2.5
NEUR 600S	Neuroscience Thesis Research	9.0
NEUR 609S	Graduate Neuroscience II	4.0

Advanced Neuroscience Course

Select at least one of the following:		1.0-4.0
NEUR 511S	Advanced Cellular and Developmental Neuroscience	
NEUR 512S	Advanced Systems and Behavioral Neuroscience	
NEUR 634S	MOTOR SYSTEMS	

Suggested Electives *

MCBG 506S	ADVANCED CELL BIOLOGY	
PHRM 512S	Graduate Pharmacology	
PHGY 503S	GRADUATE PHYSIOLOGY	
Total Credits		55.5-58.5

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

PhD Degree Requirements

Students are required to complete 96.0 credits; for additional graduation requirements, refer to the Biomedical Graduate Studies Handbook and the Neuroscience Program Policies and Procedures

During the third year, students develop a plan for their doctoral research in conjunction with their thesis advisor. A formal, written thesis proposal is then presented to the student's Thesis Advisory Committee. Acceptance of this proposal after oral examination by the Committee leads to the final stage of doctoral training. PhD candidates then spend the majority of their time on thesis research. After concluding their research, they must submit and publicly defend their thesis before the Thesis-Examination Committee.

PhD students may enroll in courses having the status "repeatable for credit" (such as journal club, seminar and research courses) for the duration of their program in order to meet the degree completion requirement of 96.0 credits.

Required Courses

ANAT 501S	NEUROBIOLOGY TOPICS I	1.0-2.0
or PHRM 502S	CURRENT TOPICS IN PHARM & PHYS	
ANAT 602S	MEDICAL NEUROSCIENCE	6.0
IDPT 500S	Responsible Conduct of Research	2.0
IDPT 521S	Molecular Structure and Metabolism	5.0
or IDPT 550S	Biochemistry and Biophysics	
IDPT 526S	Cells to Systems	5.0
IDPT 600S	THESIS DEFENSE	9.0
NEUR 500S	Statistics for Neuro/Pharm Research	2.0
NEUR 501S	NEUROSCIENCE 1ST LAB ROTATION	4.0
NEUR 502S	NEUROSCIENCE 2ND LAB ROTATION	4.0
NEUR 503S	NEUROSCIENCE 3RD LAB ROTATION	4.0
NEUR 508S	Graduate Neuroscience I	2.5
NEUR 600S	NEUROSCIENCE THESIS RESEARCH (multiple semesters, as required)	54.0-72.0
NEUR 609S	Graduate Neuroscience II	4.0
PHRM 507S	Prin of Neuropharmacology	3.0

Advanced Neuroscience Course

Select at least one of the following:		1.0-4.0
NEUR 511S	Advanced Cellular and Developmental Neuroscience	
NEUR 512S	Advanced Systems and Behavioral Neuroscience	
NEUR 634S	MOTOR SYSTEMS	

Required Electives *

MCBG 506S	ADVANCED CELL BIOLOGY	
PHRM 512S	GRADUATE PHARMACOLOGY	
PHGY 503S	GRADUATE PHYSIOLOGY	

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

Certificate of Study in Clinical Research

This certificate program is a valuable professional resource for today's busy physicians, physician assistants, nurses, clinical fellows, research coordinators, and other individuals working in the clinical arena who want in-depth exposure to the skills and knowledge needed in the evolving clinical research field without having to commit to an entire master's program. All courses are conducted online to accommodate the needs of working professionals.

This program requires the successful completion of five graduate courses. Credits earned in the certificate program are recognized towards the Master of Science in Clinical Research Organization and Management (<http://drexel.com/crom>).

Visit the Drexel University Online site for additional information and to apply to the certificate (<http://drexel.com/cscr>) program.

15.0 semester credits

Requirements

CR 515S	Intro to Clinical Trials	3.0
CR 545S	PHARMACEUTICAL LAW	3.0
CR 612S	Fundamentals of Compliance	3.0

Electives

Select two of the following:		6.0
CR 565S	Contemporary Issues in Human Research Protection	
CR 570S	Principles and Practice of Pharmacovigilance	
CR 525S	Scientific Writing & Med Lit	
CR 609S	INNOVATIVE PRODUCT DEVELOPMENT	
CR 620S	Biotech/Research	
CR 625S	Health Policy and Economics	

Total Credits 15.0

Certificate in Drexel Pathway to Medical School

About the Program

The School of Biomedical Sciences and Professional Studies at Drexel University College of Medicine offers the Drexel Pathway to Medical School (DPMS) certificate. DPMS is an early assurance program that provides students from lower socioeconomic/disadvantaged backgrounds a unique opportunity to gain entry into medical school. The program allows the student to prove their ability to succeed in a medical school program. DPMS is a one-year graduate level enhancement post-baccalaureate program. Students receive a provisional acceptance to start medical school at Drexel University College of Medicine after completing the DPMS program. Retaining the acceptance is contingent upon earning a minimum 3.0 GPA, MCAT scores of 7VR, 8BS and 8PS, among other criteria.

Students who complete and pass all courses with a minimum grade of C, achieve a minimum 2.75 graduate GPA, and for Track 1 students, release new official MCAT scores to the program, will be granted a certificate of program completion.

DPMS Curriculum

In this structured program, students take a combination of graduate and medical school courses as outlined below.

Track 1 program students take an MCAT preparation course and are required to sit for the MCAT following completion of the spring semester. Track 2 program students have been accepted into the program with a qualifying MCAT and therefore do not need to retake the exam. Instead, they are required to take the immunology course on a satisfactory/unsatisfactory basis.

Track 1 program students achieving a 3.00 graduate GPA, a minimum score of 7 Verbal Reasoning, 8 Physical Science, M Writing Sample, and 8 Biological Science on a new MCAT will retain their acceptance to the College of Medicine and begin studies in the fall.

Track 2 program students achieving a minimum 3.00 graduate GPA and passing the Medical Immunology course also retain their acceptance and matriculate into the College of Medicine in the fall.

After completion of the following certificate requirements, some students may wish to pursue a Master of Science in Drexel Pathway to Medical School (p. 13).

Required Courses

Summer Enrichment Program

DPMS 500S	Medical Science Preparation	1.0
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Fall Semester

IMSP 510S	Medical Biochemistry I	7.5
IMSP 520S	Medical Physiology I	3.5
PHRM 512S	Graduate Pharmacology	3.0

Select one of the following, depending on Track: 3.0-6.0

MSP 404S	Concepts in Verbal Reasoning I	
IMSP 570S	Medical Immunology	

Spring Semester

IMSP 503S	Medicine and Society II	2.0
IMSP 511S	Medical Biochemistry II	0.5
MSPP 513S	Special Topics in Anatomy	4.0
IMSP 521S	Medical Physiology II	3.5
MSPP 405S	Concepts in Verbal Reasoning II (For Track 1 students)	6.0

Total Credits 34.0-37.0

Admissions Requirements

See the Drexel Pathway to Medical School (DPMS) (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/Programs/PreMedicalPrograms/DrexelPathwaytoMedicalSchoolDPMSProgram.aspx>) page on the College of Medicine's web site for application information.

Certificate in Interdepartmental Medical Science

About the Program

Students pursuing the Interdepartmental Medical Science (IMS) certificate are afforded the opportunity to take actual first-year medical school courses. This special master's program has been in existence since

1981 and has helped well over a 1000 students become practicing clinicians. This program is offered at both the Philadelphia and Sacramento campus locations. Benefits of this special master's program include:

- it offers more medical school courses than other programs in existence;
- runs for two years which benefits those students not applying during the certificate year, but applying during the master's year;
- significant tuition advantages for students attending this program as compared to other similar programs;
- free tutoring and counseling services are available through the University;
- affiliations with several medical schools including Drexel University College of Medicine (DUCoM), Edward Via Virginia College of Osteopathic Medicine, Philadelphia College of Osteopathic Medicine, St. George's of Grenada School of Medicine, Touro College of Osteopathic Medicine, and the University of Queensland School of Medicine;
- a guaranteed interview for students earning grades of B or better in all fall courses and an incoming MCAT score of 27 (9's in each section) or a 30 with no score less than a 7 (US citizens or permanent residents only).
- DUCoM guarantees a minimum 25 seats for appropriate students from the office's post-baccalaureate programs (US citizens or permanent residents only).

Master of Science in Medical Science Option

The Master of Science in Medical Science Program is the second year of the Interdepartmental Medical Science (IMS) Certificate program. Upon successful completion of the IMS year students may enter the second year of the special master's program in medical sciences. The degree requires non-thesis clinical or bench-top research. Advantages of continuing on for the master's degree include applying to health professional schools from an academic environment and should enhance a student's competitiveness for residency programs in an academic institution.

Additional Information

For more information, visit Drexel College of Medicine's Interdepartmental Medical Science Program (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PremedicalPrograms/InterdepartmentalMedicalScienceIMSPProgram.aspx>) website.

Interdepartmental Medical Science

Required Courses

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 & Microanatomy I	5.0

Optional courses

IMSP 550S	Medical Nutrition *	
IMSP 570S	Medical Immunology *	

Spring Semester

IMSP 503S	Medicine and Society II	2.0
IMSP 511S	Medical Biochemistry II	0.5
IMSP 521S	Medical Physiology II	3.5
IMSP 541S	Cell Biology and Microanatomy II	3.0
IMSP 560S	Medical Neuroscience	6.0
Total Credits		34.0

* These courses are optional.

Admissions Requirements

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.

Certificate in Interdisciplinary Health Sciences

About the Program

The School of Biomedical Sciences and Professional Studies offers the Interdisciplinary Health Sciences (IHS) certificate program. IHS is designed to provide 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.

Students take 12.0-18.0 credits per semester for a minimum of 24.0 total credits, working with an advisor to select the courses that best suit their career goals. For those students wishing to pursue medical school, an MCAT preparatory course is offered during the spring semester through the program as an optional course.

For more information about the program, visit the College of Medicine's Interdisciplinary Health Sciences Certificate (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PremedicalPrograms/InterdisciplinaryHealthSciences.aspx>) program page.

Fall

Required Courses

IHS 500S	Career Counseling in the Health Sciences Seminar I	1.0
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Working with an advisor, students select four courses from the following: 11.0

CR 505S	Ethical Issues in Research	
CR 515S	Intro to Clinical Trials	
CR 525S	Scientific Writing & Med Lit	
CR 535S	Current Federal Regulatory Issues in Biomedical Research	
CR 545S	PHARMACEUTICAL LAW	

CR 550S	Leadership Skills
CR 612S	Fundamentals of Compliance
CR 617S	Informatics in Pharm Res & Development
MFSP 518	Latent Fingerprint Analysis
MFSP 521	Techniques of Interview & Interrogation
MLAS 505S	Microbiology with Lab
MLAS 523S	Organizational Management
MLAS 525S	Animal Anatomy
MLAS 531S	Embryology
MLAS 536S	Animal Models for Biomedical Research
MLAS 545S	Fundamentals of Histology
MSPA 540S	Histotechnology I
MSPA 580S	Medical Microbiology I
MLAS 531S	Embryology
PHRM 512S	GRADUATE PHARMACOLOGY
MSPP 511S	Concepts in Bioch & Cell Biolo

Spring

Required Courses

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

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

PBHL 530	Principles of Epidemiology
MFSP 526	Bloodstream Pattern Analysis
MLAS 535S	Biology & Care Of Lab Animals
MSPA 581S	Medical Microbiology II
MSPP 513S	Special Topics in Anatomy
MSPP 515S	Biological Function & Regulation
CR 545S	PHARMACEUTICAL LAW

Total Credits 24.0

For more information, visit the Drexel University College of Medicine's Interdisciplinary Health Sciences (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PreMedicalPrograms/InterdisciplinaryHealthSciences.aspx>) web page

Admissions Requirements

Applicants to the program are required to have a bachelor's degree from a US accredited institution or its equivalent. The applicant should have successfully completed a year of biology, general chemistry, organic chemistry and physics with respective laboratory sections and have a GPA of approximately 2.50 or better. In addition, students should have approximately a 15 or better on the MCAT exam with no science section below 5, comparable scores from other health professional aptitude exams (ex. DAT), or have scores near the 50th percentile on the general GRE. The admissions committee reviews each application in its entirety for consideration.

The program's application can be found on the College of Medicine's Interdisciplinary Health Sciences Certificate Admissions (<http://www.drexelmed.edu/Home/>)

Admissions/ProfessionalStudiesintheHealthSciences/InterdisciplinaryHealthSciences.aspx) web page.

Certificate in Medical Science Preparatory Program

About the Program

The School of Biomedical Sciences and Professional Studies at Drexel University's College of Medicine offers the Medical Science Preparatory (MSP) program. The MSP certificate is a one-year program designed to help students enhance their credentials for application to medical or other health professional schools by improving their science background and admissions test scores, in particular the MCAT. This structured program offers both undergraduate and graduate level coursework as well as a formal two-semester MCAT course. Those students who successfully complete the program will receive a Certificate of Program Completion. Students who apply to medical schools following completion of the MSP program and return for the second year may be considered for linkage with the following medical school programs:

Drexel University College of Medicine
Edward Via Virginia College of Osteopathic Medicine
Philadelphia College of Osteopathic Medicine
Touro College of Osteopathic Medicine, New York

Affiliations are also in place with offshore and Caribbean medical schools including St. George's of Grenada School of Medicine and the University of Queensland School of Medicine.

Medical Science Preparatory Curriculum

Students in the Medical Science Preparatory program are required to complete graduate level courses in anatomy, biochemistry, pharmacology, physiology, laboratory techniques and community outreach. Also included are undergraduate level courses in physics and chemistry and a formal MCAT preparation course.

For more information, visit Drexel's College of Medicine Medical Science Preparatory Program (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/Programs/PreMedicalPrograms/MedicalSciencePreparatoryMSPProgram.aspx>) web page.

Master of Science Option

Those MSP students who successfully complete the program may elect to continue on to earn a Master of Science degree through the Master of Biological Science or Master of Interdisciplinary Health Sciences programs. Working towards a master's degree will continue to enhance one's credentials for application to medical or other health professionals schools.

Fall		Credits
MSPP 400S	Advanced Topics in Chemistry I	4.0
MSPP 402S	Advanced Topics in Physics I	4.0
MSPP 404S	Concepts in Verbal Reasoning I	6.0
MSPP 505S	Lab Tech in Bioch & Molec Biol	2.0
MSPP 511S	Concepts in Bioch & Cell Biolo	4.0
PHRM 512S	GRADUATE PHARMACOLOGY	3.0
MSPP 525S	Community Dimensions of Medicine	2.0

Term Credits

25.0

Spring

MSPP 401S	Adv Topics in Chemistry II	4.0
MSPP 403S	Advanced Topics in Physics II	4.0
MSPP 405S	Concepts in Verbal Reasoning II	6.0
MSPP 513S	Special Topics in Anatomy	4.0
MSPP 515S	Biological Function & Regulati	4.0
Term Credits		22.0

Total Credit: 47.0

For more information about continuing on to the Master's of Biological Science, visit Drexel's College of Medicine Master of Biological Science (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/Programs/MasterofBiologicalScienceMBSProgram.aspx>) web page.

Admission Requirements

Applicants to the Medical Science Preparatory (MSP) program must have earned a bachelor's degree from a US or other accredited institution. Prerequisite coursework must include a year of biology, chemistry, organic chemistry and physics with laboratory components.

The typical applicant should have a math/science GPA of 2.90 or better and an MCAT score of 18 or higher. The General Graduate Record Exam (GRE) will be accepted for those who have never taken the MCAT. Applicants applying to other professional school programs may supply their discipline specific national aptitude exam scores (Ex., DAT, OAT, etc.). Our admissions process is holistic in nature and includes evaluations of letters of evaluation, community service and exposure in the health care field of interest.

The program's application can be found on the College of Medicine's Medical Science Preparatory Certificate Admissions (<http://www.drexelmed.edu/Home/Admissions/ProfessionalStudiesintheHealthSciences/MedicalSciencePreparatory.aspx>) web page.

Evening Post-Baccalaureate Pre-Medical Certificate Program

About the Program

32.0 semester credits

The School of Biomedical Sciences and Professional Studies at Drexel University's College of Medicine offers the part-time Evening Post-Baccalaureate Pre-Medical certificate. This program gives individuals who hold a non-science baccalaureate degree the opportunity to continue working while they take courses in the evening to prepare themselves for medical, veterinary, dental, podiatric, chiropractic, or other allied health professional schools. This program also affords the individual who took science courses many years ago the opportunity to revisit the sciences. The structured program is the equivalent of five semesters completed in succession.

Linkage agreements have been established to allow students direct entry into medical school programs immediately after successful completion of the PMED program. These schools include Drexel University College of Medicine, Philadelphia College of Osteopathic Medicine, Robert Wood Johnson School of Medicine and the Edward Via Virginia College of Osteopathic Medicine.

The curriculum offers the prerequisite science courses required by most health professional schools. During the first year, general chemistry and general physics with laboratories are offered. During the second year, students take organic chemistry and general biology in the summer and fall semesters. Outside of the program, the opportunity for students to take additional courses through Drexel University is available. Due to modifications beings made to the MCAT in 2015, a biochemistry course will be made available through the PMED program.

For more information, visit Drexel's College of Medicine Evening Post-Baccalaureate Pre-Medical Certificate Program (<http://www.drexelmed.edu/Home/AcademicPrograms/ProfessionalStudiesintheHealthSciences/PremedicalPrograms/EveningPostBaccalaureatePreMedical.aspx>) web page.

Required Courses

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
Total Credits		32.0

Admission Requirements

Students applying to the program must have a bachelor's degree from an accredited institution in the United States. Admission into the program is competitive because of the limited number of seats. Applicants are accepted on a rolling admissions basis.

An applicant should have a minimum combined SAT score of 1000 or ACT score of 21 and a minimum undergraduate grade point average of 3.00. For those individuals far removed from the college years, additional factors, or other more recent coursework, will be considered.

Applicants to the program should have at least 6.0 semester credits of coursework in English literature and the behavioral sciences (psychology, sociology, or philosophy), as that is a requirement for admission into most health professional schools. The opportunity exists within the program to acquire these courses if a student without these courses is accepted. A strong understanding of algebra and trigonometry is a prerequisite for the program. Calculus will also be beneficial.

The program's application can be found on the College of Medicine's Evening Post-Baccalaureate Pre-Med Certificate Admissions (<http://www.drexelmed.edu/Home/>

Admissions/ProfessionalStudiesintheHealthSciences/
EveningPostBaccalaureatePremedical.aspx) web page.

Certificate in Quantitative Principles for Clinical Research

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 (<http://www.drexel.edu/catalog/grad/med/mscr->) or the Clinical Research for Health Professionals (<http://www.drexel.edu/catalog/grad/med/clinical-research-health-prof->) program to obtain an MS degree.

Visit the Drexel University University Online site for additional information and to apply to the Quantitative Principals for Clinical Research (<http://www.drexel.com/online-degrees/biomedical-degrees/qpcr>) program.

Required Courses

CR 500S	Epidemiology	3.0
CR 520S	Applications of Clinical Research Biostatistics	3.0
CR 525S	Scientific Writing & Med Lit	3.0
Total Credits		9.0

Certificate in Veterinary Medical Science

About the Program

The School of Biomedical Sciences and Professional Studies in the College of Medicine offers the Veterinary Medical Science (VMS) program. The VMS program is a one-year graduate level certificate program designed to help students enhance their credentials for veterinary medical schools. The VMS program has been designed to augment the student's understanding of the basic sciences and ensure success in their professional careers as clinical veterinarians. In order to accomplish this goal, students take a combination of graduate animal science and first-year medical school courses.

Upon completion of the VMS certificate program, students have the option to continue their studies in the Master of Laboratory Animal Science (MLAS) program, in order to further enhance their academic credentials for application to veterinary medical schools. Earning the MLAS degree will allow students to pursue advanced careers in laboratory animal science or laboratory animal management.

Additional Information

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Fall		Credits
IMSP 510S	Medical Biochemistry I	7.5
IMSP 520S	Medical Physiology I	3.5
MLAS 525S	Animal Anatomy	2.0
MLAS 606S	Clinical Laboratory Techniques and Concepts	1.0
MSPA 580S	Medical Microbiology I	4.0
Term Credits		18.0
Spring		
IMSP 511S	Medical Biochemistry II	0.5
IMSP 521S	Medical Physiology II	3.5
MLAS 529S	Molecular Genetics	2.0
MLAS 530S	Biostats In Vet Science	3.0
MSPP 513S	Special Topics in Anatomy	4.0
Term Credits		13.0
Total Credit: 31.0		

Admissions Requirements

Candidates for admission must possess a bachelor's degree from a US accredited college or university or its equivalent. In addition to the completed application, applicants must submit three letters of evaluation (two from science professors, one from a veterinarian or past employer), a personal statement, and official transcripts from all universities and college attended, or where coursework was attempted or taken. Students are required to have taken a year of biology, chemistry, organic chemistry and physics with respective laboratory sections. Applicants must also submit official test scores from the General Graduate Record Exam (GRE). The deadline date for submission is the second Friday in July in the year the student seeks admissions.

Undergraduate Course Descriptions

Biochemistry

Courses

BIOC 400S Biochemistry 4.0 Credits

Biochemistry is the essential basis for understanding metabolic and disease processes at the biochemical and molecular levels. Because of its importance as a foundation to medicine, biochemistry is going to be a major focus of the MCAT, beginning with the test in the summer of 2015. The course, which will be taught at Drexel University College of Medicine, by College of Medicine faculty, will cover the topics in general biochemistry, with a particular focus on those topics that are to be included on the new MCAT.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Medical Science Perparatory

Courses

MSPP 400S Advanced Topics in Chemistry I 4.0 Credits

This review course in general and organic chemistry will contain a review of chemical calculations and theory in topics such as stoichiometry, gas laws, thermodynamics, electrochemistry, equilibria, and pH. Atomic theory and bonding will also be reviewed. The semester ends with a discussion of the stereochemistry of organic molecules.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSP.

MSPP 401S Adv Topics in Chemistry II 4.0 Credits

This review course in organic chemistry will investigate reaction mechanisms, spectroscopy, qualitative organic chemistry, and laboratory techniques.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 402S Advanced Topics in Physics I 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSP.

MSPP 403S Advanced Topics in Physics II 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 404S Concepts in Verbal Reasoning I 6.0 Credits

This is a didactic course with weekly preparations for the Verbal Reasoning and Writing, Physical Sciences and Biological Sciences of the Medical College Admissions Test. Incorporated into the course are approximately six mock MCAT exams for practice.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 405S Concepts in Verbal Reasoning II 6.0 Credits

This is a didactic course with weekly preparations for the Verbal Reasoning and Writing, Physical Sciences and Biological Sciences of the Medical College Admissions Test. Incorporated into the course are approximately six mock MCAT exams for practice.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Pre-Medical

Courses

PMED 111S General Chemistry I 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 112S General Chemistry I Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 114S CONCEPTS IN CHEMISTRY I 4.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 121S General Physics I 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 122S General Physics I Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 131S General Chemistry II 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PMED 132S General Chemistry II Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 141S General Physics II 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PMED 142S General Physics II Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PMED 151S College Algebra & Trigonometry 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 211S General Biology I 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 212S General Biology I Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 221S Organic Chemistry I 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 222S Organic Chemistry I Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 231S General Biology II 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 232S General Biology II Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 241S Organic Chemistry II 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

PMED 242S Organic Chemistry II Lab 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is PMED.

Graduate Course Descriptions

Academic Medicine

Courses

ACMD 600S Academic Medicine: Core Knowledge I 3.0 Credits

This course provides training in leadership, education, ethics, professionalism, public health, health accreditation and other topics of value to the academic physician. These topics are important to the educator but commonly not covered in residency training.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

ACMD 601S Academic Medicine: Core Knowledge II 3.0 Credits

This course provides training in statistics, bioepidemiology, research techniques, medical writing and editing, grant writing, research regulations, public speaking and academic health enter management. These topics are important to the educator but commonly not covered in residency training.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

ACMD 602S Academic Medicine Thesis Research 4.0 Credits

Research towards the fulfillment of the thesis is conducted following approval of the research plan by the student research committee. Progress is monitored by the student's advisor and department, through the students' thesis committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 6 times for 24 credits

Anatomy

Courses

ANAT 501S Neurobiology Topics I 2.0 Credits

Neurobiology topics is a "journal club" course required of all Neuroscience graduate students beginning in the second year. Students, faculty and staff from Neuroscience and other programs are also encouraged to attend as registered or non-registered participants. The course is offered in the Fall and Spring semesters. Students choose topics of interest and a faculty member conducting research in this field is invited to introduce the topic, either from Drexel University or another local university. Students then present research papers in this area to the class to refine their presentation skills, practice critical thinking, and learn about recent research. Recent topics chosen by the class have included: Analysis of Somatosensory Systems, Neuroimmunology, Neurodegenerative Diseases, and Axon Guidance. To encourage students to follow pertinent neurobiological literature, they are also expected to select recent research articles of interest and briefly write why they are significant. May be repeated for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

ANAT 504S NEUROBIOLOGY TOPICS II 2.0 Credits

Neurobiology topics is a "journal club" course required of all Neuroscience graduate students beginning in the second year. Students, faculty and staff from Neuroscience and other programs are also encouraged to attend as registered or non-registered participants. The course is offered in the Fall and Spring semesters. Students choose topics of interest and a faculty member conducting research in this field is invited to introduce the topic, either from Drexel University or another local university. Students then present research papers in this area to the class to refine their presentation skills, practice critical thinking, and learn about recent research. Recent topics chosen by the class have included: Analysis of Somatosensory Systems, Neuroimmunology, Neurodegenerative Diseases, and Axon Guidance. To encourage students to follow pertinent neurobiological literature, they are also expected to select recent research articles of interest and briefly write why they are significant.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

ANAT 602S MEDICAL NEUROSCIENCE 6.0 Credits

Through this course, students will acquire a basic knowledge of human neuroanatomy. The course will be divided into two parts. In the first part, students will learn to identify the majority of structures in the human brain and their functions. In the second part, students will learn this material on a more conceptual basis in order to better integrate the disruption of function with various clinical conditions.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

ANAT 701S GROSS ANATOMY AND EMBRYOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

ANAT 702S MICROANATOMY AND CELL BIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 703S MEDICAL NEUROSCIENCE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

ANAT 8112S ANATOMY - 2 WEEKS (S/U) 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 8113S ANATOMY - 3 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 8114S ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 821S APPLIED AND SURGICAL ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 850S HUMAN GROSS ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 851S HISTOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 852S NEUROANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 854S ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 860S HUMAN GROSS ANATOMY REEXAM 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 861S HISTOLOGY REEXAM 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 900S ACAD GROSS ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9094S ELECTIVE - ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 930S ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 932S ANATOMY 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9752S Research - Anatomy* 0.0 Credits**

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9754S RESEARCH - ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9756S RESEARCH - ANATOMY -6WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 9758S RESEARCH - ANATOMY -8WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 990S GROSS ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 992S ADVANCED NEUROANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

ANAT 993S ADVANCED HUMAN GROSS ANATOMY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Biochemistry

Courses

BIOC 502S Biochemistry 1st Lab Rotation 4.0 Credits

First rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 503S Biochemistry 2nd Lab Rotation 4.0 Credits

Second rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 504S Biochemistry 3rd Lab Rotation 4.0 Credits

Third rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

BIOC 505S Biochemical Basis of Disease 2.0 Credits

This is an advanced graduate course designed to explore the biochemical basis of a variety of diverse diseases, ranging from the diabetes to Alzheimer's. The course format consists of student presentations that will be augmented by specialized lecture.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: C] and IDPT 526S [Min Grade: C]

BIOC 506S Biochemistry Journal Club 1.0 Credit

A weekly journal club in which students take turns presenting recent papers from the biomedical literature.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 15 times for 100 credits

BIOC 507S Biochemistry Seminar Series 1.0 Credit

Weekly research seminars on topics in Biochemistry and Molecular Biology. Seminar speakers include both scientists from the Drexel faculty and scientists from outside institutions.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 15 times for 100 credits

BIOC 508S Experimental Approaches to Biochemical Problems 3.0 Credits

This course provides the student with a thorough understanding of the principles underlying the experimental techniques currently used to tackle biochemical problems. A combination of lecture, discussion, investigation of the primary literature, and demonstrations will be used.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: C] and IDPT 526S [Min Grade: C]

BIOC 509S Biochemical Basis of Disease 3.0 Credits

This is an advanced graduate course designed to explore the biochemical basis of a variety of diverse diseases, ranging from the Acquired Immunodeficiency Syndrome (AIDS) to Alzheimer's. The course format consists of specialized lectures that are augmented by student presentation. This course is open to all grad students. May be repeated once for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 3 credits

BIOC 510S Cancer Biology 3.0 Credits

This is a comprehensive team-taught course on various aspects of cancer including: transformation, oncogenes and suppresser genes, cell cycle, DNA damage/repair, cell signaling, oncogenesis, metastasis and cancer therapies. Faculty from Fox Chase Cancer Center participates in the teaching.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 511S Writing for Researchers: Grants and Papers 1.0 Credit

This is a course designed to introduce graduate students to the basics of scientific writing. The course will involve both the discussion of reading assignments and writing assignments for the students, which will be discussed and critiqued in class.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 512S Advanced Cancer Biology 2.0 Credits

The main goal of this advanced course is to provide further understanding of the principles of cancer biology. This course will emphasize reading and analyzing primary literature on the most recent advances in cancer research topics including methods to aid students who may carry out thesis work related to cancer research. This course will build upon basic information taught in the cancer biology course and intended for advanced graduate students (2nd year) looking for further understanding in the fields of cancer research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 513S Biotechnology Practicum I 4.0 Credits

The Biotechnology practicum is designed to provide hands-on experience with the techniques encountered in didactic courses and the Biochemistry seminar series. Laboratories for the practicum will be chosen taking into consideration the interests and career goals of the students. The student will carry out directed research in the lab of a faculty member with expertise in the techniques employed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 514S Biotechnology Practicum II 4.0 Credits

The Biotechnology practicum is designed to provide hands-on experience with the techniques encountered in didactic courses and the Biochemistry seminar series. Laboratories for the practicum will be chose taking into consideration the interests and career goals of the student. The student will carry out directed research in the lab of a faculty member with expertise in the techniques employed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: B]

BIOC 515S Biotechnology Practicum III 8.0 Credits

The Biotechnology practicum is designed to provide hands-on experience with the techniques encountered in didactic courses and the Biochemistry seminar series. Laboratories for the practicum will be chosen taking into consideration the interests and career goals of the student. The student will carry out directed research in the lab of a faculty member with expertise in the techniques employed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: B] and IDPT 526S [Min Grade: B]

BIOC 516S Biotechnology Practicum IV 4.0 Credits

The Biotechnology practicum is designed to provide hands-on experience with the techniques encountered in didactic courses and the Biochemistry seminar series. Laboratories for the practicum will be chosen taking into consideration the interests and career goals of the student. The student will carry out directed research in the lab of a faculty member with expertise in the techniques employed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IDPT 521S [Min Grade: B] and IDPT 526S [Min Grade: B]

BIOC 600S Biochemistry Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department. Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 15 times for 100 credits

BIOC 603S Advanced Topics in Biochemistry and Molecular Biology 1.5 Credit

This course will supplement basic information taught in the biomedical sciences first year graduate core curriculum and provide a comprehensive, in-depth analysis of various topics in biochemistry. The course will include a mixture of lectures and literature-based assignments. Lectures are intended to cover topics deemed important for Biochemistry and MCBG students, but which are not covered in depth in the core curriculum. This will include practical aspects of experimental design and execution.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

BIOC 701S MEDICAL BIOCHEMISTRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated multiple times for credit

BIOC 702S MEDICAL NUTRITION 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 850S MEDICAL BIOCHEMISTRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 860S MED BIOCHEMISTRY REEXAM 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 970S BIOCHEMISTRY RESEARCH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 9750S RESEARCH-BIOCHEMISTRY-16 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 9752S RESEARCH-BIOCHEMISTRY - 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 9754S RESEARCH-BIOCHEMISTRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

BIOC 9756S RESEARCH - BIOCHEMISTRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 9758S RESEARCH-BIOCHEMISTRY- 8WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

BIOC 975S STRUCTURAL & MOLECULAR BIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 976S BIOCHEMISTRY OF METABOLISM 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 977S PHYSIOLOGICAL CHEMISTRY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

BIOC 999S Special Topics in Biochemistry 1.0-4.0 Credit

This course will focus on graduate level topics in the area of Biochemistry. The exact content, readings, and grading will be determined by the professor on a course by course basis.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 3 times for 16 credits

Cancer Biology

Courses

CBIO 500S Core Cancer Topics 2.0 Credits

The overall goal of Cancer Topics is to provide the student with exposure to cancer topics as they relate to topics covered in the core curriculum. In addition, students will get exposure to cancer-related topics not covered in other required courses.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CBIO 501S Infection, Inflammation and Cancer 2.0 Credits

This course will be an advanced-level comprehensive survey of infectious agents and inflammatory signals that have been linked to the development of various cancers. The molecular mechanisms that underlie viral, bacterial, and parasite associated human cancers as well as inflammation-mediated cell transformation mechanisms will be the focus of lectures and discussions. Sessions will consist of lectures and discussions of assigned reading.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: BIOC 510S [Min Grade: B]

CBIO 503S Cancer Biology Journal Club 1.0 Credit

The overall goal of the cancer journal club is to provide the student with exposure to primary literature of latest high impact research related to cancer research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 4 times for 4 credits

CBIO 504S Cancer Biology 1st Lab Rotation 4.0 Credits

First rotation. Guided research is conducted on a part-time basis for 8-10 week period. Student will choose from a list of labs conducting cancer related research; the focus will be on acquisition of specific laboratory/molecular biology skills in cancer-related research. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CBIO 505S Cancer Biology 2nd Lab Rotation 2.0 Credits

Second rotation. Guided research is conducted on a part-time basis for 8-10 week period. Student will choose from a list of labs conducting cancer related research; the focus will be on acquisition of specific laboratory/molecular biology skills in cancer-related research. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CBIO 506S Cancer Biology Thesis Research 9.0 Credits

Research toward the fulfillment of the masters thesis. Process is monitored by the student's advisor and department, advisory committee or thesis committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 8 times for 18 credits

CBIO 507S Special Topics in Cancer Biology 9.0 Credits

The overall goal of special topics cancer biology is designed as a series of enrichment sessions that employ primary literature to amplify topics and concepts presented in BIOC 509S cancer biology. For non-thesis option in the master's program of cancer biology it will require writing a publication quality review on a cancer biology topic.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 18 credits

CBIO 508S Cancer Biomarkers and Therapeutics 2.0 Credits

In this advanced course, students will learn about biomarkers and therapies for human cancers. A topic by topic analysis of key developments and approaches in biomarker discovery and validation along with cancer therapy are presented, with inclusion of pharmacologic, regulatory and basic science perspectives.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Clinical Research

Courses

CR 500S Epidemiology 3.0 Credits

Epidemiology is at the core of research professions as it is the study of the distribution, determinants, and the course of health related events in populations, and the efficacy and effectiveness of prevention and intervention strategies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 501S Emerging Trends in Medical Device History 3.0 Credits

The goal of this course is to focus on the various trends that impact the research and development process inherent in the medical device industry. Case studies representing several therapeutic categories will be discussed from a business, medical scientific, ethical, regulatory and biomedical engineering perspective.

College/Department: COM School of Biomedical Sciences Professional Studies

CR 505S Ethical Issues in Research 3.0 Credits

Students explore ethical issues to sound clinical research, review the foundations of regulations for clinical investigations, and to better understand the operational imperatives of Good Clinical Practices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 510S Sponsored Projects Finance 3.0 Credits

The study of managing and monitoring external funding sources for research projects. Topics include: rules and regulations, proposal preparation and submission, cost accounting standards, salaries and benefits of staff, direct and indirect costs, the costing of equipment and facility use.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 511S The History of Misconduct in Biomedical Research 3.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CR 512S Fundamentals of Academic Research Administration 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 513S Pharmaceutical R&D: Business Process and Information Flow 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 514S World Wide Regulatory Submissions 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 515S Intro to Clinical Trials 3.0 Credits

This course introduces regulatory responsibilities of clinical investigators, sponsors, monitors, IRBs, FDA -all those parties intimately involved in clinical research. Information and exercises are designed to reinforce the elements of Good Clinical Practices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 520S Applications of Clinical Research Biostatistics 3.0 Credits

Examines role of the statistician in clinical research. Course includes a discussion of the language of statistics to facilitate communication with the clinical research project team, basic methods of describing data, fundamentals of probability, simple models and methods of parameter estimation and statistical software packages for reporting data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 525S Scientific Writing and Medical Literature 3.0 Credits

This course teaches the medical professional the ability to read for understanding, and evaluate validity of information a medical or scientific paper. In addition, the student learns how to recognize various types of medical literature and the basics of how to perform a review of the medical literature.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 530S Tech Transfer 3.0 Credits

The study of leveraging research capabilities with the marketplace and communicating research results for public benefit. Topics to include: the identification, management, development and commercialization of marketable research and technologies. Additional topics include patents and licensing.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 535S Current Federal Regulatory Issues in Biomedical Research 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 545S Pharmaceutical Law 3.0 Credits

Presents principles and practices of the Federal Food, Drug and Cosmetic Act governing the research and development of pharmaceuticals and biologics for both humans and animals including an analysis of legal and social constructs affecting industry and the academic clinical investigator with emphasis on FDA enforcement actions.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 550S Leadership Skills 3.0 Credits

This course is an in-depth analysis of specific human capital, organizational behavior and project management issues facing research facilities as they pertain to larger, integrated organizations. Selected topics include: high impact communications, negotiating, motivation and recognition.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 555S COMPLIANCE & MONITORING ISSUES 3.0 Credits

This course focuses on measuring and improving clinical trial performance as a means of saving time and money, while ensuring quality health care, as well as offering to patients both safe and effective therapeutic products. Students are required to develop milestone efficiencies through the use of process-performance data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 560S Special Topics 3.0 Credits

Individualizes enhancement to core curriculum in research. Students will determine which extracurricular lectures and events they will attend based on their interest and career intent.

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

CR 565S Contemporary Issues in Human Research Protection 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 570S Principles and Practice of Pharmacovigilance 3.0 Credits

This course is an introduction to the ethical, clinical, and regulatory complexities of medication safety and matters thinking skills for improving the quality and effectiveness of drug safety monitoring for both the pharmaceutical industry and its impact on the public.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 600S Designing the Clinical Trial 3.0 Credits

Designers and ethical, clinical, strategic issues surrounding clinical drug research are the focus of this course. Topics include design of trials for Phases one through four, an overview of the statistical component of a clinical trial, monitoring of the trial, and managing clinical data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: CR 515S [Min Grade: C]

CR 609S INNOVATIVE PRODUCT DEVELOPMENT 3.0 Credits

This comprehensive course provides a solid foundation in new therapeutic product research and development for the subsequent courses in the CROM program. This course focuses on the process of drug and medical device development from early research, discovery, and product formulation, through the federal requirements for proving safety and efficacy. May be repeated twice for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 612S Fundamentals of Compliance 3.0 Credits

The study of the federal bodies and regulations that govern research. Topics include: the rules and regulations surrounding HIPAA and how it affects research on human subjects, the history and current role of the FDA, IACUC, and the IRB within the research arena. May be repeated twice for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 614S Pharmacotherapy in New Drug R&D 3.0 Credits

Through the use of selected readings, case studies available from the FDA, and Blackboard discussions, this course will integrate preclinical/clinical research pharmaceutical operations along with federal regulatory approval principles, emphasizing the essentials of pharmacokinetic / pharmacodynamic activity of medications as the sound basis for understanding the clinical application of drug therapy with specific populations.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CR or major is CROM.

CR 616S Intro to Therapeutic Products 3.0 Credits

This course is designed to provide an overview of the diverse marketing and advertising practices and strategies of the pharmaceutical industry and their impact on the professional healthcare infrastructure, as well as on the healthcare recipient population. Students will be encouraged to develop skills to crucially evaluate the marketing techniques of the pharmaceutical industry.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CR or major is CROM.

CR 617S Informatics in Pharm Res & Development 3.0 Credits

Using a combination of printed materials, case studies, literature reviews, and on-line discussions, this course will cover past and present contributions of computer applications in pharmaceutical research and development. In addition, the student will be challenged to portend where technological advances may prove to be strategically beneficial in the future.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CR or major is CROM.

CR 620S Biotech/Research 3.0 Credits

The study of the history, use and progression of biological techniques developed through basic research and now how it is applied to research and product development.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 625S Health Policy and Economics 3.0 Credits

The study of the development, analysis and communication of economic data in the context of clinical research. May be repeated twice for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 630S Trans Research 3.0 Credits

The study of the conversion of research into information, resources or tools that can be used by the public to improve overall health and well-being. Students will learn the management and applicability issues in converting basic research discoveries and innovative ideas into clinical trials that lead to better treatment.

College/Department: COM School of Biomedical Sciences Professional Studies

CR 633S Quality Assurance Audits 3.0 Credits

This course provides the student with an in-depth knowledge of compliance and quality assurance issues as well as the related regulations inherent in the drug development process. Students develop auditing plans and strategies for conducting compliance inspections.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 635S Strategic Planning 3.0 Credits

This course introduces the student to the project management and planning process. Topics include: project communications, leadership, objectives, scope, success criteria, procurement, cost estimating, control mechanisms, developing mission statements and devising strategies that turn vision into reality. May be repeated twice for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

CR 999S Special Topics 1.0-3.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

Clinical Research Health Prof

Courses

CRHP 501S Research Health Professions I 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. 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.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

CRHP 502S Research Health Professions II 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. 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.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S

CRHP 503S Research Health Professions III 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. 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.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S and CRHP 502S

CRHP 504S Research Health Professions IV 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. 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.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S and CRHP 502S and CRHP 503S

CRHP 505S Research Health Professions V 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. 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.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S and CRHP 502S and CRHP 503S and CRHP 504S

CRHP 506S Research Health Professions VI 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. 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.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S and CRHP 502S and CRHP 503S and CRHP 504S and CRHP 505S

CRHP 507S Research Health Professions VII 3.0 Credits

CRHP requires research plus a 7-10 page journal-type paper on a topic approved by the Program Director. 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.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is CRHP.

Prerequisites: CRHP 501S and CRHP 502S and CRHP 503S and CRHP 504S and CRHP 505S and CRHP 506S

Drexel Pathway to Medicine

Courses

DPMS 500S Medical Science Preparation 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Forensic Criminalistic Analysis

Courses

FCA 505S Physical Aspects of Forensic Science 3.0 Credits

This course is designed to present students with a snapshot of each of the criminalistics disciplines and how they interrelate with each other and with the criminal system. The student will learn the structure of the crime laboratory and how it interrelates to both the criminal investigation and the criminal justice system. Proper investigative techniques and scientific protocols are presented and examined.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

FCA 506S Medico-legal Death Investigation 2.0 Credits

Students will learn the history of pathology as well as the principles of manner, mode and cause of death from a medical standpoint. Postmortem changes after death, along with death from blunt force injury, sharp force injury, asphyxia, gunshot injury and traffic crash injuries will also be studied. Case studies will be presented and discussed to illustrate the lectures in this course.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

FCA 507S Gross Human Skeleton I 1.0 Credit

This course provides students with an in-depth familiarity with the gross human skeleton – its bones, their features, and how it develops. Through numerous laboratory exercises, students will be able to handle skeletal material in order to become proficient in the identification of human skeletal remains and differentiate them from those of non-human animals for application. This course focuses on the skull and dentition, whereas FCA-508 focuses on the post-cranial skeleton.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

FCA 508S Gross Human Skeleton II 3.0 Credits

Gross human skeleton is a study of the human skeletal system: its bones, their major parts and features, and development. Through lecture and hands-on laboratory examinations of human osteological material, students learn to identify the bones of the body quickly and be able to easily discriminate between human and non-human skeletal remains whether adult or immature. This course is a direct continuation of FCA-507 (Gross Human Skeleton I), and deals with the post-cranial portion of the skeleton.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: FCA 507S [Min Grade: C] or MFSP 581S [Min Grade: C]

Histotechnology

Courses

MHPP 500S Advanced Histotechnology 4.0 Credits

In depth study of routine and advanced techniques associated with the histology laboratory.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSPA 540S

MHPP 501S Anatomy for Histotechnologists 4.0 Credits

Provides students with a comprehensive introduction to human gross anatomy. The structure of the human body is explained from a systematic standpoint with emphasis on how structures form complexes of clinical importance.

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MHPP 502S Histotechnology Capstone Project 3.0 Credits

This course will give students the opportunity to integrate the theory and the practical experiences from the previous semesters. Students will investigate a new technology technique or current issue involving histotechnology and apply the knowledge and skills developed in courses and practicum to produce a paper or technical project that supports their position. This course is the culmination of the programs courses and the practicum and will be considered the official written comprehensive examination.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSPA 540S and MHPP 500S and MHPP 503S

MHPP 503S Histotechnology Practicum 9.0 Credits

The clinical Practicum is designed to allow the students to apply knowledge and techniques learned during their didactic courses in a clinical hospital setting. It allows the student the opportunity to perform routine as well as specialized histotechnology techniques under the supervision of a qualified histotechnologist.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MSPA 540S and MSPA 520S and MSPA 590S and MLAS 545S and MHPP 500S and MHPP 501S and MSPA 581S and MHPP 502S

IMS Prog. Interdepartmental Sciences

Courses

IMSP 502S Medicine and Society I 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IMS.

IMSP 503S Medicine and Society II 2.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 505S CLINICAL FRAMEWORK 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IMSP 510S Medical Biochemistry I 7.5 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IMS.

IMSP 511S Medical Biochemistry II 0.5 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 520S Medical Physiology I 3.5 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IMS.

IMSP 521S Medical Physiology II 3.5 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 530S BASIC IMMUNOLOGY 1.5 Credit

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IMS.

IMSP 540S Cell Biology & Microanatomy I 5.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IMS.

IMSP 541S Cell Biology and Microanatomy II 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 550S Medical Nutrition 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IMS.

IMSP 560S Medical Neuroscience 6.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IMSP 561S MEDICAL NEUROSCIENCE 6.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IMSP 570S Medical Immunology 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IMS.

IMSP 580S Special Topics 0.5-9.0 Credits

The Special Topics Course is to be used for a course that a faculty member or program director would like to be taught as a topic of interest course.

College/Department: College of Medicine

Repeat Status: Can be repeated 4 times for 50 credits

IMSP 602S MEDICAL NEUROSCIENCE 5.0 Credits

This first year medical school course will introduce the student to the principles of organization and function of the human nervous system in lecture and laboratory format. Emphasis is placed on the major nuclei, pathways and divisions of the human central and peripheral nervous systems, their functional roles and their dysfunction during certain pathological processes and following injury. Clinical cases are presented throughout the course to assist the student in clinical diagnoses and treatment of nervous system disorders.

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IMSP 999S Special Topics 1.0-9.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Interdepartmental Courses

IDPT 500S Responsible Conduct of Research 2.0 Credits

This two credit course is offered once a year, usually in the spring semester, one evening a week. It is presented using lecture, discussion and problem-based curriculum approaches, with associated requested readings in texts. Some topics additionally require web-based exercises and quizzes. Graduate students, postdoctoral researchers and faculty discuss current issues of scientific integrity that all scientists encounter in their research. Solutions to hypothetical and real research challenges and ethical dilemmas are discussed and debated by trainees and faculty. Course sessions and discussions are led by a team of faculty leaders, including department head, deans and provosts. Grades are based on quizzes, class participation, web-based exercises, a term paper and a PowerPoint presentation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 0 times for 0 credits

IDPT 501S Biostatistics I 2.0 Credits

Introduction to the theory of probability, frequency distribution, correlation's and regression analysis, probability, chi-square and analysis of variance, applications of statistics in the laboratory.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 9 times for 999 credits

IDPT 503S SEARCHING BIOMEDICAL LITERATUR 1.0 Credit

This course surveys information sources in the library (books, journals, computer "finding tools"), with primary focus on finding biomedical journal articles via MEDLINE. Search planning is emphasized, including points on using Medical Subject Headings and precautions when searching title/abstract words. Resources for keeping up with the literature and maintaining personal files are briefly mentioned.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 505S BIOMEDICAL RESEARCH 9.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 506S BIOSTATISTICS II 2.0 Credits

Graduate Biostatistics II picks up where Biostatistics I leaves off. It teaches applications of commonly-used techniques in greater depth, with the intended audience being individuals who will be using statistics considerably in their work. This course includes one and two-way ANOVAs (and post hoc tests), multivariate techniques, power analysis, and other methods. The basic of the SPSS computer program is taught as well.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 507S Teaching Practicum I 1.0-4.0 Credit

The goal of this practicum is to provide mentored teaching experiences for graduate students enrolled in the biomedical science programs of the COM. Graduate students in COM programs can meet practicum requirements in a variety of teaching venues including but not limited to tutoring, laboratory instruction, conferences, and lectures in medical school and graduate program-specific courses. Eligible teaching experiences also include instruction for high school and undergraduate students. Credits for each practicum will be awarded according to preparation time and contact hours. 1 credit hr = 16hrs of instruction.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 508S Teaching Practicum II 1.0-4.0 Credit

The goal of this practicum is to provide mentored teaching experiences for graduate students enrolled in the biomedical science programs of the COM. Graduate students in COM programs can meet practicum requirements in a variety of teaching venues including but not limited to tutoring, laboratory instruction, conferences, and lectures in medical school and graduate program-specific courses. Eligible teaching experiences also include instruction for high school and undergraduate students. Credits for each practicum will be awarded according to preparation time and contact hours. 1 credit hr = 16hrs of instruction.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 509S Teaching Practicum III 1.0-4.0 Credit

The goal of this practicum is to provide mentored teaching experiences for graduate students enrolled in the biomedical science programs of the COM. Graduate students in COM programs can meet practicum requirements in a variety of teaching venues including but not limited to tutoring, laboratory instruction, conferences, and lectures in medical school and graduate program-specific courses. Eligible teaching experiences also include instruction for high school and undergraduate students. Credits for each practicum will be awarded according to preparation time and contact hours. 1 credit hr = 16hrs of instruction.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 521S Molecular Structure and Metabolism 5.0 Credits

Introduction to the fundamental concepts of biochemistry and molecular biology. Topics covered include the structure and function of biomolecules such as proteins, nucleic acids, carbohydrates, and lipids; enzymes; membrane transport phenomena; second messenger signaling; prokaryotic and eukaryotic DNA replication; transcription and translation; protein processing and trafficking; and intermediary metabolism.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 524S Molecular Genetics 0.0 Credits

The goal of the molecular genetics core course is to familiarize students with the underlying mechanisms regulating the inheritance of genetic material. In addition, students will be introduced to genetic methodologies used to manipulate, interpret and define gene function.

College/Department: Biomedical Graduate Studies_COM

Repeat Status: Not repeatable for credit

IDPT 525S Immunology 0.0 Credits

Topics will include cells of the immune system and their development and function, antigen/antibody interactions and the generation of antibody diversity, the major histocompatibility complex, humoral immunity, cell-mediated immunity, transplantation immunology, and immune dysfunction and disease. immune mechanisms.

College/Department: Biomedical Graduate Studies_COM

Repeat Status: Not repeatable for credit

IDPT 526S Cells to Systems 5.0 Credits

Cells to Systems provides a foundation in cell biology, with topics in cytoskeleton, cell adhesion, membrane biology, endocytosis, intracellular signaling, cell cycle, cell growth (cancer), cell senescence, cell death (apoptosis), and genetic methodologies. A final section covers integrative topics on complex biological systems operating in intact organisms.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 528S Cell Biology II 0.0 Credits

This module covers basic membrane transport processes, the ionic basis of membrane excitability, various types of ion channels, the process and role of endocytosis in cell function, step in folding of nascent proteins and protein degradation, protein import into various organelles including the nucleus, ER and mitochondria, and protein processing and trafficking the Golgi.

College/Department: Biomedical Graduate Studies_COM

Repeat Status: Not repeatable for credit

IDPT 531S Integ of Bio Func in Organ Sys 0.0 Credits

This module will provide an introduction to aspects of endocrinology, cardiovascular physiology, and central nervous system function as a means of illustrating the integration of molecular and cellular biological functions in the intact organism.

College/Department: Biomedical Graduate Studies_COM

Repeat Status: Not repeatable for credit

IDPT 532S SUMMER MAKE-UP MED BIOCHEM 7.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 536S Molecular Genetics 1.5 Credit

The goal of the molecular genetics core course is to familiarize students with the underlying mechanisms regulating the inheritance of genetic material. In addition, students will be introduced to genetic methodologies used to manipulate, interpret and define gene function.

College/Department: Biomedical Graduate Studies_COM

Repeat Status: Not repeatable for credit

IDPT 537S Immunology 1.5 Credit

Topics will include cells of the immune system and their development and function, antigen/antibody interactions and the generation of antibody diversity, the major histocompatibility complex, humoral immunity, cell-mediated immunity, transplantation immunology, and immune dysfunction and disease immune mechanisms.

College/Department: Biomedical Graduate Studies_COM

Repeat Status: Not repeatable for credit

IDPT 542S Integ of Bio Func in Org Sys 2.0 Credits

This module will provide an introduction to aspects of endocrinology, cardiovascular physiology, and central nervous system function as a means of illustrating the integration of molecular and cellular biological functions in the intact organism.

College/Department: Biomedical Graduate Studies_COM

Repeat Status: Not repeatable for credit

IDPT 550S Biochemistry and Biophysics 5.0 Credits

This course includes the fundamentals of metabolism, enzymology, protein synthesis and structure, and molecular biology taught from neuroscience perspective. In addition, there are lectures on biophysics of ion channels, and neuronal circuits.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 600S Thesis Defense 9.0 Credits

Students who have complete all course work and research requirements, but have not defended their thesis, may carry a status of "Registered for Thesis Defense Only". This registration carries no credit, has no fee and students receive no grade. Students may only be registered for thesis defense for no more than two semesters. Students may not be registered for this category if they are registered for any other graduate courses.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 9 times for 999 credits

IDPT 601S Optional Rotation 4.0 Credits

Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 7001S Professionalism in Medicine 1 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 7002S Professionalism in Medicine 2 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 7003S Professionalism in Medicine 3 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 7004S Professionalism in Medicine 4 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 703S HUMAN SEXUALITY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 9 times for 999 credits

IDPT 706S PHYSICIAN AND PATIENT 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

IDPT 710S PIL FALL SESSION 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 720S PIL WINTER SESSION 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 730S PIL SPRING SESSION 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 740S PIL SUMMER SESSION 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 750S PIL FALL SESSION II 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 751S INTR TO GERIATRICS/GERONTOLOGY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 752S INTRODUCTION TO AMBULATORY MEDICINE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 760S PIL WINTER SESSION II 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 770S PIL SPRING SESSION II 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 800S Register for Degree Only 9.0 Credits

This is a course designated to allow students who recently defended the opportunity to finish up any loose ends while maintaining the graduate student status. Students can only register for this course after they have defended their thesis.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IDPT 801S CLINICAL PRACTICE EXAM (S/U) 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 802S FOURTH YEAR RESEARCH COURSE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 821S INTERDEPT. ELECT.-NUTRITION 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 822S ACADEMIC ELECTIVE 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 823S MD/MPH RESEARCH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 824S MD/Ph.D RESEARCH 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 850S Literature Review Non-Thesis MS 4.0 Credits

Literature Review of a specific topic directed at fulfillment of the degree requirement for a scholarly paper by non-thesis master's students. Progress is monitored by student's advisor and advisory committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

IDPT 901S CLINICAL EXAM PREP 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 990S INDEPENDENT STUDY 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 991S INDEPENDENT STUDY 2 0.0 Credits

College/Department: College of Medicine

IDPT 992S INDEPENDENT STUDY 3 0.0 Credits

College/Department: College of Medicine

IDPT 997S SUMMER ENRICHMENT PROGRAM 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 998S TERM ACTIVATOR 0.0 Credits

College/Department: College of Medicine
Repeat Status: Not repeatable for credit

IDPT 999S Special Topics in Biomedical Sciences 1.0-4.0 Credit

Special Topics in Biomedical Sciences.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 3 times for 16 credits

Interdisciplinary Health Science

Courses

IHS 500S Career Counseling in the Health Sciences Seminar I 1.0 Credit

This 1 credit/semester, two semester course is devised to acquaint the student with a broad spectrum of professional opportunities in the health sciences. The lecture series would be conducted by professionals in their respective fields.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IHS.

IHS 501S Career Counseling in the Health Sciences Seminar II 1.0 Credit

This 1 credit/semester, two semester course is devised to acquaint the student with a broad spectrum of professional opportunities in the health sciences. The lecture series would be conducted by professionals in their respective fields.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 502S Neuropharmacology 3.0 Credits

This course will introduce students to neurotransmitters and their role in nervous system function. Course readings and lectures will provide: Anatomy and physiology basic elements; drug research and treatment of nervous system disorders; and explore environmental factors that affect nervous system function.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 503S Special Topics 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 505S Healthcare in Spanish I 3.0 Credits

This course will permit students with an existing knowledge of spanish to develop a rich medical vocabulary through reading, writing and class discussions. Information regarding cultural subtleties and differences between various hispanic subcultures will further enhance students' ability to communicate with hispanic patients. Various public health & socio-political issues impacting the treatment & management of hispanic patients will be examined & hispanic healthcare scholars invited for selected guest lectures.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is IHS or major is MIHS.

IHS 506S Healthcare in Spanish II 3.0 Credits

The course is designed to build cultural competency in numerous hispanic subcultures to assist future healthcare professionals in treating and interacting with patients of hispanic heritage. Course sessions will be conducted in spanish to further enhance students' communication skills with lecture and discussion emphasizing topics of significant interest to healthcare delivery and medicine.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IHS 505S [Min Grade: C]

IHS 507S Initiating Biomedical Research 2.0 Credits

Designed to assist students with the process of initiation biomedical research. Students will be provided with a structured series of steps which guide them in independently exploring and, ultimately, identifying a research topic and developing a sound research proposal in a logical, satisfying manner.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 508S MIHS Research Project 1.5 Credit

Will involve student investigation of a biomedical research problem on a topic approved by the IHS Program Director in order to complete the research component for the research/journal paper graduation requirement. Acceptable topics may be based on library research; the analysis of retrospective clinical, laboratory, archival, or descriptive data.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 509S MIHS Research Paper 1.5 Credit

Will assist students in organizing, writing, and preparing a 15-page double-spaced, typewritten document on a topic approved by the MIHS Program Director in order to meet the research journal paper graduation requirement.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: IHS 508S [Min Grade: C]

IHS 511S Biology of Cancer 3.0 Credits

This course is a comprehensive overview of cancer, the goal is to provide students with general knowledge of cancer biology. Tumor development will be discussed as a multi-step process dependent upon changes of underlying molecular and cellular events. Additionally, the role of growth factors, oncogenes, and tumor suppressor genes will be included. Specific cell signaling pathways, cell cycle controls, and apoptosis resulting in metastasis will also be discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 900S Registered for Degree Only 0.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

IHS 999S Special Topics 2.0-10.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

MMS Prog. - Masters in Med. Science

Courses

MMSP 501S Research in Medical Science I 6.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 12 credits

MMSP 502S Research in Medical Science II 6.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MMSP 503S Research Seminar I 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 2 credits

MMSP 504S Research Seminar II 1.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MMSP 510S Lab Tech In Bioc & Molec Biol 2.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MMSP 520S Medical Pathology I 6.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MMSP 521S Medical Pathology II 4.0 Credits

The purpose of the course in Pathology and Laboratory Medicine is to serve as a bridge between the basic sciences and clinical material. With this in mind, the course attempts to enable the student to recognize and understand the diseases that are encountered in clinical practice.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

Prerequisites: MMSP 520S [Min Grade: C]

MMSP 530S Selected Topic in Pharmacology 7.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MMSP 540S MEDICAL MICROBIOLOGY I 5.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MMSP 541S MEDICAL MICROBIOLOGY II 2.0-3.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

MMSP 999S Special Topics 1.0-4.0 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Master of Lab Animal Science

Courses

MLAS 500S Animal Nutrition 3.0 Credits

This course will provide an overview of the basic principles of animal nutrition including nutrition concepts and related historical/current research. Upon completion, each student should understand the digestion, absorption and metabolism of the various food nutrients, characteristics of the nutrients, measurement of body needs, and ration formulation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 501S Laboratory Animal Seminar 2.0 Credits

This course is open to second year MLAS students. The seminar allows students to network with other laboratory animal professionals in preparation for their career in the field. Each week, a different guest speaker will present information about state-of-the art equipment, animals and techniques.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MLAS 530S, MLAS 610S (Can be taken Concurrently) MLAS 535S

MLAS 510S Clinical Orientation In Laboratory Animal Facilities 1.0 Credit

Two hours per week of hands-on experience working in the university's laboratory animal facilities. Students do most of the daily work performed by the animal technicians, such as cage washing, placing animals into new cages, environmental sanitation, treatments (if necessary), tuberculosis testing of primates and the like. Species usually housed include rats, mice, rabbits, guinea pigs, dogs, cats, primates, swine, etc. The goal of the course is to provide the necessary skills and exposure to allow students to become familiar with many of the examples that will be used in later courses by their instructors. It also provides an introduction to the Practicum experience of the second year.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 513S Biochemical Basis of Disease (Upenn) 2.0 Credits

Lecture at the University of Pennsylvania veterinary school. Biochemical and molecular basis of disease. In-depth biochemical examination of specific aspects of selective diseases.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MLAS 512S and PHGY 503S

MLAS 514S Hematopoiesis (Upenn) 1.5 Credit

Lecture at the University of Pennsylvania veterinary school. Correlates clinical and basic science in comparative hematology. Recent developments in clinical medicine and basic research of disorders of blood cells. A paper on a hematology topic makes up part of the grade.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 515S Microbial Pathogenesis 1.5 Credit

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 520S Financial Mgmt In Lab Anim Sci 3.0 Credits

Animal facility managers and veterinarians must understand more about financial management than they realize. It is not unusual for budgets and cost-accounting methods to be poorly understood, and therefore left to others. The manager is at the mercy of somebody else's numbers, yet he or she may be held responsible for hundreds of thousands of dollars.. The instructor, an animal facility manager with an M.B.A. degree, gives a strong background in many aspects of financial management, not just those that are core to animal facility and veterinary practice management.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 521S Arch Eng & Plan For Anim Fac 4.0 Credits

The course of instruction, presented by one of the nations leading architectural and engineering firms, encompasses general design considerations, working with architects and engineers, reading and producing drawings, proximity considerations, control systems, heating, ventilation, air conditioning, etc. The goal is to give the student a unique background, not only in facility design and engineering, but also in understanding why things are the way they are. Students are expected to develop and present a floor plan.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MLAS 535S (Can be taken Concurrently)MLAS 510S

MLAS 523S Organizational Management 3.0 Credits

Organizational management provides the theoretical background necessary for the practical application of managerial skills especially in laboratory animal facilities.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 525S Animal Anatomy 2.0 Credits

An introductory independent study course that will provide a background in gross animal anatomy. Students will learn comparative anatomy by comparing the anatomical structures in several species of laboratory animals using synthetic models.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 529S Molecular Genetics 3.0 Credits

The focus of this course is to expose students to "cutting edge" molecular genetic concepts as they apply to laboratory animal science. The course provides a description of DNA structure, an overview of its replication and function in gene expression, an overview of the structure and function of nuclei & chromosomes, a sampling of tools used for genome analysis and a sampling of the basic techniques used in a molecular genetics laboratory. Various genome-sequencing projects are discussed along with the information they provide about the organization of a complex genome.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 530S Biostats In Vet Science 3.0 Credits

This course will cover biostatistical methods and principles and their application in the field of veterinary science-both in clinical setting and in research. The application of biostatistics in veterinary epidemiology will also be discussed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 531S Embryology 3.0 Credits

Embryology is the study of anatomy from the time of fertilization through the time of birth. The course discusses the "hows" and in part the "whys" concerning the development of the morphology and structure of the body. Knowledge of embryology is essential for understanding gross anatomy and the developments of birth defects.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 535S Biology & Care Of Lab Animals 4.0 Credits

Many specialists in laboratory animal science teach this course. Part of this course is devoted to discussions of the ethics of using animals in biomedical research. The remainder of this team taught course discusses the care, use and husbandry of rodents, lagomorphs, primates, farm animals, carnivores, etc., as well as presentations on sanitation and other pertinent subjects. The primary goal is to provide the student with the information needed to properly care for the physical and psychological needs of laboratory animals.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: MLAS 510S

MLAS 536S Animal Models for Biomedical Research 1.0 Credit

In this course university investigators will discuss their research using animal models, emphasizing why they chose the animal model they are using and how the model helps them understand basic biological processes. Grading is based on a single term paper.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 545S Fundamentals of Histology 3.0 Credits

This course is a survey of the basic tissues of the body with an emphasis on the structure of normal cells, their specializations and methods of acting together to form tissues and organs. The normal structure-function relationships at the subcellular, cellular and tissue levels are emphasized. This course provides students with a framework for recognizing and interpreting the changes seen in disease states.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 546S Special Topics in Anatomy 4.0 Credits

Cross listed course given concurrently with students from other programs. This course is mostly human oriented. MLAS students who have gone on to veterinary school have commented on how valuable it was. It provides a systemic review of the entire body. Human prosections are included in the course work.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 547S Special Topics in Anatomy Lab 2.0 Credits

Discussions on and gross anatomical dissections of common laboratory animals. Comparisons with human anatomy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

Prerequisites: MLAS 546S

MLAS 606S Clinical Laboratory Techniques and Concepts 1.0 Credit

Hands-on and theoretical laboratory work. Teaches animal handling and injections, serological testing, microbiology techniques, hematology and urinalysis. There is an emphasis on correct specimen handling and preparation as part of a quality control program. Your instructors will expect you to do independent reading and be able to extrapolate your knowledge to various case reports.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

MLAS 610S Diseases of Laboratory Animals 3.0 Credits

Reviews the major diseases of laboratory animals, and provides information on surgery, anesthesia and radiology. Unlike clinical veterinary medicine where a common objective is to make a sick animal healthy, in laboratory animal medicine the objective is to prevent a healthy animal from becoming sick. The goal of the course is to have the student understand means of disease prevention and recognition. This course will be taught, as much as possible, in a modified problem based learning format.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is LAS.

Prerequisites: MLAS 535S

MLAS 800S Registered for Degree 0.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 801S Laboratory Animal Practicum 3.0-15.0 Credits

The practical application of what was learned in class. The entire final MLAS semester is spent in one of many animal facilities in the Philadelphia area or around the nation. To the extent possible, time is divided between basic animal care, management, laboratory techniques, and research. S/U grading.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MLAS 999S Special Topics 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Medical Science Preparatory

Courses

MSP 501S ADV TOPICS IN CHEMISTRY II 3.0 Credits

This review course in organic chemistry will investigate reaction mechanisms, spectroscopy, qualitative organic chemistry, and laboratory techniques.

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSP.

MSP 504S ADVANCED TOPICS IN PHYSICS II 3.0 Credits

This review course in physics will cover the classical mechanics (statics and dynamics) including wave motion, fluid statics and dynamics, and classical thermodynamics. The second semester will contain topics from classical electromagnetism including DC and AC electronics. Geometrical and physical optics, including interference phenomena, as well as modern physics will also be covered. With all topics, biological and medical examples will be given in order to demonstrate the universality of physical laws.

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSP.

MSP 505S Lab Tech in Bioch & Molec Biol 2.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSP.

MSPP 511S Concepts in Bioch & Cell Biolo 4.0 Credits

This course introduces structure and function of the major groups of biomolecules (proteins, nucleic acids, lipids and carbohydrates) and essential structures that constitute a cell. Also discussed are basic biochemical and molecular mechanisms/pathways that contribute to homeostasis, such as protein synthesis, cellular energetics, signal transduction, and techniques to study cells and their constituents.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is MSP.

MSPP 513S Special Topics in Anatomy 4.0 Credits

This course provides extensive exposure to select organ systems at the gross anatomical, microscopics, and ultrastructural levels. Structural and functional relationships are considered in depth. The format of the course is slide-show and lecture with two visits to a gross lab to observe predissected cadavers. Please note: this is not a cadaver based dissection course.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 515S Biological Function & Regulati 4.0 Credits

Topics covered in this course include: homeostasis, cellular physiology, membrane and neuronal physiology, central and peripheral nervous systems, muscle physiology, cardiac physiology, blood vessels and blood pressure, blood and body defenses, respiratory systems, urinary system, fluid and acid base balance, and the endocrine system. May be repeated twice for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

MSPP 525S Community Dimensions of Medici 2.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPP 540S Concepts in Science & Verbal Reasoning I 6.0 Credits

This is a didactic course with weekly preparation for the Verbal Reasoning and Writing, Physical Sciences and Biological Sciences of the Medical College Admissions Test. Incorporated into the course are approximately six mock MCAT exams for practice.

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DPMS or major is IMS or major is MSP.

MSPP 541S Concepts in Science & Verbal Reasoning II 6.0 Credits

This is a didactic course with weekly preparation for the Verbal Reasoning and Writing, Physical Sciences and Biological Sciences of the Medical College Admissions Test. Incorporated into the course are approximately six mock MCAT exams for practice.

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DPMS or major is IMS or major is MSP.

Prerequisites: MSPP 540S

MSPP 550S Research Project 2.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Restrictions: Can enroll if major is DPMS or major is MSP.

Neuroscience

Courses

NEUR 500S Statistics for Neuro/Pharm Research 2.0 Credits

This course will provide hands on instruction in how research data are managed and analyzed in neurobiological research. Studies will acquire a basic statistical knowledge with emphasis on application to data sets similar to what they can expect to encounter in their thesis research. Instruction in the use of statistical programs will be included.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 501S Neuroscience 1st Lab Rotation 4.0 Credits

First laboratory rotation. Guided research is conducted on a part-time basis for two or three 10-16 week periods. Rotations are generally conducted during fall, spring and summer of the first and second years. An oral presentation highlighting the background, rationale, methods, results and discussion of the research activity is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 502S Neuroscience 2nd Lab Rotation 4.0 Credits

Second laboratory rotation. Guided research is conducted on a part-time basis for two or three 10-16 week periods. Rotations are generally conducted during fall, spring and summer of the first and second years. An oral presentation highlighting the background, rationale, methods, results and discussion of the research activity is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 503S Neuroscience 3rd Lab Rotatin 4.0 Credits

Third laboratory rotation. Guided research is conducted on a part-time basis for two or three 10-16 week periods. Rotations are generally conducted during fall, spring and summer of the first and second years. An oral presentation highlighting the background, rationale, methods, results and discussion of the research activity is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 505S ADVANCED MOLECULAR NEUROBIOLOGY 1.0 Credit

This is a graduate course aimed to discuss basic concepts and state-of-the-art techniques in molecular neurobiology. The course also serves as a forum for all members of the Graduate Program in Neurobiology, including faculty, graduate and post-doctoral students, and technical staff, to discuss recent developments in molecular neurobiology. The class meets once a month. Some meetings focus on basic concepts and recent findings in the field, whereas others examine novel biotechniques. The discussion is led by a speaker, who in most cases is a faculty member from the Department of Neurobiology and Anatomy. Occasionally, specialists from other institutions are invited to speak on a particular subject. Students taking the course for credits will be asked to lead one section in a related subject of their choice. Full attendance is required.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 506S NEUROSCIENCE 2ND ROTATION RES. 4.0 Credits

College/Department: Biomedical Graduate Studies_COM

Repeat Status: Not repeatable for credit

NEUR 508S Graduate Neuroscience I 2.5 Credits

This course is offered to incoming first year Neuroscience graduate students and covers the basic tenets of Developmental Neuroscience as well as providing a historical context to the progression of Neuroscience as a field of study.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 511S Advanced Cellular and Developmental Neuroscience 1.0 Credit

This course provides didactic teaching and in-depth discussion of topics in cellular and developmental neuroscience. Topics will emphasize the most recent and contemporary issues in the field.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 512S Advanced Systems and Behavioral Neuroscience 1.5 Credit

This course provides an in-depth understanding of cellular and systems neurophysiology. Topics include: basic mechanisms, emergent network activities, sensory processing, and models of learning and memory. May be repeated once for credit.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 1 times for 3 credits

NEUR 600S Neuroscience Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department, Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

NEUR 605S NEUROSCIENCE THESIS RESEARCH 8.0 Credits

Repeat Status: Not repeatable for credit

NEUR 607S INTEGRATED NEUROSCIENCE 4.0 Credits

This is a core course required of all graduate students in the Neuroscience Program. The prerequisite is completion of Medical Neuroscience. The course meets twice weekly during the fall semester for 2 hour sessions, which include a mix of lecture and discussion. The course emphasizes critical evaluation of experimental methods used for investigation problems in the organization and function of the central nervous system. One major goal of the course is to teach the students a system approach to analyzing the CNS control of behavior and physiology. The topics that are chosen to illustrate these principles of organization include sensorimotor integration; CNS development; neurochemical anatomy: sites and mechanism underlying regulation of ingestion, responses to stress and sexual behavior: central mechanisms of reward, learning and memory: and recovery of function after CNS damage. An important second goal is to relate activity at the systems level to underlying cellular and molecular mechanisms. These strategies discussed throughout the course but especially in development; genetic basis of psychopathology: CNS injury and recovery; and use of molecular techniques for modulating behavior. The students are required to write four papers covering information from four separate blocks of the course and one final paper comparing the uses of transgenic knockouts, inducible knockouts and antisense approaches for studying a system of the student's choice. These papers are read by the faculty and defended by the students.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 0 times for 0 credits

NEUR 609S Graduate Neuroscience II 4.0 Credits

Graduate Neuroscience II is didactic in nature with neurological disease as the basis for understanding concepts in Cellular Neuroscience (module I), Systems Neuroscience (module II) and Behavioral Neuroscience (module III).

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 615S ADVANCED SPEC. TOPICS IN NEURO 1.0-3.0 Credit

Graduate students present current research papers in the general areas of systems and behavioral neurobiology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 634S MOTOR SYSTEMS 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

NEUR 8214S NEUROSCIENCE SENIOR ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUR 900S NEUROSCIENCE RESEARCH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

NEUR 901S NEUROSCIENCE SENIOR ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

NEUR 9096S ELECTIVE - NEUROSCIENCE 6WKS 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NEUR 9750S RESEARCH - NEUROSCIENCE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NEUR 9754S RESEARCH - NEUROSCIENCE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**NEUR 999S Special Topics in Neuroscience 1.0-4.0 Credit**

This is a special topics course that will focus on graduate level topics in the area of Neuroscience. The exact content, readings, and grading will be determined by the professor on a course by course basis.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 3 times for 16 credits

Otolaryngology

Courses

OTO 600S General Otolaryngology 3.0 Credits

This course introduces students to basic concepts in diagnoses and treatments of common ear, nose and throat disorders as well as emergent conditions encountered frequently. It includes didactic training in infectious diseases of the head and neck, sudden deafness, epistaxis ear ache, sore throat and other maladies. This course includes lectures and individually supervised clinical encounters.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**OTO 601S Otology 3.0 Credits**

The student is introduced to embryologic development, anatomy, physiology and functions of the external, middle and internal ear. Concepts in the diagnosis and treatment of common pathologic conditions of the ear including hearing loss, dizziness, tinnitus, otitis externa, otitis media, chronic ear disease, mastoiditis, cholesteatoma, labyrinthitis, otosclerosis, sudden deafness and congenital conditions are addressed. It includes didactic training I facial nerve and 8th cranial nerve function and abnormalities, autoimmune training in facial nerve and 8th cranial nerve function and abnormalities, autoimmune.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**OTO 602S Head and Neck Oncology 3.0 Credits**

This course introduces the student to the biology, pathology, diagnosis, treatment and prognosis of head and neck neoplastic disease. It includes didactic training in radiation therapy, immunotherapy, chemotherapy and surgery; combined use, indications and contraindications of treatment with an emphasis on acute management and long-term follow up. Tumor classification according to the American Joint Commission Guidelines will be covered. Complications of treatment and non-treatment including carotid artery.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**OTO 603S Pediatric Otolaryngology, Introduction 3.0 Credits**

This course contains essential information for post-doctoral training (post-M.D. or D.O.) necessary for specialization, and as core knowledge for an academic physician in otolaryngology.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**OTO 604S Journal Club in Otolaryngology 1.0 Credit**

This course is intended to introduce students to critical analysis of published literature. Articles will be assigned in advance and discussed in journal club. The articles will be selected by faculty. Some will be chosen for excellence. Others will be chosen for flaws in scientific design that cast doubt on their validity and probably should have precluded their publication. Students will take turns presenting papers and critiquing them, with the guidance of faculty.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated 5 times for 5 credits**OTO 605S Laryngology – Voice, Introduction 3.0 Credits**

This course introduces the student to current concepts in anatomy and physiology of phonation, techniques for history and physical examination in patients with voice complaints and common diagnoses and treatments in patients with voice disorders. Voice therapy is introduced. The course includes didactic lectures and individually supervised clinical encounters.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**OTO 606S Laryngology – Voice, Advanced 3.0 Credits**

This course introduces the student to advanced concepts in voice management including objective voice assessment, stroboscoped laryngoscopy, high-speed laryngeal imaging and related technology. Avenues for voice research also are discussed. Advanced office-based care is included, including indirect laryngeal surgery, office-based laser surgery, EMG guided Botulinum Toxin injection and other techniques.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Not repeatable for credit**Prerequisites:** OTO 605S

OTO 607S Laryngology – Swallowing 3.0 Credits

The student is introduced to anatomy and physiology of deglutition, as well as diagnoses and treatments of swallowing disorders. Techniques addressed include functional endoscopic evaluation of swallowing and sensory function (FEESST), three-phase barium swallow, transnasal esophagoscopy and esophageal manometry, among others.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 608S Temporal Bone Dissection 3.0 Credits

This intensive, hands-on course includes didactic lectures, evaluation of histology and imaging studies, and extensive supervised cadaver dissection. All students will complete a variety of cadaver dissections including mastoidectomy, translabyrinthine craniotomy, middle fossa approach to the internal auditory canal, stapedectomy, cochlear implantation and others.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 609S Neurotology 3.0 Credits

This course is designed to introduce the student to conditions of the inner ear and ear-brain interface. Didactic lectures introduce concepts in the diagnosis and treatment of vertigo, tinnitus, autoimmune inner ear disease, Meniere's syndrome, cochlear otosclerosis, sudden deafness, acoustic neuroma and other tumors of the ear and cerebellopontine angle. The student will learn techniques for history and physical examination, evaluation of diagnostic testing, histology and imaging studies. Surgical management of patients with neurotological disorders will be introduced in didactic courses.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: OTO 601S

OTO 610S Audiology 3.0 Credits

The student is introduced to anatomy and physiology of hearing and balance as well as tests used in diagnosis and treatment of disorders of hearing and balance. Techniques addressed include audiogram, tympanograms, otoacoustic emission, brainstem evoked response audiogram (ABR), Electronystagmogram (ENG), computerized dynamic posturography (CDP), rotary chair testing, electroneurography (ENoG), electrocorticogram (ECoG), vestibular-evoked myogenic potential (VEMP), tinnitus matching and masking, and central auditory processing testing.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 611S Endocrine Surgery 3.0 Credits

This course introduces the student to concepts in the diagnosis and treatment of common disorders of the thyroid, parathyroid and pituitary glands. Techniques include serologic testing, imaging studies, nuclear medicine studies, FNA cytology and biopsy. Didactic lectures address autoimmune, malignant and non-malignant disorders, as well as chronic and emergent management of endocrine pathologies.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 612S Allergy and Immunology 3.0 Credits

This course introduces the student to the diagnosis and treatment of allergic and immunologic disorders of the ear, nose, throat, head and neck. Basic science and principles of the various components of the immune system are presented. Techniques addressed include skin testing, RAST testing and serologic testing.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 613S Radiology of the Head and Neck 3.0 Credits

This course introduces students to the physics of and indications for imaging of the head and neck. Emphasis is placed on computed tomography, magnetic resonance imaging, magnetic resonance angiography, arteriography and ultrasound. The course also includes nuclear imaging SPECT and PET.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 614S Pathology and Histology 3.0 Credits

The student is introduced to pathologic and histologic diagnoses of surgical pathology of the head and neck. This hands-on course includes didactic lectures and evaluation of pathology specimens and microscopic slide analysis.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 615S Pediatric Otolaryngology, Advanced 3.0 Credits

This course is tailored to introduce students to the diagnosis and treatment of complexly and/or critically ill children. Didactic lectures include pediatric cancer, rare childhood disease, pediatric HIV and AIDS, congenital abnormalities and prematurity, with emphasis on acute, chronic and emergent care.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: OTO 603S

OTO 616S Otolaryngology Practice 3.0 Credits

This course focuses on practice management issues for the otolaryngologist including procedural terminology and coding, patient registration, surgical scheduling, precertification, documentation of services, legal issues including contract law and privacy issues. Economic issues and practice building will also be covered in didactic lectures. A special emphasis is placed on academic practice.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 617S Research Methodology and Publication 3.0 Credits

This introductory course focuses on the fundamentals of basic clinical research and research involving human subjects. Institutional, state and federal laws and regulations are covered. A special focus is placed on clinical relevance, research design and publication of research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 618S Facial Plastic and Reconstructive Surgery 3.0 Credits

The student is introduced to the basic concepts of facial plastic and reconstructive surgery. Didactic training in rhinoplasty, open reduction internal fixation of frontal sinus fractures, mandibular, malar, orbital and maxillary fractures, blepharoplasty, rhytidectomy, orbital decompression, local flap closure, MOHS reconstructive surgery, techniques and facial reanimation procedures and other topics are included.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 619S Sleep Disorders 3.0 Credits

This course introduces the student to the pathophysiology, evaluation and treatment of snoring, upper airway resistance syndrome and obstructive sleep apnea. Testing techniques, treatment options and outcomes assessment are included.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 620S Taste and Smell 3.0 Credits

Didactic instruction introduces the student to the pathophysiology, evaluation and treatment of patients with disorders of taste and smell. Emphasis is placed on issues including nutrition and quality of life, and especially on current diagnostic technology and research potentials.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 621S Rhinosinusology 3.0 Credits

This course introduces the student to anatomy and physiology of the nose, and a variety of techniques for evaluation of the nose and sinuses. Direct examination, nasal endoscopy, open sinus surgery and functional endoscopic sinus surgery are stressed. Variations and infectious diseases involving those in paranasal sinuses are included.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 622S Bronchoesophagology 3.0 Credits

This course introduces the student to anatomy and diagnostic techniques for disorders of the larynx, trachea, bronchial tree and esophagus. Pathophysiology of a wide variety of disorders is included. This course is intended to provide the foundation for surgical training in flexible and rigid endoscopy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 700S General Otolaryngologic Surgery 6.0 Credits

General otolaryngology trains the student in surgical procedures common in general otolaryngologic practice. These include, among others, septoplasty, tonsillectomy, adenoidectomy, uvulopalatopharyngoplasty and other surgery for sleep disorders, submandibular gland resection, and resection of skin lesions of the head and neck. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 701S Otologic Surgery 6.0 Credits

Supervised training in microsurgical techniques including middle ear and mastoid surgery is provided. Procedures will include myringotomy, tympanoplasty, ossiculoplasty, stapedectomy, tympanomastoidectomy and others. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 702S Head and Neck Oncologic Surgery 6.0 Credits

This course requires mastery of surgery for cancer of the head and neck including glossectomy, mandibulectomy, laryngectomy, modified radical neck dissection, radical neck dissection, flap reconstruction and related procedures. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 703S Pediatric Otolaryngologic Surgery 6.0 Credits

Pediatric otolaryngology trains the student in management of common and specialized otolaryngologic problems involving children. Common problems include pediatric approach to tonsillectomy and adenoidectomy, septoplasty, and direct laryngoscopy. This course of training also includes more complex issues including congenital malformations of the face, head and neck, benign and malignant neoplasms of the head and neck, pediatric airway disorders and bronchotracheal reconstruction. Pediatric cochlearimplantation also may be included. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 704S Neurotologic Surgery 6.0 Credits

This course involves advanced otologic surgery including cochlear implantation, translabrynthine and middle cranial fossa approaches to the internal auditory canal for resection of ear-brain interface tumors, skull base surgery, facial nerve reanastomosis and related procedures. This also includes acquisition of knowledge about lumbar drainage, management of cerebral spinal fluid leaks and other issues common to neurotologic surgery. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 705S Laryngologic Surgery 6.0 Credits

Laryngology includes knowledge of the special microsurgical techniques required for delicate surgical management of benign and malignant disorders of the larynx. It includes microdirect laryngoscopy, techniques for vocal fold injection, injection medialization, use of cold instruments, appropriate laser use and safety, and other surgical techniques. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 706S Rhinologic Surgery 6.0 Credits

The hands-on training in rhinological surgery includes complex septoplasty, repair of nasal fracture, extensive nasal turbinate surgery, rhinotomy, transnasal approaches to the sphenoid sinus and other complex rhinologic procedures. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 707S Surgery of the Sinuses 6.0 Credits

Sinusology trains the otolaryngologic surgeon in external and functional endoscopic surgical approaches to the paranasal sinuses. It includes training in maxillary antrostomy, Caldwell-Luc, endoscopic surgery of the maxillary and ethmoid sinuses, external ethmoidectomy, intranasal and external frontal sinus procedures, and sphenoid sinus procedures. Special emphasis is placed on recognition and protection of the cribriform plate and four of the anterior cranial fossa. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 708S Bronchoesophagology 6.0 Credits

Bronchoesophagology provides training in flexible and rigid direct laryngoscopy, bronchoscopy and esophagoscopy. This also includes transnasal esophagoscopy and flexible and rigid endoscopic laser surgical techniques. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

OTO 709S Cosmetic Plastic and Reconstructive Surgery 6.0 Credits

The cosmetic and reconstructive surgery experience includes training in theory and practice of procedures such as rhinoplasty, blepharoplasty, rhytidectomy, chin implantation, skin resurfacing, regional free flaps, and may include training and free flap techniques. The student will learn the names of all instruments, surgical reasoning and strategy, and will develop competence in surgical techniques, demonstrated by the ability to perform the procedures under supervision.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Pathologists Assistant

Courses

MSPA 500S Gross Anatomy 5.0 Credits

Dissection of the human body with particular attention to the morphological relationships of individual organ systems. Emphasis is placed on internal anatomy as a major facet of this instruction which is designed for eventual autopsy evisceration and subsequent dissection, as well as surgical pathology gross examinations.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 10 credits

MSPA 510S Laboratory Management 2.0 Credits

The organization and function of an Anatomic Pathology laboratory is investigated to include ordering supplies, financial management, computerization, laboratory safety, billing, personnel managements, organizational compliance (JCAHO, CAP, OSHA) and quality assurance.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 4 credits

MSPA 520S Medical Terminology 3.0 Credits

Study of the etymology of medical and surgical terms with emphasis on the principles or word analysis, construction, and evolution.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPA 530S Biomedical Photography 4.0 Credits

Basic introductory photography course with special emphasis on macro, close-up and photomicrographic techniques. Special techniques relative to the biomedical field, such as digital imaging and basic radiographic techniques are explored.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

MSPA 540S Histotechnology I 3.0 Credits

Basic histology and histochemistry techniques are covered through formal lecture and laboratory experience.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

MSPA 541S Histotechnology II 3.0 Credits

Advanced histology and histochemistry techniques are covered through formal lecture and laboratory experience. This course is a continuation of MSPA 540S.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

Prerequisites: MSPA 540S [Min Grade: C]

MSPA 550S Applied Anatomic Pathology 4.0 Credits

The course is designed to bring the students through the clinical aspects of chart review as well as academic autopsy and surgical pathology practices.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

MSPA 560S Medical Ethics 2.0 Credits

MedEthEx OnLine" is a series of exercises in medical ethics and communication skills. The goal of the program is to enable students to improve their knowledge of medical ethics and their skills in communicating about ethical issues with patients and their families.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 4 credits

MSPA 570S Medical Pathology I 6.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

MSPA 571S Medical Pathology II 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

MSPA 580S Medical Microbiology I 4.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 8 credits

MSPA 581S Medical Microbiology II 3.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 6 credits

MSPA 590S Leadership Skills for the Medical Profession 3.0 Credits

This course is designed to help students develop leadership skills in order to facilitate success in their professional and personal lives. Students will be given the opportunity to discover and practice several leadership strategies and techniques. Topics will include leadership skills, communication skills, time-management, team-building, conflict resolution and stress management.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

MSPA 600S Surgical Pathology I 6.0 Credits

Clinical practicum designed to teach the students the methods of gross tissue description, dissection and preparation of surgical specimens for light, immunofluorescent, immunochemical, frozen and electron microscopy.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

MSPA 601S Surgical Pathology II 6.0 Credits

Clinical practicum designed to teach the students the methods of gross tissue description, dissection and preparation of surgical specimens for light, immunofluorescent, immunochemical, frozen and electron microscopy. A continuation of Surgical Pathology I.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

Prerequisites: MSPA 600S [Min Grade: C]

MSPA 602S Surgical Pathology III 6.0 Credits

Clinical practicum designed to teach the students the methods of gross tissue description, dissection and preparation of surgical specimens for light, immunofluorescent, immunochemical, frozen and electron microscopy. A continuation of Surgical Pathology II.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

Prerequisites: MSPA 601S [Min Grade: C]

MSPA 610S Autopsy Pathology I 6.0 Credits

Clinical practicum designed to teach the students techniques of autopsy evisceration and dissection as well as special skills and procedures necessary for the performance of post-mortem examinations.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

MSPA 611S Autopsy Pathology II 6.0 Credits

Clinical practicum designed to teach the students techniques of autopsy evisceration and dissection as well as special skills and procedures necessary for the performance of post-mortem examinations. A continuation of Autopsy Pathology I.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

Prerequisites: MSPA 610S [Min Grade: C]

MSPA 612S Autopsy Pathology III 6.0 Credits

Clinical practicum designed to teach the students techniques of autopsy evisceration and dissection as well as special skills and procedures necessary for the performance of post-mortem examinations. A continuation of Autopsy Pathology II.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 12 credits

Prerequisites: MSPA 611S [Min Grade: C]

MSPA 799S Special Topics 10.0 Credits

College/Department: Biomedical Graduate Studies_COM

Repeat Status: Can be repeated 10 times for 50 credits

Pathology

Courses

PATH 502S PATHOLOGY 1ST LAB ROTATION 4.0 Credits

First rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotation are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 503S Pathology Journal Club 1.0 Credit

Students enroll for a minimum of four semesters for this twice monthly meeting.

College/Department: COM School of Biomedical Sciences Professional Studies

PATH 505S PATHOLOGY 2ND LAB ROTATION 4.0 Credits

Second rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 506S PATHOLOGY 3RD LAB ROTATION 4.0 Credits

Third rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during fall, spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 507S MEDICAL PATHOLOGY PART 1 7.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 509S Pathologic Processes 3.0 Credits

An abridged pathology course focusing primarily on aspects of general pathology (inflammation, wound healing and repair, immunopathology and autoimmunity, coagulation, vascular biology, and principles of neoplasia). Histopathology and cytology will be introduced. This course is a subset of PATH-507-05 Medical Pathology I geared toward the needs of graduate students.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 600S Pathology Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department, Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

PATH 601S CELL MOL PATHBIO CANCER ANGIOG 4.0 Credits

An advanced course addressing the cell and molecular processes associated with the biology of cancer progression. Major topics include cytogenetic abnormalities, the role and function of oncogenes and tumor suppressor genes, growth factor receptor interactions, cell cycle control and regulation of cell death, angiogenesis and the role of the extracellular matrix, viruses and cancer, tumor immunobiology, and tumor metastases. Although didactic in nature, the course requires extensive exposure to the current literature on topics at the forefront of cancer research.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PATH 751S PATHOLOGY AND LABORATORY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 819S ANATOMIC PATH & LAB MED- 3 WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 820S ANATOMIC PATH & LAB MED- 1 WK 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8214S LABORATORY MEDICINE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 821S ANATOMIC PATHOLOGY- 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PATH 8222S ANATOMIC PATHOLOGY - 2 WEEKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PATH 8224S ANATOMIC PATHOLOGY 0.0 Credits**College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**PATH 822S ANATOMIC PATHOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 8232S CLINICAL PATHOLOGY- 2 WEEKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**PATH 8234S Clinical Pathology 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 823S CLINICAL PATHOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 8242S Diagnostic Cytology*** 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Can be repeated 0 times for 0 credits**PATH 8244S DIAGNOSTIC CYTOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 824S CLINICAL PATHOLOGY-2 WEEKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 825S DIAGNOSTIC CYTOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 826S ANATOMIC PATH & LAB MEDICINE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 828S DIAGNOSTIC CYTOLOGY - 2 WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 829S PATHOLOGY SUBSPECIALTY - 2 WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 8311S ANATOMIC PATH & LAB MED - 1 WK 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 8312S ANATOMIC PATH & LAB MED - 2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 8313S ANATOMIC PATH & LAB MED- 3WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 8314S Anatomic Path & Lab Medicine 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 8412S PATHOLOGY SUBSPECIALTY- 2 WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 8414S PATHOLOGY SUBSPECIALTY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 9092S Forensic Pathology - 2wks 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 9094S ELECTIVE - PATHOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 955S LABORATORY MEDICINE 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 956S PATHOLOGY RESEARCH 2 WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 9752S RESEARCH - PATHOLOGY - 2WKS 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 9754S RESEARCH - PATHOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit**PATH 9756S RESEARCH-PATHOLOGY 0.0 Credits****College/Department:** College of Medicine**Repeat Status:** Not repeatable for credit

Pharmacology

Courses

PHRM 502S Current Topics i Pharm & Phys 1.0 Credit

Current topics in experimental pharmacology are presented via a journal club alternating with research presentations. In addition to active student participation, all members of the department of pharmacology and physiology (research assistants, postdoctoral fellows and faculty) participate.

College/Department: COM School of Biomedical Sciences Professional Studies**Repeat Status:** Can be repeated multiple times for credit

PHRM 503S Pharm & Phys 1st Lab Rotation 4.0 Credits

First rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 504S Pharm & Phys 2nd Lab Rotation 4.0 Credits

Second rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 505S Pharm & Phys 3rd Lab Rotation 4.0 Credits

Third rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during spring or summer of the first year. A written research report is required at the end of each rotation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 507S Prin of Neuropharmacology 3.0 Credits

This course covers basic concepts in Neuropharmacology, all of the major neurotransmitter systems, behavioral pharmacology and addiction, approaches to molecular and cellular physiology including photoactivated biomolecules, electrophysiology, phosphorylation.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 512S Graduate Pharmacology 3.0 Credits

This team taught course provides a basic knowledge of the pharmacologic mechanisms of action, effects on organ systems, routes of administration, pharmacokinetics, therapeutic uses, adverse reactions, contraindications, and drug interactions of drugs.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 516S Advanced Topics in Physiology 1.0 Credit

PHRM516S is presented in several formats throughout the semester to discuss cellular physiology, neurophysiology, muscle physiology, cardiovascular physiology, pulmonary physiology, gastrointestinal physiology, endocrinology, and renal physiology. These formats include review of past scientific findings that led to the current understanding of a physiological principle, journal club style format, self-directed problem sheets, development of a working model based on past and present scientific knowledge, and point/counter-point discussions where students debate pros and cons of a controversy in physiology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 517S Advanced Topics in Pharmacology 1.0 Credit

This course will expand upon the Graduate Pharmacology course for graduate students enrolled in Graduate Pharmacology 512S. The intent is to provide more in-depth coverage of selected topics that will be beneficial to students pursuing a career where pharmacology is a principle component of training, education and/or employment.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 518S New Frontiers in Therapy 1.0 Credit

This course will provide a glimpse of what could revolutionize diagnosis and treatment with emphasis on personalized medicine. Scientific impact, technical challenges, and sociopolitical repercussions will be discussed. Students will be required to write a research proposal in NIH format and are expected to participate in peer reviews.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 519S Methods in Biomedical Research 1.0 Credit

A primary goal for this course is to introduce Pharmacology & Physiology graduate students to the breadth of techniques used within the Department. Students will gain insight into not only some of the technical aspects of a variety of methods, but also how to critically examine techniques in both their own research and the literature for strengths, weaknesses and limits. At the end of the course, students should have a greater appreciation for the modalities used outside of their own labs, and an understanding of how those technologies are moving biomedical research forward.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 525S Drug Discovery and Development I 3.0 Credits

This course, the first of two, will provide in-depth exposure to the concepts and processes involved in drug discovery and development as practiced in the biopharmaceutical industry cover all facets from target identification through to the submission of the investigational New Drug Application (IND). Current unmet medical needs and case histories from difference therapeutic areas will be reviewed.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 526S Drug Discovery and Development II 3.0 Credits

This course will provide in-depth exposure to the concepts and processes involved in drug discovery and development as practiced in the biopharmaceutical industry. It will follow the first course (Drug Discovery and Development I) and will cover all aspects from roval process to the submission of the NDA to regulatory approval and post-marketing surveillance.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

Prerequisites: PHRM 525S [Min Grade: B]

PHRM 600S Pharmacology Thesis Research 9.0 Credits

Research toward the fulfillment of the dissertation is conducted beginning after successful completion of the qualifying examination. Progress is monitored by the student's advisor and department, Advisory Committee or Thesis Committee.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated multiple times for credit

PHRM 602S RESEARCH METHODS IN PHARMACOLOGY 2.0 Credits

A research course in which the student participates in several research projects under the direction of different staff members in order to become familiar with the specific areas of expertise of the faculty. This course emphasizes not only experimental methods but also the conceptual bases for investigating current problems in pharmacology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 605S Research in Drug Discovery and Development 4.0 Credits

This course is designed to provide opportunities for the student to pursue research in the area of drug discovery and development. This can be done either in an academic or pharmaceutical laboratory under the supervision of a mentor. An alternative or an additional aspect can be the conduct of research for this thesis that is not laboratory research but library research based on an approved topic for the thesis requirement. Both alternatives, laboratory or library research must be approved by the course directors.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHRM 751S MEDICAL PHARMACOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 823S CARDIOVASCULAR PHARMACOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 895S PHARMACOLOGY RESEARCH 0.0 Credits

Repeat Status: Not repeatable for credit

PHRM 9092S PHARMACOLOGY - ELECTIVE - 2WKS 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 9094S PHARMACOLOGY -ELECTIVE 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 0 times for 0 credits

PHRM 9750S RESEARCH-PHARMACOLOGY-16 wks 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 9754S PHARMACOLOGY RESEARCH 0.0 Credits

College/Department: College of Medicine

Repeat Status: Not repeatable for credit

PHRM 999S Special Topics in Pharmacology & Physiology 1.0-4.0 Credit

This is a special topics course that will focus on graduate level topics in the area of Pharmacology & Physiology. The exact content, readings, and grading will be determined by the professor on a course by course basis.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 3 times for 16 credits

Physiology

Courses

PHGY 502S ION CHANNELS IN CELLULAR PHYS. 2.0 Credits

This elective advanced course covers all aspects of ion channel physiology. In depth lectures on voltage-gated and ligand-gated ion channel structure and function are presented in the first part of the course. The second part of the course delves into electrophysiology and its application to cell physiology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PHGY 503S GRADUATE PHYSIOLOGY 4.0 Credits

This lecture course is designed to introduce graduate students to the major organ systems of the body and their integration. A major focus will be on the basic biological/biophysical processes that underlie the integration functioning of these systems. The focus is on general principles, and examples will be drawn from both human and animal physiology.

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Can be repeated 2 times for 0 credits

PHGY 701S MEDICAL PHYSIOLOGY 0.0 Credits

College/Department: College of Medicine

Repeat Status: Can be repeated 9 times for NaN credits

Pre - Medical

Courses

PMED 800S Registered for Degree Only 0.5-6.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

PMED 999S Special Topics 0.5-9.0 Credits

College/Department: COM School of Biomedical Sciences Professional Studies

Repeat Status: Not repeatable for credit

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