

PR 625
Discovery (Willette)

In Vivo Pharmacology: Animal Research, Disease Models and Drug

Credits 3

Fall

This course provides basic training for M.S. and Ph.D. students in animal pharmacology. The specific goals of the course are: 1) to provide basic principles of *in vivo* drug experimentation conducted on anesthetized and conscious animals. Principles of animal anesthesia, surgical procedures, pre- and post-operative care will be studied along with regulatory and ethical aspects of experimentation on small and large laboratory animals; 2) to provide basic knowledge and insights on animal models of human disease and the scientific and technical issues associated with the use of laboratory animals in drug development. Principles of pharmacodynamics and pharmacokinetics will be introduced, along with major organ and systemic pharmacology of the heart, kidney, brain, blood vessels, and the pulmonary system; 3) to provide an opportunity to acquaint students with modern pharmacology research in an industrial set-up and the fundamentals of the processes of drug discovery.

PR 630

General Toxicology (Middleberg)

Credits 3

Summer

This course will introduce students to the principles and practices of Toxicology. Emphasis will be given to the comprehensiveness of toxicology as opposed to individual academic interests. While introductory courses in biochemistry, physiology, anatomy, and pharmacology would be helpful, they are not necessary since each topic will be covered as an introduction to the subject matter.

PR 635

Clinical Pharmacotoxicology (Kocsis)

Credits 3

Spring I

This course gives the student an understanding of the concepts, knowledge, and skills which provide the basis for applications such as effectively providing consultative and laboratory testing services. Students will also become familiar with other aspects of pharmacotoxicology, such as research and development, quality assurance/quality control, education, and training relating to prevention, diagnosis, and treatment; forensic and regulatory aspects of harmful/toxic effects of exogenous chemicals.

PR 680

Molecular Pharmacology (Wedegaertner)

Credits 3

Prerequisite: GC 550 or BI 550

Spring II

This course focuses on regulation of cell function through an understanding of hormone, neurotransmitter and drug action at the molecular level. Specific emphasis will be placed on the mechanisms by which cell surface receptors, GTP binding proteins, effector enzymes and ion channels mediate signal transduction in the cell.

PR 710, 720, 730

Seminar (Faculty)

Credits 1

Fall, Spring I, Spring II

Presentation of research reports and review of special topics by faculty, graduate students, and speakers invited from other institutions.

GC 550 **Foundations of Biomedical Sciences** (Ellingson)

Credits 10

Fall

This course is designed to provide a basic knowledge of biochemistry, genetics, molecular biology and cellular biology to the beginning student. The primary goal is to convey knowledge of the molecular and cellular mechanisms controlling cell, tissue and organ system function using material drawn from biochemistry, cell biology, genetics, pharmacology and physiology. The course will familiarize the student with the powerful technologies used in scientific research and will train the student in the communication of science through informal sessions on evaluation of published literature, scientific writing, oral presentations, and information retrieval.

GC 640 **Research Ethics: The Responsible Conduct of Research** (Flynn)

Credits 1

Fall, Spring I, Spring II

This graduate seminar course is designed to familiarize students with the ethical dilemmas inherent to the conduct of research. Topics to be discussed include codes of ethical behavior, research design, conflicts of interest, informed consent and the appropriate use of animals. The student will be required to prepare a paper on the analysis of one or more case studies.

GC 660 **Statistical Methods** (Diamond, Winter, Crawford)

Credits 3

Fall, Spring I, Spring II

Students learn to apply the principles and techniques of basic statistical analysis, including descriptive and inferential statistics. Applications using the normal, t and chi-square distributions are emphasized. The SAS software package for analysis is included.

Course Check List

First Year

Course Name	Fall (credits)	Spring (credits)		Summer (credits)
		Spring 1 (credits)	Spring II (credits)	
Research Rotation	PR 640 (3)	PR 650 (3)	PR 660 (3)	
Foundations in Biomedical Science	GC 550 (10)			
Biochemistry		BI 525 (3)	BI 535 (3)	
Protein Structure and Function		PR 613 (3)	BI 614 (3)	
Molecular Pharmacology			PR 680 (3)	
Statistics		GC 660 (2)		
Seminar		PR 720 (1)	PR 730 (1)	
Elective			3 credits	
Research Ethics	GC 640 (1)			
Research	PR 910 (6)	PR 920 (2)		PR 930 (10)
Credits Required for Full-time Enrollment	20	30		10

Second Year

Course Name	Fall (credits)	Spring (credits)		Summer (credits)
		Spring 1 (credits)	Spring II (credits)	
Pharmacology	PR 522 (3)			
Seminar	PR 710 (1)	PR 720 (1)	PR 730 (1)	
Elective or "Fundamentals"		3 credits	3 credits	
Research	PR 910 (variable)	PR 920 (variable)		PR 930 (variable)
Credits Required for Full-time Enrollment	20	30		10

**"Fundamentals" courses are: GE 637 (Spring II), IMP 505 (Spring I), IMP 600 (Spring I) and PR 680 (Spring II)