PHR-Pharmacology

PHR 611. Physiological Principles of Pharmacology & Toxicology. 3 Hours.
Pharmacology is the study of how drugs/substances interact with living systems. These interactions form the basis of using chemical substances for beneficial therapeutic effects in humans and other animals. The chemical processes induced by drugs often involve drug binding to receptors and subsequent activation/inhibition of normal physiological processes. This course will provide a broad but rigorous overview of pharmacology & toxicology. The content will include the nature of drugs, principles of drug receptors and how drugs work (pharmacodynamics), the fate, disposition and time-course of the drug in the body after administration (pharmacokinetics), chemical modification of the drug by the body (drug metabolism), the influence of genetic differences on drug responses (pharmacogenomics), and the study of the undesirable effects of drugs (toxicology). The student will also learn about the science and processes of drug discovery and development, including drug regulation and regulatory agencies. This course will be of interest and have broad appeal to many science and non-science major students including those preparing for careers in health professions (medicine, pharmacy, nursing, dentistry, optometry, public health), and those who are interested in drug discovery research, chemistry, biology, pharmacology, biochemistry, neurobiology, toxicology, formulations, pharmaceutical industry, FDA, forensic science, toxicology, and microbiology.

PHR 612. Systems Physiology and Pharmacology I. 3 Hours.
This course will introduce the student to the use, mechanism of action and physiological properties of major families of drugs that affect the cardiovascular system, autonomic nervous system (ANS) and central nervous system (CNS). Lectures will provide an overview of nervous system / cardiovascular physiology and pathophysiology that results from various diseases, disorders and injuries, the drugs used to treat these conditions and their mechanisms of action. Both classical drugs and newer classes of drugs will be discussed for both their therapeutic value and also their use in different research settings. This course will be taught using a combination of traditional didactic lectures and student participation through discussion of seminal research papers and presentations.

PHR 613. Systems Physiology and Pharmacology II. 3 Hours.
This course will introduce drug use, mechanism of action and physiological properties of major drug families, with a focus on specific organ systems (endocrine, gastrointestinal and renal systems). In addition, this course will also cover specific classes of drugs for cancer treatment specifically related to the organ systems covered in the course. This course is divided into three “modules”. Each module has its own exam. In addition, there are graded student presentations at the end of the semester, topics of discussion to be determined.

PHR 614. Drug Discovery and Development. 3 Hours.
The course will provide an overview of the drug discovery and development process. Topics will include (among others): Target identification and validation, High-Throughput Screening, Hit discovery, Lead optimization, Preclinical testing, Safety requirements, Clinical trials, IND, NDA, Patents, and Federal regulations. The course will highlight multidisciplinary nature of drug discovery and the roles of biologists, medicinal chemists, pharmacologists, regulatory agencies, and investors in the process. Real-life case stories highlighting successful and unsuccessful drug development examples will be introduced for discussions, as well as some current examples of early stage biotech startups.

PHR 615. Pharmacokinetics and Biopharmaceutics. 3 Hours.
Pharmacokinetics is the study of the time-course of drugs in physiological systems. This includes the fate of administered drugs in relation to time starting with absorption, through distribution, and elimination. Pharmacokinetics is fundamental to the understanding of observed drug effects and responses. This course is divided into three sections that are assessed independently. The first section explores the mathematical principles of pharmacokinetics using the compartmental and noncompartmental models of analysis. The second section evaluates the roles of biopharmaceutical factors in the pharmacokinetics of drugs. The last section introduces the students to hands-on pharmacokinetics analysis and modeling using an industry-standard software package.

PHR 616. Cancer Physiology and Pharmacology. 3 Hours.
This course will introduce different types or classes of chemotherapeutic agents currently used in the clinic for the treatment of cancer. These include classic chemotherapeutic agents and newer targeted agents. Students will learn the latest cancer chemotherapy and treatment strategy. Students will also learn historical aspects of cancer treatment and of drug development for this disease. Team projects will prepare students to participate in literature reviews, presentation preparation and skills, and approaches to preparing for scientific discussions and Q&A sessions.

PHR 617. Neuropharmacology. 3 Hours.
This course will introduce the student to the use, mechanism of action, and physiological properties of major families of drugs that affect the autonomic nervous system (ANS) and central nervous system (CNS). Lectures will provide an overview of ANS, CNS, and pharmacology of related diseases. Mechanisms and actions of different drugs used in these systems will be discussed. Both classical and newer classes of drugs will be discussed for their therapeutic value and use in different research settings. This course will be taught using a combination of traditional didactic lectures and student participation through discussions.

PHR 696. Special Topics. 1-3 Hour.
Special Topics in Pharmacology.

PHR 701. Adv Prin Pharm-Sys&Pharmacok 1. 3 Hours.

PHR 702. Adv Prin Pharm-Sys&Pharmacok 2. 3 Hours.

PHR 706. Special Topics in Pharmacology. 3 Hours.

PHR 715. Pharmacokinetics and Biopharmaceutics. 3 Hours.
Pharmacokinetics is the study of the time-course of drugs in physiological systems. This includes the fate of administered drugs in relation to time starting with absorption, through distribution, and elimination. Pharmacokinetics is fundamental to the understanding of observed drug effects and responses. This course is divided into three sections that are assessed independently. The first section explores the principles of pharmacokinetics using the compartmental and noncompartmental models of analysis. The second section evaluates the roles of biopharmaceutical factors in the pharmacokinetics of drugs. The last section introduces the students to hands-on pharmacokinetics analysis and modeling using an industry-standard software package.

PHR 720. Laboratory Rotation in Pharmacology. 1-12 Hour.

PHR 735. Nucleotide Metabolism and Chemotherapy. 3 Hours.
Principles, characteristics and therapeutics of nucleotide metabolism. This course is designed for second year and above graduate students.

PHR 744. Protein Mass Spectrometry. 3 Hours.

PHR 752. Pharmacokinetic Analysis. 1 Hour.
The course will provide a detailed introduction to the analysis of pharmacokinetic data preferably generated as part of the student¿s research. Descriptions of the use of appropriate analytical programs and the interpretation of pharmacokinetic data will be the major focus of this course.

PHR 754. Model Sys for Drug Discovery. 2 Hours.
This course will focus on the use of different genetically tractable model systems and their roles in drug discovery and drug development. The course will discuss the properties, benefits and deficiencies of major model systems used in drug discovery including yeast, zebrafish, xenographs, and genetically modified mouse strains.

PHR 755. Translational Pharmacology and Drug Development. 2 Hours.
Translational pharmacology covers the principles and practice of drug development from the laboratory (bench) to the patient (bedside). This course provides an overview of the processes involved in drug development. It familiarizes the student with the drug discovery and development process including types of clinical trials, regulatory requirements and results interpretations.

PHR 790. Pharmacology Journal Club. 1 Hour.
Pharmacology Journal Club.

PHR 798. Doctoral Level Non-Dissertation Research. 1-12 Hour.

PHR 799. Doctoral Level Dissertation Research. 1-12 Hour.
Prerequisites: GAC Z