Contents

The College of Medicine: Biomedical Graduate Studies/Professional Studies 2010-2011 Graduate Course Descriptions

Anatomy Courses

ANAT 501S - NEUROBIOLOGY TOPICS I
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.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

ANAT 504S - NEUROBIOLOGY TOPICS II
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.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

ANAT 507S - HUMAN ANATOMY
This course introduces the student to the structure and function of the head, neck, back, upper limb, thorax, abdomen, pelvis and lower limb with particular emphasis on the nervous and musculoskeletal systems. The format consists of lecture presentation and laboratory dissections and special emphasis is placed on clinical relevance and functional relationships of the anatomic structures. The course is organized regionally and both lecture and laboratory study are coordinated so that all aspects of a region are considered simultaneously.
Credits: 5.00
College: Nursing & Health Professions
Department: Health Sciences
Repeat Status: Not repeatable for credit

ANAT 520S - ADVANCED ANATOMY
This is a five credit course tailored to the specific needs of students in the Physician Assistant Program. The course is designed to introduce the student to the fundamentals of Gross Anatomy and to provide an appreciation of the inexorable relationships between structures that exist in the human body. The topics to be studied include the following regions: back, central nervous system, head and neck, thorax, abdomen, pelvis and upper and lower extremities. Laboratory will be used to demonstrate many of the structures that are described in lecture. Laboratory teaching materials will include human cadavers, special dissections, models and radiographs. Cross-sectional anatomy will be introduced in lecture to facilitate learning the 3-dimensional relationships that anatomical structures have to each other. MRI and CT scans will be utilized to demonstrate these relationships. Some Microscopic Anatomy will also be presented in this course, to correlate with principles taught in Physiology.
Credits: 5.00
College: Nursing & Health Professions
Department: Health Sciences
Repeat Status:

ANAT 533S - ANATOMY & KINESIOLOGY
Covers the anatomical, biomechanical, and physiological fundamentals of kinesiology.
Credits: 2.00
College: Nursing & Health Professions
Department: Health Sciences
Restrictions:
Must be enrolled in one of the following Major(s):
Art Therapy
Dance/Movement Therapy
Music Therapy
Repeat Status: Not repeatable for credit

ANAT 534S - NEUROANATOMY/NEUROPHYSIOLOGY
Introduces the fundamentals of neural mechanisms involved in the peripheral and central nervous systems.
Credits: 2.00
College: Nursing & Health Professions
Department: Health Sciences
Restrictions:
Must be enrolled in one of the following Major(s):
Art Therapy
Dance/Movement Therapy

Music Therapy
Repeat Status: Not repeatable for credit

ANAT 602S - MEDICAL NEUROSCIENCE
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

Biochemistry Courses

BIOC 502S - BIOCHEMISTRY 1ST LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

BIOC 503S - BIOCHEMISTRY 2ND LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

BIOC 504S - BIOCHEMISTRY 3RD LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

BIOC 505S - Biochemical Basis of Disease
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 presentations. This course is open to all graduate students.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

BIOC 506S - BIOCHEMISTRY JOURNAL CLUB
A weekly journal club in which students take turns presenting recent papers from the biomedical literature.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Graduate Studies
Repeat Status: Course can be repeated 15 time(s) for 100.00 credit(s)

BIOC 507S - BIOCHEMISTRY SEMINAR SERIES
Weekly research seminars on topics in Biochemistry and Molecular Biology. Seminar speakers include both scientists from the Drexel faculty and scientists from outside institutions.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Graduate Studies
Repeat Status: Course can be repeated 15 time(s) for 100.00 credit(s)

BIOC 508S - Biochemistry Exper Approaches
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 lectures, discussion, investigation of the primary literature, and demonstrations will be used. May be repeated once for credit.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 1 time(s) for 4.00 credit(s)

BIOC 509S - Biochemical Basis of Disease
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.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 1 time(s) for 3.00 credit(s)

BIOC 510S - Cancer Biology

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.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

BIOC 511S - Writing for Researchers: Grants and Papers
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.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

BIOC 512S - Advanced Cancer Biology
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.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: BIOC 510S
Repeat Status: Not repeatable for credit

BIOC 600S - BIOCHEMISTRY THESIS RESEARCH
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.
Credits: 9.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 15 time(s) for 100.00 credit(s)

BIOC 603S - SPECIAL TOPICS: BIOCHEM. & NUT
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

Clinical Research Courses

CR 500S - EPIDEMIOLOGY
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Course can be repeated 2 time(s)

CR 501S - Emerging Trends in Medical Device History
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 bio-medical engineering perspective
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated for 6.00 credit(s)

CR 505S - ETHICAL ISSUES IN RESEARCH
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites:
Repeat Status: Not repeatable for credit

CR 510S - SPONSORED PROJECTS FINANCE
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Course can be repeated 2 time(s)

CR 511S - The History of Misconduct in Biomedical Research
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 1 time(s)

CR 512S - Fundamentals of Academic Research Administration
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 1 time(s) for 3.00 credit(s)

CR 513S - Pharmaceutical R&D: Business Process and Information Flow
Credits: 3.00
College: Biomedical Graduate Studies
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 1 time(s)

CR 514S - World Wide Regulatory Submissions
Credits: 3.00
College: Biomedical Graduate Studies
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 1 time(s)

CR 515S - INTRO TO CLINICAL TRIALS
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites:
Repeat Status: Not repeatable for credit

CR 520S - Applications of Clinical Research Biostatistics
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated for 3.00 credit(s)

CR 525S - SCIENTIFIC WRITING & MED LIT
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 6.00 credit(s)

CR 530S - TECH TRANSFER
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.
Credits: 3.00
College: Biomedical Graduate Studies
Department: SOM - Professional Studies
Repeat Status: Course can be repeated 2 time(s)

CR 535S - Current Federal Regulatory Issues in Biomedical Research
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 1 time(s) for 3.00 credit(s)

CR 545S - PHARMACEUTICAL LAW
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.

Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

CR 550S - LEADERSHIP SKILLS
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Course can be repeated 2 time(s) for 6.00 credit(s)

CR 555S - COMPLIANCE & MONITORING ISSUES
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites:
Repeat Status: Not repeatable for credit

CR 560S - SPECIAL TOPICS
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Course can be repeated 2 time(s)

CR 565S - Contemporary Issues in Human Research Protection
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 1 time(s) for 3.00 credit(s)

CR 570S - Principles and Practice of Pharmacovigilance
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Not repeatable for credit

CR 600S - DESIGNING THE CLINICAL TRIAL
Designers and ethical, clinical, strategic issues surrounding clinical drug research are the focus of this course. Topics include design of trials for Phases one though four, an overview of the statistical component of a clinical trial, monitoring of the trial, and managing clinical data.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: CR 515S Minimum Grade: C
Repeat Status: Not repeatable for credit

CR 609S - INNOVATIVE PRODUCE DEVELOPMENT
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 form proving safety and efficacy. May be repeated twice for credit.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

CR 612S - FUNDAMENTALS OF COMPLIANCE
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 0 time(s) for 6.00 credit(s)

CR 614S - Pharmacotherapy in New Drug R&D

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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Clinical Research
Clinical Research Org & Mgmt
Repeat Status: Not repeatable for credit

CR 616S - Intro to Therapeutic Products
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.
Credits: 3.00
College: Biomedical Graduate Studies
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
Must be enrolled in one of the following Major(s):
Clinical Research
Clinical Research Org & Mgmt
Repeat Status: Not repeatable for credit

CR 617S - Informatics in Pharm Res & Development
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Clinical Research
Clinical Research Org & Mgmt
Repeat Status: Not repeatable for credit

CR 620S - BIOTECH/RESEARCH
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Course can be repeated 0 time(s)

CR 625S - HEALTH POLICY AND ECONOMICS
The study of the development, analysis and communication of economic data in the context of clinical research. May be repeated twice for credit.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 6.00 credit(s)

CR 630S - TRANS RESEARCH
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.
Credits: 3.00
College: Biomedical Graduate Studies
Department: SOM - Professional Studies
Repeat Status:

CR 633S - QUALITY ASSURANCE AUDITS
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites:
Repeat Status: Not repeatable for credit

CR 635S - STRATEGIC PLANNING
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.
Credits: 3.00
College: Biomedical Graduate Studies
Department: SOM - Professional Studies

Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 6.00 credit(s)

CR 999S - Special Topics
Credits: 1.00 to 3.00
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Course can be repeated 99 time(s) for ####### credit(s)

Histotechnology Courses

MHPP 500S - Advanced Histotechnology
In depth study of routine and advanced techniques associated with the histology laboratory.
Credits: 4.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: MSPA 540S
Repeat Status: Not repeatable for credit

MHPP 501S - Anatomy for Histotechnologists
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.
Credits: 4.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

MHPP 502S - Histotechnology Capstone Project
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: MSPA 540S and MHPP 500S and MHPP 503S
Repeat Status: Not repeatable for credit

MHPP 503S - Histotechnology Practicum
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.
Credits: 9.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: MSPA 540S and MSPA 520S and MSPA 590S and MLAS 545S and MHPP 500S and MHPP 501S and MSPA 581S and MHPP 502S
Repeat Status: Not repeatable for credit

IMS Program Interdepartmental Science Courses

IMSP 502S - MEDICINE AND SOCIETY I
Credits: 3.00
College: College of Medicine
Department: IMS
Restrictions:
May not be enrolled in one of the following College(s)/School(s):
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status: Not repeatable for credit

IMSP 503S - MEDICINE AND SOCIETY II
Credits: 2.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status: Not repeatable for credit

IMSP 505S - CLINICAL FRAMEWORK
Credits:
College: College of Medicine
Department: IMS
Repeat Status: Not repeatable for credit

IMSP 510S - MEDICAL BIOCHEMISTRY I
Credits: 7.50
College: College of Medicine
Department: IMS

Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status: Not repeatable for credit

IMSP 511S - MEDICAL BIOCHEMISTRY II
Credits: .50
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status:

IMSP 520S - MEDICAL PHYSIOLOGY I
Credits: 3.50
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status: Not repeatable for credit

IMSP 521S - MEDICAL PHYSIOLOGY II
Credits: 3.50
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status: Not repeatable for credit

IMSP 530S - BASIC IMMUNOLOGY
Credits: 1.50
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status: Not repeatable for credit

IMSP 540S - CELL BIOLOGY & MICROANATOMY I
Credits: 5.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status:

IMSP 541S - CELL BIOLOGY & MICROANATOMY II
Credits: 3.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status: Not repeatable for credit

IMSP 550S - MEDICAL NUTRITION
Credits: 1.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status:

IMSP 560S - MEDICAL NEUROSCIENCE
Credits: 6.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status:

IMSP 561S - MEDICAL NEUROSCIENCE
Credits: 6.00
College: College of Medicine
Department: Biomedical Science
Repeat Status:

IMSP 570S - MEDICAL IMMUNOLOGY
Credits: 3.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Repeat Status: Not repeatable for credit

IMSP 580S - Special Topics
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.
Credits: .50 to 9.00
College: College of Medicine
Department: IMS
Repeat Status: Course can be repeated 4 time(s) for 50.00 credit(s)

IMSP 602S - MEDICAL NEUROSCIENCE
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.
Credits: 5.00
College: College of Medicine
Department: IMS
Repeat Status: Not repeatable for credit

Interdepartmental Courses

IDPT 300S - MCB IMSG FALL TERM
Credits: 3.00
College: College of Medicine
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 310S - MCB MPSG FALL TERM
Credits: 3.00
College: College of Medicine
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 320S - MCB MBSG FALL TERM
Credits: 3.00
College: College of Medicine
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 330S - MCB MBSI FALL TERM
Credits: 3.00
College: College of Medicine
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 500S - Scientific Integrity & Ethics
Offered during an eight-ten week period, once a week. It is presented using a problem-based curriculum, with associated mandatory text. Students and faculty discuss current issues that all scientists address in their research programs. Solutions to specific problems and ethical dilemmas are presented by the students for discussion and debate. May be repeated once for credit.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 1 time(s) for 2.00 credit(s)

IDPT 501S - BIOSTATISTICS I
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.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

IDPT 503S - SEARCHING BIOMEDICAL LITERATUR
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.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

IDPT 505S - BIOMEDICAL RESEARCH
Credits: 9.00

College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 506S - BIOSTATISTICS II
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.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 521S - Core Curriculum I
The core curriculum is a comprehensive interdisciplinary program of study for all first year master's and Ph.D. students in the Biomedical Graduate Studies Programs. The goal of the core curriculum is to provide a broad foundation in biomedical science and serve as framework for advanced study in more specialized areas. Four courses will covered in the fall semester for a total of 119.5 credits.
Credits: 6.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 522S - Molec Structure and Metabolism
This course serves to introduce students to fundamental concepts of molecular structure and function; these will serve as a basis for understanding both the biochemical basis for topics such as metabolism as well as aspects to be covered in the other core modules, such as membrane transport phenomena and second messenger signaling. are aspects of hormone biochemistry.
Credits:
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 523S - Molecular Biology and Genetics
The goal of the Molecular Biology and Genetics module is to understand the basic concepts of prokaryotic and eukaryotic DNA replication, transcription, and their regulation and to familiarize student with the underlying mechanisms regulating the inheritance of genetic material. Students are introduced to genetic methodologies used to manipulate interpret and define gene function.
Credits:
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 524S - Molecular Genetics
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.
Credits:
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 525S - Immunology
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.
Credits:
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 526S - Core Curriculum II
The core curriculum is a comprehensive interdisciplinary program of study for all first year master's and Ph.D. students in the Biomedical Graduate Programs. The goal of the core curriculum is to provide a broad foundation in biomedical science and serve as a framework for advanced study in more specialized areas. Five courses will be covered in the spring semester with the total of 106 credits
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 527S - Cell Biology I
This course is designed to provide a general introduction to cell structure. Topics include cytoskeleton, cell adhesion, and methods for imaging cells using contemporary microscopes and computer technology.
Credits:
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status:

IDPT 528S - Cell Biology II
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.
Credits:
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 529S - Cell Signaling and Cell Cycle
In this module, students learn the principles of intracellular signaling, events that occur when a ligand binds to its cognate receptor. In the first part of the module the lectures cover aspects related to the individual components of intracellular signaling pathways from receptor-ligand interactions to modulators to second messengers to effectors. In the second part of the module, students are exposed to signaling aspects associated with cell cycle, cell growth (cancer) and cell death (apoptosis).
Credits:
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 530S - Cells to Systems
This module provides and introduction to aspects of the nervous system, neurendocrinolgy, cardiovascular physiology and the immune system as a means of illustrating the integration of molecular and cellular biological functions in the intact organism.
Credits:
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

IDPT 531S - Integ of Bio Func in Organ Sys
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.
Credits:
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 532S - SUMMER MAKE-UP MED BIOCHEM
Credits: 7.00
College: College of Medicine
Department: Biochemistry Control
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status:

IDPT 534S - Molec Structure and Metabolism
This course serves to introduce students to fundamental concepts of molecular structure and function: these will serve as a basis for understanding both the biochemical basis for topics such as metabolism as well as aspects to be covered in the other core modules, such as membrane trans-port phenomena and second messenger signaling, are aspects of hormone biochemistry. May be repeated once for credit.
Credits: 3.50
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 535S - Molecular Biology and Genetics
The goal of the Molecular Biology and Genetics module is to understand the basic concepts of prokaryotic and eukaryotic DNA replication, transcription, and their regulation and to familiarize student with the underlying mechanisms regulating the inheritance of genetic material. Students are introduced to genetic methodologies used to manipulate interpret and define gene function. May be repeated once for credit.
Credits: 2.50
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 536S - Molecular Genetics
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.
Credits: 1.50
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 537S - Immunology
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.
Credits: 1.50
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 538S - Cell Biology I
This course is designed to provide a general introduction to cell structure. Topics include cytoskeleton, cell adhesion, and methods for imaging cells using contemporary microscopes and computer technology. May be repeated once for credit.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 539S - Cell Biology II
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. May be repeated for credit.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 540S - Cell Signaling and Cell Cycle
In this module, students learn the principles of intracellular signaling, events that occur when a ligand binds to its cognate receptor. In the first part of the module the lectures cover aspects related to the individual components of intracellular signaling pathways from receptor-ligand interactions to modulators to second messengers to effectors. In the second part of the module, students are exposed to signaling aspects associated with cell cycle, cell growth (cancer) and cell death (apoptosis). May be repeated once for credit.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 541S - Cells to Systems
This module provides and introduction to aspects of the nervous system, neurendocrinolgy, cardiovascular physiology and the immune system as a means of illustrating the integration of molecular and cellular biological functions in the intact organism. May be repeated once for credit.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 542S - Integ of Bio Func in Org Sys
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.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 600S - THESIS DEFENSE
Students who have completed 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.
Credits: 9.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

IDPT 601S - OPTIONAL 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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

IDPT 800S - REGISTER FOR DEGREE ONLY
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.
Credits: 9.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

IDPT 850S - Literature Review Non-Thesis MS
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
Repeat Status: Course can be repeated 2 time(s) for 8.00 credit(s)

Interdisciplinary Health Science Courses

IHS 500S - Career Counseling in the Health Sciences Seminar I

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.
Credits: 1.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following College(s)/School(s):
College of Medicine
Must be enrolled in one of the following Major(s):
Interdisciplinary Health Sci
Repeat Status: Not repeatable for credit

IHS 501S - Career Counseling in the Health Sciences Seminar II
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.
Credits: 1.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Interdisciplinary Health Sci
Repeat Status: Not repeatable for credit

IHS 502S - Neuropharmacology
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.
Credits: 3.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following College(s)/School(s):
College of Medicine
Must be enrolled in one of the following Major(s):
Interdisciplinary Health Sci
Repeat Status: Not repeatable for credit

IHS 503S - Special Topics
Credits: 3.00
College: College of Medicine
Department: IMS
Repeat Status: Not repeatable for credit

IHS 504S - Research Project and Paper
The MIHS Research/Journal Paper is 15 double-spaced, typewritten page document on a topic approved by the IHS Program Director in order to meet the research/journal paper graduation requirement. Acceptable topics may be based in library research; the analysis of retrospective clinical, laboratory, archival or descriptive data.
Credits: 3.00
College: College of Medicine
Department: IMS
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Interdisciplinary Health Sci
Pre-Requisites: IHS 500S and IHS 501S
Repeat Status: Not repeatable for credit

IHS 505S - Healthcare in Spanish I
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Interdisciplinary Health Sci
Interdisciplinary Health Sci
Repeat Status: Not repeatable for credit

IHS 506S - Healthcare in Spanish II
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Interdisciplinary Health Sci
Interdisciplinary Health Sci
Pre-Requisites: IHS 505S Minimum Grade: C
Repeat Status: Not repeatable for credit

MMS Program: Medical Science Courses

MMSP 501S - RESEARCH IN MEDICAL SCIENCE I
Credits: 6.00
College: College of Medicine
Department: Master of Medical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 1 time(s) for 12.00 credit(s)

MMSP 502S - RESEARCH IN MEDICAL SCIENCE II
Credits: 6.00
College: College of Medicine
Department: Master of Medical Science
Repeat Status: Not repeatable for credit

MMSP 503S - RESEARCH SEMINAR I
Credits: 1.00
College: College of Medicine
Department: Master of Medical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 1 time(s) for 2.00 credit(s)

MMSP 504S - RESEARCH SEMINAR II
Credits: 1.00
College: College of Medicine
Department: Master of Medical Science
Repeat Status:

MMSP 510S - LAB TECH IN BIOC & MOLEC BIOL
Credits: 2.00
College: College of Medicine
Department: Master of Medical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

MMSP 520S - MEDICAL PATHOLOGY I
Credits: 6.00
College: College of Medicine
Department: Master of Medical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

MMSP 521S - MEDICAL PATHOLOGY II
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Master of Medical Science
Pre-Requisites: MMSP 520S Minimum Grade: C
Repeat Status: Course can be repeated 2 time(s) for 8.00 credit(s)

MMSP 530S - SELECTED TOPICS IN PHARMACOL.
Credits: 7.00
College: College of Medicine
Department: Master of Medical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

MMSP 540S - MEDICAL MICROBIOLOGY I
Credits: 5.00
College: College of Medicine
Department: Master of Medical Science
Repeat Status: Not repeatable for credit

MMSP 541S - MEDICAL MICROBIOLOGY II
Credits: 2.00 to 3.00
College: College of Medicine
Department: Master of Medical Science
Repeat Status: Not repeatable for credit

Master of Lab Animal Science Courses

MLAS 501S - Lab Animal Science
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.
Credits: 2.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Pre-Requisites: MLAS 530S (May be taken concurrently) and MLAS 535S and MLAS 610S (May be taken concurrently)

Repeat Status: Not repeatable for credit

MLAS 505S - MICROBIOLOGY WITH LAB
MLAS 505S presents the basic biology of the major microbial pathogens (viruses, bacteria, fungi, parasites) of laboratory animals and humans in lecture format. Their structure, physiology, virulence factors, epidemiology, host immune response, treatment and prevention of diseases emphasized. Basic techniques (Gram staining, aseptic techniques, disinfection) are covered in the lab.
Credits: 4.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 510S - CLIN. ORIENT. IN LAB. ANIM. SC
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.
Credits: 1.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 512S - DISEASES MECHANISMS - PATHOLOG
Provides the background for understanding how diseases affect the mammalian body. The course focuses on pathophysiology and concepts more than specific diseases.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Grad - Lab Animal Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 513S - BIOCHEMICAL BASIS OF DISEASE(U
Lecture at the University of Pennsylvania veterinary school. Biochemical and molecular basis of disease. In-depth biochemical examination of specific aspects of selective diseases.
Credits: 2.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
May not be enrolled in one of the following Program Level(s):
Pre-Requisites: MLAS 512S and PHGY 503S
Repeat Status: Not repeatable for credit

MLAS 514S - HEMATOPOIESIS (UP)
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.
Credits: 1.50
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 515S - MICROBIAL PATHOGENESIS
Credits: 1.50
College: Biomedical Graduate Studies
Department: Grad - Lab Animal Science
Repeat Status: Not repeatable for credit

MLAS 520S - FINANCIAL MGMT IN LAB ANIM SCI
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.
Credits: 3.00
College: College of Medicine
Department: Grad - Lab Animal Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 521S - ARCH ENG & PLAN FOR ANIM FAC
The course of instruction, presented by one of the nation's 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.
Credits: 4.00
College: College of Medicine
Department: Grad - Lab Animal Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Pre-Requisites: MLAS 510S and MLAS 535S (May be taken concurrently)
Repeat Status: Not repeatable for credit

MLAS 523S - ORGANIZATIONAL MANAGEMENT I
Organizational management provides the theoretical background necessary for the practical application of managerial skills especially in laboratory animal facilities.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 525S - Animal Anatomy
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
Credits: 2.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 529S - MOLECULAR GENETICS
In the past and for the foreseeable future, animals will continue to be used in biomedical research, and the majority of these animals will likely be genetically modified rodents (usually transgenic and knockout animals). The focus of this course is to expose students to "cutting edge" molecular genetic concepts as they apply to laboratory animal science.
Credits: 2.00
College: College of Medicine
Department: Grad - Lab Animal Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 530S - Biostatistics in Veterinary Science
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.
Credits: 3.00
College: College of Medicine
Department: Grad - Lab Animal Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 531S - EMBRYOLOGY
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

MLAS 535S - BIOLOGY & CARE OF LAB ANIMALS
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.
Credits: 4.00
College: College of Medicine
Department: Grad - Lab Animal Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Must be enrolled in one of the following Major(s):
Laboratory Animal Science

Pre-Requisites: MLAS 510S
Repeat Status: Not repeatable for credit

MLAS 536S - ANIMAL MODELS FOR BIOMED. RES.
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.
Credits: 1.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 545S - FUNDAMENTALS OF HISTOLOGY
Integrates histology and cell biology to provide a better background for anatomy, pathology, physiology, and a general understanding of cell structure and function.
Credits: 2.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 546S - SPECIAL TOPICS IN ANATOMY
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Grad - Lab Animal Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 547S - SPECIAL TOPICS IN ANATOMY LAB
Discussions on and gross anatomical dissections of common laboratory animals. Comparisons with human anatomy.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Grad - Lab Animal Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Quarter
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Pre-Requisites: MLAS 546S
Repeat Status: Not repeatable for credit

MLAS 606S - CLIN. LAB. TECHNIQUES & CONCEP
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.
Credits: 1.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

MLAS 610S - DISEASES OF LAB ANIMALS
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Pre-Requisites: MLAS 535S
Repeat Status: Not repeatable for credit

MLAS 800S - Registered for Degree
Credits:
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Not repeatable for credit

MLAS 801S - LABORATORY ANIMAL PRACTICUM
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.
Credits: 3.00 to 15.00
College: College of Medicine
Department: Grad - Lab Animal Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Laboratory Animal Science
Repeat Status: Not repeatable for credit

Topics covered in this course include: homeostatsis, 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.
Credits: 4.00
College: College of Medicine
Department: Medical Science
Restrictions:
Must be enrolled in one of the following Major(s):
Medical Science Preparatory
Repeat Status: Course can be repeated 2 time(s) for 8.00 credit(s)

Medical Science Preparatory Courses

MSPP 505S - LAB TECH IN BIOCH & MOLEC BIOL
Credits: 2.00
College: College of Medicine
Department: Medical Science
Restrictions:
Must be enrolled in one of the following Major(s):
Medical Science Preparatory
Repeat Status: Not repeatable for credit

MSPP 511S - CONCEPTS IN BIOCH & CELL BIOLO
Topics covered in this course include: the cell, chemical foundations, protein structure and function, nucleic acids, the genetics code C protein synthesis, cell structure and across cell membranes, secretory and lysosomal proteins, cellular energetics, microfilaments, microtubules and intermediates filaments, multicellularity C cell-cell and cell-matric interactions, cancer and immunity.
Credits: 4.00
College: College of Medicine
Department: Medical Science
Restrictions:
Must be enrolled in one of the following Major(s):
Medical Science Preparatory
Repeat Status: Not repeatable for credit

MSPP 513S - SPECIAL TOPICS IN ANATOMY
This course provides extensive exposure to select organ systems at the gross anatomical, microscopics, and ultrastuctural 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.
Credits: 4.00
College: College of Medicine
Department: Medical Science
Restrictions:
Must be enrolled in one of the following Major(s):
Medical Science Preparatory
Repeat Status: Not repeatable for credit

MSPP 515S - BIOLOGICAL FUNCTION & REGULATI

MSPP 525S - COMMUNITY DIMENSIONS OF MEDICI
Credits: 2.00
College: College of Medicine
Department: Medical Science
Restrictions:
Must be enrolled in one of the following Major(s):
Medical Science Preparatory
Repeat Status: Not repeatable for credit

MSPP 540S - Concepts in Science & Verbal Reasoning I
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.
Credits: 6.00
College: College of Medicine
Department: Medical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Drexel Pathway to Med School
Interdepartmental Medical Sci.
Medical Science Preparatory
Repeat Status: Not repeatable for credit

MSPP 541S - Concepts in Science & Verbal Reasoning II
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.
Credits: 6.00
College: College of Medicine
Department: Medical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Drexel Pathway to Med School
Interdepartmental Medical Sci.
Medical Science Preparatory
Pre-Requisites: MSPP 540S

Repeat Status: Not repeatable for credit

MSPP 550S - RESEARCH PROJECT
Credits: 2.00
College: College of Medicine
Department: Medical Science
Restrictions:
Must be enrolled in one of the following Major(s):
Interdepartmental Medical Sci.
Medical Science Preparatory
Repeat Status: Not repeatable for credit

Microbiology & Immunology Courses

MIIM 500S - MEDICAL MICROBIOLOGY
This course offers detailed discussion of immunology and all aspects of the major infectious diseases of bacterial, viral, parasitic and mycotic origins. The course, although designed for medical students, also accommodates graduate students, who will be required to complete additional assignments.
Credits: 5.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

MIIM 501S - MEDICAL IMMUNOLOGY
Credits: 2.00 to 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

MIIM 502S - MICRO & IMMUNO. JOURNAL CLUB
Faculty members rotate in directing this weekly session devoted to increasing the critical analysis skills of students, providing experience in oral presentation of data, increasing student awareness of various sources of literature, and exposing students to current areas of importance in microbiology and immunology. Recent topic themes have included T-cell immunoregulation, molecular virology, regulatory and safety requirements in microbiology research, lymphokines and cytokines, neuroendocrine immunology, bacteriocins, molecular biology of parasites, and regulation of humoral immune responses.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

MIIM 504S - MICRO. & IMMUNO. 1ST ROTATION
First laboratory rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during the spring or summer of the first year. A written research report is required at the end of each rotation.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

MIIM 505S - MICRO. & IMMUNO. 2ND ROTATION
Second laboratory rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during the spring or summer of the first year. A written research report is required at the end of each rotation.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

MIIM 506S - MICRO. & IMMUNO. 3RD ROTATION
Third laboratory rotation. Guided research is conducted on a part-time basis for two or three 8-10 week periods. Rotations are generally conducted during the spring or summer of the first year. A written research report is required at the end of each rotation.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

MIIM 507S - MICRO & IMMUN STUDENT SEM SERI
The required seminar offers graduates at all levels opportunities to present research data and reviews of literature to fellow students and faculty.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

MIIM 508S - IMMUNOLOGY I

This is a graduate level introductory course that will cover basic principles of immunology. The format is a lecture series with student participation.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

MIIM 509S - PRINCIPLES IN IMMUNOLOGY
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status:

MIIM 510S - CLINICAL IMMUNOLOGY
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status:

MIIM 511S - FUNDAMENTALS MED MICROBIOLOGY
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status:

MIIM 512S - MOLECULAR PATHOGENESIS I
This course is designed to convey to graduate students basic concepts concerning the molecular mechanisms of disease caused by pathogenic microorganisms. The course will utilize information derived from in vitro tissue culture and in vivo animal model systems as well as studies performed in humans to enhance students understanding of diseases caused by bacteria, fungi, parasites and viruses. The immune response and other host defense mechanisms will also be examined as an integral part of this course. The course is designed to complement the first year graduate core curriculum and will strive to develop analytical thought processes. The student will learn to identify gaps in knowledge, formulate important and experimentally approachable questions, and develop sounds hypotheses to direct the generation of new scientific discoveries. The development of sound specific aims and experimental design will also be emphasized.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status:

MIIM 513S - MOLECULAR PATHOGENSIS II
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status:

MIIM 521S - Biotechniques I
This course will introduce the molecular, cellular and computational methods that underlie modern biotechnology, drug discovery and development. The strengths and limitations of the procedures will be considered, and their suitability for either a basic or industrial research setting will be evaluated.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Repeat Status: Not repeatable for credit

MIIM 522S - Biotechniques II
The course, along with the companion course Biotechniques I (MIIM 521S) will introduce the molecular, cellular and computational methods that underlie biotechnology, drug discovery and development. The strengths and limitations of the procedures will be considered, and their suitability for either a basic or industrial research setting will be evaluated.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Repeat Status: Not repeatable for credit

MIIM 523S - Molecular Virology
This course will provide a comprehensive overview of the molecular aspects of viral pathogenesis, using various host-virus interactions as models.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Repeat Status: Not repeatable for credit

MIIM 524S - Vaccines and Vaccine Development
This course will provide information pertaining to the history of vaccines, the principles of vaccine design, the concepts of induction of the immune protection, and the choice of vaccine types. Emphasis will be given to current and future methods for vaccine design, and approved tests for safety and efficacy. The concepts of prophylactic and therapeutic vaccines will be discussed.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Repeat Status: Not repeatable for credit

MIIM 525S - Principles of Biocontainment
This course will provide an overview of the classification of biological hazards, and the principles of biocontainment, based upon these classifications. The course will further provide both conceptual and practical information regarding working with controlled agents, collection and storage of biohazardous materials, the practicalities of working in biocontainment facilities, and the design considerations for biocontainment in the laboratory and in the field.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Repeat Status: Not repeatable for credit

MIIM 526S - Animal Models in Biotechnology
The course will focus on the ethical and practical utilization of animal models in biomedical research, with emphasis given to their use in biomedical research. The course will discuss the history of animal research, the requirements for generating inbred animal lines, the development of transgenic models, and the utilization of disease-specific models. Emphasis will be given to experimental designs and the justification of animal models
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Repeat Status: Not repeatable for credit

MIIM 527S - Immunology, Immunopathology & Infectious Diseases
The course will provide the basic knowledge of immunity from the organism to the cellular level. The subject matter will focus upon how the immune system elicits protection against invasion by pathogenic organisms, and how these same responses may be damaging to the host.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Repeat Status: Not repeatable for credit

MIIM 530S - Fundamentals of Molecular Medicine I
This course, along with the companion Fundamentals in Molecular Medicine II (MIM-531) will provide an overview of key topics in biochemistry, molecular biology and genetics. It will sever as an alternative to the Core Curriculum and will be offered only in the evenings, with preference given to enrollees in the Masters if Science in Molecular Medicine. Emphasis will be placed on the areas that are the foundation of modern bioscience.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

MIIM 531S - Fundamentals of Molecular Medicine II
The course, along with the companion Fundamentals in Molecular Medicine I (MIIM-530) will provide an overview of key topics in biochemistry, molecular biology and genetics. It will serve as an alternative to the Core Curriculum and will be offered only in the evenings, with preference given to enrollees in the Master of Science in Molecular Medicine. Emphasis will be placed on the areas that are the foundation of modern bioscience.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program(s):
Master of Science MB
Master of Science MB ONL
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

MIIM 555S - MOLEC. MECH. OF MICRO. PATH.
An advanced graduate course involving presentation and in depth discussion of recent and historical literature on the molecular and cellular mechanisms of bacterial pathogenesis. Prerequisite: a previous bacterial pathogenesis or medical microbiology course.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science

Repeat Status: Not repeatable for credit

MIIM 600S - MICRO. & IMMUNO THESIS RESEARC
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.
Credits: 9.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

MIIM 602S - SPECIAL TOPICS IN IMMUNOLOGY
This course is designed for a small group of advanced students of immunology. Each student will investigate a selected area of immunology that he or she will then present to the group for discussion and analysis. The student's knowledge of the subject should be based on personal laboratory experience and literature review.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

MIIM 604S - SPECIAL TOPICS IN VIROLOGY
Emphasis is directed toward the study of mammalian virus-host interaction at the cellular level.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

MIIM 606S - MICRO & IMMUNO SEMINAR
Faculty and students meet in an informal way to discuss selected subjects, hear guest lecturers or explore topics related to the biomedical sciences of interest to the group.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

MIIM 607S - IMMUNOLOGY II
This is an advanced course in immunology covering various aspects of contemporary cellular and molecular biology. It consists of some didactic sessions followed by reading and discussion of current literature. The prerequisites for this course are a graduate level course in immunology and permission of the instructor.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

MIIM 610S - SPECIAL TOPICS IN MICRO & IMMU
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

MIIM 612S - MOLEC MECH OF VIRAL PATHOGENSI
This is a review course dealing with recent advances in viral pathogenesis. Current literature will be examined in lecture and discussion format.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

MIIM 613S - Emerging Infectious Diseases
This is an advanced course covering aspects of the emergence and spread of infectious agents, including species jumping, mutation and global transport. In addition, students will earn about recently emerged agents (HIV, HCV, etc.) as well as possible future outbreaks or reemergence of viral, bacterial, parasitic and novel agents.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 0 time(s)

MIIM 615S - EXPERIMENTAL THERAPEUTICS
In this advanced course, students will learn about experimental and emerging therapies for human disease, emphasizing infectious disease. Analysis of key developments and approaches in drug design representative of experimental therapeutics is presented, with inclusion of pharmacologic, regulatory and basic science perspectives.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status:

MIIM 621S - Biotechniques and Laboratory Research I
This elective course will provide students with the option to experience an academic research laboratory setting, in contrast to the industrial setting provided through the Research Internship (MIIM 650S), offered as part of the Masters of Science in Molecular Medicine. This course should be attractive to students considering additional graduate or professional school training. It will also incorporate the practical application of biotechniques to research problems.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Pre-Requisites: MIIM 521S
Repeat Status: Not repeatable for credit

MIIM 622S - Biotechniques and Laboratory Research II
This elective course will provide students with the option to experience an academic research laboratory setting, in contrast to the industrial setting provided through the Research Internship (MIIM 650S), offered as part of the Masters of Science in Molecular Medicine. This course should be attractive to students considering additional graduate or professional school training. It will also incorporate the practical application of biotechniques to research problems.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Pre-Requisites: MIIM 522S
Repeat Status: Not repeatable for credit

MIIM 630S - Advanced Molecular Biology
Advanced level course (lecture and discussions) of topics of current interest in the area of molecular biology and molecular genetics. Topics vary in different years and may include aspects of both lower eukaryotic systems and mammalian systems. May be repeated once for credit.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 1 time(s) for 2.00 credit(s)

MIIM 640S - EFFECTIVE TEACHING SKILLS
This eight-week course is designed to help doctoral candidates in the biomedical science become better teachers. Participants are introduced to behaviors and techniques used by effective teachers and are given the opportunity to make several presentations. Each presentation is videotaped and positive feedback is given to the presenter by other members of the class.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

MIIM 650S - Research Internship
The concept of the Research Internship is to provide practical experience using the concepts and the techniques encountered during the academic lecture series. Laboratories for the internship will be chosen on the basis of their applicability to the Biotechnology Industrial setting. The laboratories may be located within the College of Medicine or within the Industrial Partners to the MS-MM degree program.
Credits: 6.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Must be enrolled in one of the following Major(s):
Molecular Medicine
Repeat Status: Not repeatable for credit

Molecular & Cell Biology and Genetics Courses

MCBG 501S - MCBG 1ST LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status:

MCBG 502S - MCBG 2ND LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status:

MCBG 503S - MCBG 3RD LAB ROTATION
Third rotation. Guided research is conducted on a part-time basis for two or three 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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

MCBG 506S - ADVANCED CELL BIOLOGY
This course is designed to introduce the student to current research topics and latest developments in the area of Cell Biology. Topics may include ion transport, signal transduction and apoptosis, cytoskeleton, protein translocation and sorting, protein kinases and phosphatases, cell motility and membrane giogenesis. Topics may vary in different years.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status:

MCBG 507S - MACROMOLECULAR STRUCT & FUNCTI
This course is designed to introduce the student to current research topics and latest developments in the area of the structure and function of various types of macromolecules. Topics may include enzyme mutagenesis, protein folding, structure based drug design and structural aspects of receptors, transcription factors and ion channels. Topics may vary in different years.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status:

MCBG 510S - MCBG JOURNAL CLUB
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 15 time(s) for 100.00 credit(s)

MCBG 511S - SPECIAL TOPICS IN MCBG
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status:

MCBG 512S - MCBG JOURNAL CLUB
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 15 time(s) for 100.00 credit(s)

MCBG 513S - MOLEC & CELL BIOLOGY SEMINAR
Faculty and students meet in an informal way to discuss selected subjects, hear guest lecturers or explore topics related to the biomedical science of interest to the group.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 15 time(s) for 100.00 credit(s)

MCBG 514S - Cell Cycle and Apoptosis
The main goal of this advanced course is to provide an in-depth molecular understanding of the principles of cell growth and cell death. This course will build upon basic information taught in the Molecular Cell Biology and Genetics Module of the Biomedical Sciences first year graduate core curriculum and intended for advanced graduate students (2nd yr. and higher) looking for further understanding in the fields of cell cycle and apoptosis. This course will also emphasize advanced topics and methods not in the core.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

MCBG 600S - MCBG THESIS RESEARCH
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.
Credits: 9.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 15 time(s) for 150.00 credit(s)

MCBG 601S - MOLE & CELL BIO & GENE SEMINAR
Faculty and students meet in an informal way to discuss selected subjects, hear guest lecturers or explore topics related to the biomedical science of interest to the group.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science

Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 10 time(s) for 50.00 credit(s)

Neuroscience Courses

NEUR 500S - STATISTICS FOR NEUROSCIENCE/PHARMACOLOGY RESEARCH
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.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

NEUR 501S - NEUROSCIENCE 1ST LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

NEUR 502S - NEUROSCIENCE 2ND LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

NEUR 503S - NEUROSCIENCE 3RD LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

NEUR 505S - ADVANCED MOLECULAR NERUBIOL.
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 form 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.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status:

NEUR 507S - NEUROSCIENCE
This first part of a two-part series in Neuroscience introduces the physical therapy student to basic principles in neuroanatomy and neurophysiology with emphasis on the relevance to the professional curriculum. This course stresses the neuron, its physiological properties and the relationship to muscle contraction. Emphasis is placed on sensory and motor systems and their neuroanatomical relationship to each other. The physiological function of these systems and how they relate to motor control is also discussed.
Credits: 4.00
College: Nursing & Health Professions
Department: Health Sciences
Repeat Status:

NEUR 508S - NEUROSCIENCE PRIN & TECHNIQUES
This course provides a foundation in basic principles and research techniques of neuroscience, familiarizes students with the various faculty, research opportunities, and resources of the Neuroscience graduate group, and create a conceptual Neuroscience perspective for the first year course.
Credits: 2.00

College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 1 time(s) for 2.00 credit(s)

NEUR 511S - Adv Cell & Devel Neuroscience
This course provides in-depth discussion of topics in cellular and developmental neuroscience. Topics will emphasize the most recent and contemporary issues in the field. May be repeated once for credit.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 1 time(s) for 2.00 credit(s)

NEUR 512S - Adv Cell & Sys Neurophysiology
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.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 1 time(s) for 2.00 credit(s)

NEUR 600S - NEUROSCIENCE THESIS RESEARCH
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.
Credits: 9.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

NEUR 607S - INTEGRATED NEUROSCIENCE
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 if ingestion, responses to stress and sexual behavior: central mechanisms of award, 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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 0 time(s) for .00 credit(s)

NEUR 609S - Advanced Neuroscience
This course emphasizes critical evaluation of experimental methods used to investigate CNS organization and function. The topics chosen for illustration include: CMS development, sensorimotor integration, neural substrates of complex behaviors, learning and memory, and CNS injury and repair. May be repeated once for credit.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 1 time(s) for 4.00 credit(s)

NEUR 615S - ADVANCED SPEC. TOPICS IN NEURO
Graduate students present current research papers in the general areas of systems and behavioral neurobiology.
Credits: 1.00 to 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

NEUR 634S - MOTOR SYSTEMS
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

Pathologists' Assistant Courses

MSPA 500S - Gross Anatomy
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.
Credits: 5.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):

Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 10.00 credit(s)

MSPA 510S - Laboratory Management
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.
Credits: 2.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 4.00 credit(s)

MSPA 520S - Medical Terminology
Study of the etymology of medical and surgical terms with emphasis on the principles or word analysis, construction, and evolution.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

MSPA 530S - Biomedical Photography
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.
Credits: 4.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 8.00 credit(s)

MSPA 540S - Histotechnology I
Basic histology and histochemistry techniques are covered through formal lecture and laboratory experience.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 6.00 credit(s)

MSPA 541S - Histotechnology II
Advanced histology and histochemistry techniques are covered through formal lecture and laboratory experience. This course is a continuation of MSPA 540S.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: MSPA 540S Minimum Grade: C
Repeat Status: Course can be repeated 2 time(s) for 6.00 credit(s)

MSPA 550S - Applied Anatomic Pathology
The course is designed to bring the students through the clinical aspects of chart review as well as academic autopsy and surgical pathology practices.
Credits: 4.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 8.00 credit(s)

MSPA 560S - Medical Ethics
"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.
Credits: 2.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 4.00 credit(s)

MSPA 570S - Medical Pathology I
Credits: 6.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 12.00 credit(s)

MSPA 571S - Medical Pathology II
Credits: 4.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 8.00 credit(s)

MSPA 580S - Medical Microbiology I
Credits: 4.00
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Course can be repeated 2 time(s) for 8.00 credit(s)

MSPA 581S - Medical Microbiology I
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites:
Repeat Status: Course can be repeated 2 time(s) for 6.00 credit(s)

MSPA 590S - Leadership Skills for the Medical Profession
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.
Credits: 3.00
College: College of Medicine
Department: SOM - Professional Studies
Repeat Status: Not repeatable for credit

MSPA 600S - Surgical Pathology I
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.
Credits: 6.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 12.00 credit(s)

MSPA 601S - Surgical Pathology II
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.
Credits: 6.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: MSPA 600S Minimum Grade: C
Repeat Status: Course can be repeated 2 time(s) for 12.00 credit(s)

MSPA 602S - Surgical Pathology III
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.
Credits: 6.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: MSPA 601S Minimum Grade: C
Repeat Status: Course can be repeated 2 time(s) for 12.00 credit(s)

MSPA 610S - Autopsy Pathology I
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.
Credits: 6.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Course can be repeated 2 time(s) for 12.00 credit(s)

MSPA 611S - Autopsy Pathology II
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.
Credits: 6.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: MSPA 610S Minimum Grade: C
Repeat Status: Course can be repeated 2 time(s) for 12.00 credit(s)

MSPA 612S - Autopsy Pathology III
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.
Credits: 6.00
College: College of Medicine
Department: SOM - Professional Studies
Restrictions:

Must be enrolled in one of the following Program Level(s):
Graduate Semester
Pre-Requisites: MSPA 611S Minimum Grade: C
Repeat Status: Course can be repeated 2 time(s) for 12.00 credit(s)

MSPA 799S - Special Topics
Credits: 10.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Course can be repeated 10 time(s) for 50.00 credit(s)

Pathology Courses

PATH 502S - PATHOLOGY 1ST LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

PATH 503S - PATHOLOGY JOURNAL CLUB
Students enroll for a minimum of four semesters for this twice monthly meeting.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated for 10.00 credit(s)

PATH 505S - PATHOLOGY 2ND LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status:

PATH 506S - PATHOLOGY 3RD LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

PATH 507S - MEDICAL PATHOLOGY PART 1
Credits: 7.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

PATH 509S - PATHOLOGIC PROCESSES
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.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

PATH 600S - PATHOLOGY THESIS RESEARCH
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.
Credits: 9.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated for 90.00 credit(s)

PATH 601S - CELL MOL PATHBIO CANCER ANGIOG
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

Pharmacology Courses

PHRM 502S - CURRENT TOPICS IN PHARM & PHYS
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.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

PHRM 503S - PHARM & PHYS 1ST LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

PHRM 504S - PHARM & PHYS 2ND LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

PHRM 505S - PHARM & PHYS 3RD LAB ROTATION
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

PHRM 507S - Prin of Neuropharmacology
This course covers basic concepts in Neuropharmacology, all of the major neurotransmitter systems, behavioral pharmacology and addition, approaches to molecular and cellular physiology including photoactivated biomolecules, electrophysiology, phosphorylation.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

PHRM 512S - GRADUATE PHARMACOLOGY
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.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Pre-Requisites:
Repeat Status: Not repeatable for credit

PHRM 516S - SPECIAL TOPICS IN PHARM & PHYS
This required course serves to complement either Graduate Physiology or Graduate Pharmacology, and is taken concurrently with each. The focus is on fundamental concepts using typically published reports as examples. For instance, use of two-photon imaging paired with electrophysiology has been covered under Physiology, whereas inverse agonists and pharmacogenetics have been covered under Pharmacology. For Graduate Pharmacology, computer simulation exercises of pharmacokinetics and autonomic drugs are also included.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

PHRM 525S - Drug Discovery and Development
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 cover all facets from target identification through to the regulatory and approval process. Current unmet medical needs and case histories from different therapeutic areas will be reviewed.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Pharmacology Control
Restrictions:
Must be enrolled in one of the following Program Level(s):
Graduate Semester
Repeat Status: Not repeatable for credit

PHRM 600S - PHARMACOLOGY THESIS RESEARCH
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.
Credits: 9.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 99 time(s) for 999.00 credit(s)

Physiology Courses

PHGY 502S - ION CHANNELS IN CELLULAR PHYS.
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.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

PHGY 503S - GRADUATE PHYSIOLOGY
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.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated 2 time(s) for .00 credit(s)

Pre-Medical Courses

PMED 532S - COLLEGE ALGEBRA AND TRIGONOME
Credits: 3.00
College: College of Medicine
Department: Post - Bac Evening
Restrictions:
Must be enrolled in one of the following Major(s):
Post-Bacc Pre-Med
Repeat Status:

PMED 800S - REGISTERED FOR DEGREE ONLY
Credits: .50 to 6.00
College: College of Medicine
Department: Biomedical Program
Repeat Status: Not repeatable for credit

PMED 999S - Special Topics
Credits: .50 to 9.00
College: College of Medicine
Department: Medical Science
Repeat Status: Course can be repeated 10 time(s) for 50.00 credit(s)

Radiation Sciences Courses

RADS 500S - BIONUCLEONICS
This course is designed to introduce graduate students to concepts used in radiotracer methodology. Topics include nuclear theory, radiation safety and protection, radiation detectors, nuclear instrumentation, diagnostic applications of radiation, basic radiation biology, autoradiography, and radiotracer experimental design. The laboratory involves practical experience handling radionuclides and operating radiation detection instrumentation.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

RADS 502S - RADIONUCLIDE MEAS. & IMAGING
A detailed study of counting methodology and the limitations of various detector systems is examined. The student is required to develop skill in standardizing equipment and mastering technical procedures. In addition, operational and quality control aspects of nuclear medicine are covered by this staff.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science

Repeat Status: Not repeatable for credit

RADS 503S - INTRO MEDICAL RAD. PHYSICS
Physics of production, interactions, detection and medical application of ionizing radiation. This course is normally a prerequisite to the following course, although it may be taken concurrently.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 504S - PHYSICS RAD. THERAPY
Theoretical and practical aspects of the combination of multiple radiation sources to achieve favorable dose distribution in treating tumors.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 505S - EXT TH PHOTON BEAM CAL 1
Theoretical and practical aspects of ionization chamber instruments, TLD, and diodes, and their use. The student is required to develop skill in the calibration and quality assurance testing of therapy equipment.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 506S - X-RAY IMAGE FORM & EVALUATION
Theoretical and practical aspects of conventional, fluoro-and CT x-ray imaging systems as well as MR imaging systems.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 507S - RAD SHIELD DES & EVAL
Control of radiation hazards from diagnostic and high energy X-ray and electron accelerators as well as from Cs-137 and other brachytherapy sources.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 508S - RAD SAFETY & QUAL ASSUR
The principles involved for meeting regulatory requirements for radiation installations.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 510S - RADIATION SCIENCES 1ST ROTATIO
First rotation. Guided research is conducted in conjunction with didactic training during each rotation.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

RADS 511S - RADIATION SCIENCES 2ND ROTATIO
Second rotation. Guided research is conducted in conjunction with didactic training during each rotation.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 512S - RADIATION SCIENCES 3RD ROTATIO
Third rotation. Guided research is conducted in conjunction with didactic training during each rotation.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 600S - RADIATION SCIENCES THESIS RES.
Research leading to the completion of the thesis requirements for the Master of Science or Doctor of Philosophy degree.
Credits: 9.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated for 90.00 credit(s)

RADS 601S - RADIOPHARMACOLOGY
The pharmacological use of radionuclides will be presented both for students who will be preparing and using radionuclides clinically and for students who will undertake basic research studies. Methods of developing, testing and evaluating radiopharmaceuticals will be presented.
Credits: 3.00
College: Biomedical Graduate Studies

Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 602S - SEMINARS IN RADIATION SCIENCES
Seminars are given by faculty and students who report on current journal articles related to applications of radiation to the solution of biomedical problems. Students in the department are required to attend all seminars and present at least one seminar during each semester.
Credits: 1.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Course can be repeated for 10.00 credit(s)

RADS 604S - RADIOPHARMACEUTICAL CHEMISTRY
The detailed chemistry of radionuclides which are used in diagnostic radiopharmaceuticals is studied. Generator kinetics, synthesis with short-lived carrier free radioisotopes and analytical methods are covered in depth.
Credits: 3.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 607S - RADIONUCLIDE DOSIMETRY
Basic theory of and computational approaches to evaluating dosage from radioactive material both internal and external to the body is covered.
Credits: 2.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 608S - ADV TOPICS - RAD PHYS
Current research areas in radiological physics will be examined in depth. Topics will vary from year to year, and the course may be repeated for credit.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

RADS 610S - DOSIMETRY OF PARTIC RAD
Theoretical and practical aspects of computational methods of 3-D dosimetry applied to radiation oncology. Repeatable depending on laboratory focus.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 611S - RADIATION BIOLOGY I
Effects at the clinical, cellular, and molecular levels covering ionizing and non-ionizing radiations, lethal and mutagenic damage and human radiation biology are discussed to go insight of radiation interact with living matter. The two courses should be taken in sequence.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Restrictions:
Must be enrolled in one of the following College(s)/School(s):
Biomedical Graduate Studies
College of Medicine
Repeat Status: Not repeatable for credit

RADS 612S - RADIATION BIOLOGY II
Continues RADS 611.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit

RADS 613S - ADV. TOPICS - RAD. BIOL
These courses will examine in detail one subject of contemporary interest, e.g., modification of radiation sensitivity, oxygen effects, mutagenesis, photobiology, etc. Course topic will vary from year to year, and students may register for credit whenever topic is different.
Credits: 4.00
College: Biomedical Graduate Studies
Department: Biomedical Science
Repeat Status: Not repeatable for credit