PHARMACEUTICAL SCIENCES (PHSC)

PHSC 800 PHARMACY HEALTH SERVICES EVALUATION & RESEARCH METHODS I 2 Credit Hours
This course will provide students with the skills to evaluate and critique Pharmacy Health Services Evaluation and Research (HSER) projects with emphasis on the evaluation of outcomes related to pharmaceuticals and clinical pharmacy services. Topics will include identifying and critiquing study design and objectives, data sources, bias/confounding and other study limitations, as well as appropriate interpretation of study findings. Topics to cover both observational and pharmacoeconomic studies.
Typically Offered: FALL

PHSC 801 PHARMACY HEALTH SERVICES EVALUATION & RESEARCH METHODS II 2 Credit Hours
This course will provide students with more advanced skills to plan, design, and implement Pharmacy Health Services Evaluation and Research (HSER) projects. It will build upon PHSC 800 (Pharmacy Health Services Evaluation and Research Methods I) and required courses in epidemiology (EPI 820) and biostatistics (BIOS 806) by concentrating on the application of research and evaluation methods in the context of pharmaceuticals and pharmacy practice, and by including pharmacoepidemiology and pharmacoeconomic evaluations methods. It will also focus on the use of drug dispensing, electronic health record, and claims data for evaluating process, clinical, and economic outcomes related to pharmacotherapy and pharmacy services. The course will provide practice-relevant training for pharmacists, researchers, and pharmacy informatics specialists involved in the design, delivery, and evaluation of clinical pharmacy programs in health systems and managed care settings.
Prerequisite: BIOS 806
Corequisite: BIOS 806 at same time as PHSC 801
Typically Offered: SPRING

PHSC 802 ESSENTIALS OF DRUG DISCOVERY AND DEVELOPMENT 3 Credit Hours
This course is designed to prepare the graduate student to understand the wider drug discovery process and the role of their research within that process. Major topics to be covered include target identification, pharmacology of common drug targets, hit discovery, lead optimization, pharmacokinetics, toxicity and clinicals trials phases.
Typically Offered: FALL

PHSC 820 SELECTED TOPICS 1-2 Credit Hours
A detailed study of specific subject areas related to the pharmaceutical sciences. Evaluation and discussion of the scientific literature is an integral part of the course.
Prerequisite: Permission of instructor.

PHSC 821 ORGANIC CHEMISTRY AND APPLICATIONS TO BIOMOLECULES 2 Credit Hours
This course deals with the basic principles to understand the structure, reactivity, and synthesis of bioactive organic molecules. The focus is on the types of key organic reactions used in drug synthesis, mechanism of reactions, scope and limitations of reactions, design of a synthetic route for a bioactive target compound, and application of biocompatible reactions to biomedical systems.
Prerequisite: Permission of instructor.
Typically Offered: FALL

PHSC 825 OPHTHALMIC DRUG DISCOV 3 Credit Hours
A survey of ocular diseases, their pathogenesis, current drug treatment, and approaches to the development of drug treatment. Special methods for the evaluation of ocular drugs as well as use of animal models will be included.
Typically Offered: FALL/SP/SU

PHSC 830 ADV MEDICINAL CHEM 3 Credit Hours
This course will apply essential concepts of medicinal chemistry at an advanced level. Receptor theory, stereochemistry, chemical bonding, and bioisosterism will be discussed as they relate to drug design.
Prerequisite: PHSC 626 (or equivalent).
Typically Offered: FALL/SP/SU

PHSC 845 QUANTITATIVE PHARMACUETICAL ANALYSIS 3 Credit Hours
A lecture and laboratory course covering the theory and applications of current analytical methods for the quantitative determination of drugs, metabolites, and other biologically active agents.
Prerequisite: first year organic chemistry
Typically Offered: FALL/SP/SU

PHSC 848 NANOIMAGING/BIOIMAGING 3 Credit Hours
This course will review various nanotechnology approaches to imaging, probing and manipulation at the nanoscale and discuss significance and impact of these technological advances on pharmaceutical and biomedical industries.
Typically Offered: FALL/SP/SU

PHSC 851 INNOVATIVE DRUG DLVRY 3 Credit Hours
This course will examine the innovations in the design, preparation, and evaluation of modern drug delivery systems.
Prerequisite: permission of instructor.
Typically Offered: SPRING

PHSC 852 PHARMACEUTICAL CHEMISTRY FOR DRUG DELIVERY AND NANOMEDICINE 3 Credit Hours
This course will review various chemical reactions and their applications in pharmaceutics, drug delivery and nanomedicine. Practical/laboratory experiments will be included.

PHSC 861 ADV PHARMACOKINETICS 3 Credit Hours
The mathematical description of the rate and extent of drug absorption, distribution, elimination and action.
Prerequisite: PHSC 674 or permission of instructor.
Typically Offered: FALL

PHSC 880 PRINCIPLES AND METHODOLOGIES IN CANCER RESEARCH 2-3 Credit Hours
A survey of the biology and biochemical mechanisms underlying cancer development, prevention, and therapy.
Prerequisite: Permission of instructor.
Cross List: BMB 880, CRGP 880, PAMM 880.
Typically Offered: FALL/SPR

PHSC 885 PHYSICAL PHARMACY 3 Credit Hours
A study of physicochemical principles applicable to drug delivery systems, with emphasis on solubility, diffusion, dispersed systems, and stability testing.
Prerequisite: Permission of instructor.
Typically Offered: FALL

PHSC 890 POLYMER THERAPEUTICS 3 Credit Hours
A study of the physicochemical and biomedical properties of synthetic polymers with an emphasis on their application as modern therapeutics.
Prerequisite: Permission of instructor.
Typically Offered: FALL

PHSC 896 RSCH OTHER THAN THESIS 1-8 Credit Hours
Student research that is clearly distinct from ongoing or planned thesis/dissertation work, or research/lab rotations preformed prior to selecting a permanent advisor or supervisor.
Typically Offered: FALL/SP/SU

PHSC 899 MASTERS THESIS 1-9 Credit Hours
Independent student research related to the masters thesis.
Typically Offered: FALL/SP/SU

PHSC 900 INDUSTRIAL PHARMACY 3 Credit Hours
ELECTIVE
This course intends to teach students the various unit operations and techniques used for manufacturing safe and effective pharmaceutical products. Drug manufacturing includes a series of operations, such as size reduction, mixing, solubility enhancement, drying, filtration, sterilization, scaleup, and storage. This course will enable students to understand the pharmaceutical industry's role and learn the fundamentals of the formulation development cycle and the critical elements of dosage formulation. The topics are selected for future scientists interested in working in the pharmaceutical industry in product development, formulations, and manufacturing. These topics will also be beneficial for future scientists in academia who wish to translate their benchwork into marketable products.
Prerequisite: Introduction to Pharmaceutical Sciences.
Instructor: Jinging Sun, Ph.D
Typically Offered: SPRING

PHSC 902 DRUG DELIVERY AND NANOMEDICINE RESEARCH 3 Credit Hours
This is a webcast seminar course based on the lectures presented by outside and internal faculty speakers in the seminar program of the Center of Drug Delivery and Nanomedicine (CDDN). Videos of these seminars are posted online.
Typically Offered: FALL

PHSC 903 SPECTROSCOPIC METHODS AND ANALYSIS 3 Credit Hours
Spectroscopic methods and analysis is an advanced medicinal chemistry course. The course is designed to familiarize graduate students with principles of Chromatography, Mass Spectroscopy, X-Ray Crystallography, IR, UV and Nuclear Magnetic Resonance spectroscopy techniques for structure assignment. The student will become proficient in advanced techniques in assigning stereochemistry/isomers, selection, use and interpretation of 1H, 13C, heteronuclear NMR, and three-dimensional NMR experiments.
Prerequisite: PHSC 846
Instructor: Dr. Paul Trippier, Dr. Jared Garrison Dr. DJ Murray, and Dr. Y Chhonker
Typically Offered: FALL/SP/SU

PHSC 904 DELIVERY AND BIOCOMPATABILITY OF PROTEIN AND NUCLEIC ACID DRUGS 3 Credit Hours
This course is designed to teach students about the delivery and biocompatibility of proteins, peptides and nucleic acid drugs and dosage form design. Topics will include: biocompatibility, protein and peptide drug delivery, nucleic acid drug delivery, and oligonucleotide, siRNA, shRNA, miRNA, and gene therapy.
Prerequisite: One year of graduate level Medicinal, Physical Chemistry, Bioengineering, Biotechnology.
Typically Offered: FALL/SP/SU

PHSC 905 APPLIED PHARMACOGENOMICS 3 Credit Hours
A 3 credit hour course that integrates physiology, pharmacology, clinical applications, clinical trials,and ethics all in the context of applied pharmacogenomics. Pre-reqs: Completion of a previous pharmacokinetic course or permission from instructor.
Typically Offered: FALL

PHSC 910 PHARMACOKINETICS AND BIOPHARMACEUTICS 3 Credit Hours
This course will address in depth the drug- and body- biopharmaceutical factors that control the absorption, distribution, metabolism, and excretion (ADME) of therapeutic molecules and how they affect the overall pharmacokinetic (PK) profile of these molecules. It will also address the theory and applications of pharmacokinetics in drug discovery and development and its relationship to pharmacodynamics (PD) and toxicity (Tox).
Typically Offered: SPRING

PHSC 920 APPLIED PHARMACOKINETICS IN TRANSLATIONAL RESEARCH AND DRUG DEVELOPMENT 3 Credit Hours
This course introduces and extends key principles and methods for application of pharmacokinetic studies in experimental therapeutics and the drug development process. The format of the course is designed to challenge students to critically think about selected topics in drug disposition, efficacy and toxicity. The course consists of various presentations, lectures, assigned readings and class discussion.
PREREQ: Completion of a basic pharmacokenetics course or PHSC 910
Typically Offered: SPRING

PHSC 921 BIOPHYSICAL CHEMISTRY 3 Credit Hours
The biophysical chemistry of nucleic acids and proteins, including the study of these molecules using NMR, calorimetry and fluorescence.
Prerequisite: Permission of instructor.
Cross List: BMB 921.
Typically Offered: SPRING

PHSC 923 INTRODUCTION TO PHARMACOMETRICS: POPULATION PHARMACOKINETIC MODELING APPLICATION 2 Credit Hours
This class builds upon the fundamental foundation for Population Pharmacokinetic (PopPK) Modeling. Introduction to Pharmacometrics builds upon the topics discussed in PHSC 905 and 920. to a provide a more hands on approach to Pharmacometrics, where students will develop Population Pharmacokinetic models and apply them to different research questions. By the end of this course, students will be able to successfully run their own basic PopPK analyses. All modeling will be performed in the PmetricsTM platform/software, which has free access. Students will be required to bring laptops to class.
Prerequisite: Completion of PHSC 905 and/or PHSC 920
Instructor: Sean N. Avedissian
Typically Offered: FALL

PHSC 950 ADVANCED TOXICOLOGY 3 Credit Hours
This course deals with the adverse effects of chemicals on biological systems. Physiological and biochemical mechanisms of toxicity at the cellular and subcellular levels will be emphasized.
Prerequisite: Permission of instructor.
Cross List: ENV 950.
Typically Offered: FALL

PHSC 960 CURRENT TOPICS IN THE PHARMACEUTICAL SCIENCES 1 Credit Hour
This course is mandatory for all students enrolled in the Pharmaceutical Sciences Graduate Program for the first six semesters upon matriculation.
Typically Offered: FALL/SPR

PHSC 970 SEMINAR 1 Credit Hour
Attendance at weekly seminars offered by the department/program, or other activities specific to the degree program (contact the program director for more information). This course is mandatory for all pharmaceutical sciences students.
Typically Offered: FALL/SPR

PHSC 999 DOCTORAL DISSERTATION 1-15 Credit Hours
Independent student research related to the PhD dissertation. This course may be utilized before or after successful completion of the comprehensive exam.
Typically Offered: FALL/SP/SU