

BioMed and Pharmacy Sci (PSCI)

Courses

PSCI 5508 Respons Conduct in Research: 1 semester hour.

This course consists of the study of the ethical principles and related federal and state laws that govern scientific research. Through a combination of lecture and case study discussion, students will learn both the substance and application to scientific research of ethical principles and related laws. Topics addressed include conflict of interest, human subject research, live vertebrate animal subjects in research, safe laboratory practices, mentor/mentee responsibilities and relationships, collaborative research, peer review, data acquisition and laboratory tools (management, sharing, and ownership), research misconduct and procedures for handling misconduct, responsible authorship and publication, and contemporary ethical issues in biomedical research.

PSCI 5599 Experimental Course: 1-6 semester hours.

The content of this course is not described in the catalog. Title and number of credits are announced in the Class Schedule. Experimental courses may be offered no more than three times with the same title and content. May be repeated.

PSCI 6601 Graduate Seminar: 1 semester hour.

Discussion of current research and theories in Pharmaceutical Sciences. May be repeated.

PSCI 6602 Research Design and Analysis for Pharmaceutical Sciences: 3 semester hours.

Principles of research design and statistical analysis applicable to the pharmaceutical or biomedical sciences. Emphasis on evaluation of biomedical literature and on development of research plans. PREREQ: Permission of instructor.

PSCI 6603 Scientific Communication: 2 semester hours.

This course will survey basic techniques in scientific communication including: scientific manuscripts/articles, theses/dissertation, and other forms of written scientific communication; laboratory notebooks, reports and other technical documentation; collecting and citing literature; basic grantsmanship and introduction to the NIH grant submission process; scientific poster and podium (oral communication) formats; preparation of professional scientific materials including CV/resume, research summary, research philosophy, teaching philosophy; and the use of relevant software.

PSCI 6604 Research Practicum: 3 semester hours.

The student will receive practical laboratory training in pharmaceutical sciences under the guidance of faculty. May be repeated. PREREQ: Enrollment in the non-thesis option and permission of the instructor. Graded S/U.

PSCI 6605 Critical Literature Evaluation: 1 semester hour.

Offered each semester, this course involves the discussion and critical analysis of the current scientific literature, focusing in the pharmaceutical sciences and its related disciplines, with written and oral presentations by the students facilitated by rotating faculty. May be repeated.

PSCI 6606 Selected Techniques in the Laboratory: 2 semester hours.

Practical experience in the use of instrumentation and techniques in the student's area of specialization. Each student shall select three faculty laboratories in the Pharmaceutical Sciences for specific technical training. PREREQ: Permission of instructor.

PSCI 6607 Research Foundations: 3 semester hours.

A discussion of the nature and critical analysis of experimentation, principles of the scientific method, and literature in the Pharmaceutical Sciences.

PSCI 6609 Advanced Drug Delivery: 3 semester hours.

Critical assessment of novel drug carrier systems regarding biological, drug-related, and carrier-related factors. Study of targeted drug delivery and controlled release devices with emphasis on bioerodible polymers, matrix and reservoir systems.

PSCI 6610 Analytical Techniques in Pharmaceutics and Drug Delivery: 3 semester hours.

Theory and practice of analytical techniques in pharmaceutics and drug delivery research. PREREQ: Permission of instructor.

PSCI 6611 Current Topics in Pharmaceutics and Drug Delivery: 1 semester hour.

Discussion of current research topics in pharmaceutics and drug delivery. PREREQ: Permission of Instructor.

PSCI 6612 Basic Clinical Pharmacology: 3 semester hours.

This course is an introduction to pharmacologic principles and mechanism of drug action. Overviews on pharmacokinetics, pharmacodynamics, metabolism, receptor theory, and major medication classes will be covered.

PSCI 6613 Clinical Neuropharmacology: 3 semester hours.

Expanding on foundational knowledge, this course has added emphasis on neuropharmacology. It includes an in-depth study of neurotransmitter systems and psychotropic medications, while preparing the student to understand treatment of mental disorders with psychopharmacology. COREQ: PSCI 6612

PSCI 6618 Principles of Pharmacology I: 4 semester hours.

This course, the first of a two-part series, is designed to teach students the essential principles of pharmacology as a foundation for more advanced courses. Topics covered include cell biology, PK/PD, drug-receptor interactions, pharmacogenetics-epigenetics, and drug metabolism. Students will also be introduced to the molecular pharmacology of biological drug target classes, including enzymes, membrane receptors, ion channels, transport proteins, and transcription factors.

PSCI 6619 Principles of Pharmacology II: 4 semester hours.

This course, the second of a two-part series, is designed to teach students the essential principles of pharmacology as a foundation for more advanced courses. This semester focuses on the pharmacology of the major drug classes, including drugs affecting neurotransmission, cardiovascular and pulmonary function, immunomodulation, gastrointestinal function, hormones and hormone antagonists, and drug used for chemotherapy of microbial and neoplastic diseases. PREREQ: PSCI 6618.

PSCI 6620 Principles of Drug Design and Drug Action: 3 semester hours.

This course will survey the principles of drug discovery, drug design, and drug action including compound screening, hit identification, lead optimization, and theories of drug-receptor binding, focusing on small-molecule drug discovery. Fundamentals of enzyme kinetics and assay development will be reviewed as well as an introduction to rational drug discovery techniques. Special topics in prodrug and peptide drug design, inorganic medicinal chemistry, design of DNA active therapeutics, drug metabolism, and natural products drug discovery will be discussed. Drug discovery case studies will highlight and reinforce the concepts and theories covered. PREREQ: Permission of instructor.

PSCI 6622 Principles of Toxicology: 3 semester hours.

Introduction to basic concepts of toxicology, including mutagenesis, carcinogenesis, teratology, risk assessment, regulatory toxicology, toxicology of solvents, pesticides, metals and radioactive materials and design of toxicological studies. PREREQ: PSCI 6621 or permission of instructor.

PSCI 6630 Psychopharmacology: 3 semester hours.

This course will cover the mechanisms of action of psychoactive drugs, including drugs used in the treatment of psychopathological disorders and drugs of abuse. Also covered will be the learned basis of drug effects. Students will critique contemporary readings in the application of psychotherapeutic agents and processes of addiction. PREREQ: Permission of instructor.

PSCI 6631 Cancer Biology: 3 semester hours.

Study of the difference between normal and cancerous cells growth control, cell cycle, carcinogenesis, growth factor and oncogenes, cellular signaling, angiogenesis, telomerases, tumor invasion and metastasis, vitamins, diet and tobacco. PREREQ: Permission of instructor.

PSCI 6632 Anti-Cancer Drugs: 3 semester hours.

Cell cycle drug design and development, mechanisms of antimetabolites, alkylating agents, topoisomerase inhibitors, natural compounds, hormones and novel agents. Relationship between receptors and response to chemotherapy, drug resistance, drug delivery. PREREQ: Permission of instructor.

PSCI 6633 Experimental Oncology: 2 semester hours.

Cell culture, anti-cancer drug screening, protein, RNA and DNA analysis, methods in signal transduction and oncogene expression. Immunohistology, cell cycle analysis, receptor binding, receptor screening of tumors. Laboratory work included. Limit 5 students.

PSCI 6634 Current Topics in Oncology: 1 semester hour.

Study of current topics in cancer research. Emphasis on novel approaches to understand and treat cancer. PREREQ: Permission of instructor.

PSCI 6635 Special Topics in Oncology: 2 semester hours.

An introduction to cancer biology and cancer terminology. An overview of fundamentals of pharmacology as applied to cancer therapy. Mechanisms of action and resistance to chemotherapeutic drugs will be emphasized. A discussion of the importance of early detection. PREREQ: Permission of instructor.

PSCI 6636 Concepts and Tools in Pharmacogenomics: 2 semester hours.

The role of genetic factors in the development and evaluation of drugs, basic principles of microarray analysis introduction to proteomics. PREREQ: Permission of instructor.

PSCI 6640 Elements of Nanoscience and Nanotechnology: 3 semester hours.

An introduction to the properties of nanomaterials. Applications of nanomaterials in biomedical, pharmaceutical, environmental, and bioengineering systems and their impact on society. PREREQ: Permission of instructor.

PSCI 6650 Thesis Research: 1-10 semester hours.

1-10 Credits. May be repeated. Graded S/U

PSCI 6652 Advanced Biopharmaceutics and Pharmacokinetics: 3 semester hours.

Physicochemical principles involved in the kinetics of drug absorption, distribution, biotransformation, elimination, and therapeutic response. PREREQ: Permission of instructor.

PSCI 6653 Principles of Biopharmaceutical Analysis: 3 semester hours.

A treatment of the principles of modern methods for the qualitative and quantitative determination of drugs in biological materials.

PSCI 6655 Advanced Biopharmaceutical Analysis: 3 semester hours.

A continuation of PSCI 6653, this course covers the chromatographic techniques of analysis in detail including liquid chromatography, gas chromatography, thin layer capillary zone electrophoresis, and mass spectrometry, chromatography.

PSCI 6658 Biophys Chem and Struct Biol: 3 semester hours.

This course will explore the fundamentals of macromolecular structural biology, with an emphasis on the underlying principles of the related biophysical techniques, including x-ray crystallography, NMR, and mass spectrometry. Additional techniques related to the study of biological structure and function, including ultracentrifugation, absorption spectroscopy, and chromatographic methods will also be reviewed. PREREQ: Permission of instructor.

PSCI 6660 Molecular Pharmacology: 3 semester hours.

Advanced study in the transduction of biological signals, molecular basis for the action of hormones, neurotransmitters and growth factors on neurotransmission, metabolism, gene regulation and cell growth. PREREQ: PSCI 5567 and permission of instructor.

PSCI 6661 Drug Metabolism: 3 semester hours.

Advanced study in drug metabolism, cytochrome P450 oxidative system, toxic actions of drugs, mutagenicity, carcinogenicity, and in vitro systems for the study of metabolism. PREREQ: Permission of instructor.

PSCI 6662 Neuropharmacology: 3 semester hours.

The molecular basis of drug action in the central nervous system including nerve excitation, molecular properties of ion channels, neuropharmacological methods, pharmacology of ethanol and the mechanisms in tolerance and physical dependence. PREREQ: Permission of instructor.

PSCI 6670 Computer-Aided Drug Design I: 3 semester hours.

This course, the first of a two-part series, is designed to teach students the essential elements of computer-aided drug design. It will cover principles and applications of molecular modeling, an introduction to computational quantum mechanics, energy minimizations and methods of conformational analysis, computational simulations of biophysical systems (molecular dynamics and Monte Carlo methods), protein and DNA modeling, virtual screening, and structure-based hit and lead identification methods. PREREQ: Permission of instructor.

PSCI 6671 Computer-Aided Drug Design II: 3 semester hours.

This course, the second of a two-part series, is designed to teach students the essential elements of computer-aided drug design. It will cover principles and applications of cheminformatics, pharmacophore modeling in drug design, quantitative structure-activity relationship modeling, ADMET modeling, and ligand-based drug design techniques in hit identification and lead optimization. PREREQ: PSCI 6670 or permission of instructor.

PSCI 6682 Independent Problems in Pharmaceutical Sciences: 1-4 semester hours.

Advanced students are assigned special studies in areas of pharmaceutical sciences on the basis of interest and previous preparation. May be repeated. PREREQ: Permission of instructor.

PSCI 6698 Dissertation Research: 1-10 semester hours.

Research toward completion of the dissertation in the pharmaceutical, social, behavioral or administrative pharmacy sciences. May be repeated. Graded S/U.

PSCI 6699 Experimental Course: 1-6 semester hours.

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PSCI 8850 Dissertation: 1-10 semester hours.

Preparation of the written report of the dissertation research. Variable credits. May be repeated. Graded S/U.