MOLECULAR PHARM & EXP THER (MPET)

MPET 5808 Introduction to Molecular Pharmacology (4 Credits)
S. Lee (Fall) – This course covers the effects of drugs and other therapeutic agents on biological systems, with particular emphasis on how drugs interact with their receptors, are metabolized by humans, affect the functions of organ systems, and are used to treat diseases.
Grading: Standard Letter, Test-Out/Waivers

MPET 5900 Molecular Pharmacology and Receptor Signaling (3 Credits)
S. Kaufmann (Spring) – Receptor-ligand interactions underpin a multitude of biological processes, and are central to the field of pharmacology. This course will develop mechanistic understanding of receptor-ligand interactions and how they are linked to biological responses. Types of receptor ligand interactions will include agonists, partial agonists, competitive and non-competitive antagonists, and allosteric modulators. Quantitative aspects of the mechanisms will be considered from both steady state and kinetic perspectives. Hands on computational methods using MATLAB will solidify understanding of how different types of ligands interact with receptors and elicit or modify their biological responses. Selected topics will include neurotransmitter-gated ion channels, G-protein coupled receptors, Grehlin receptors, tyrosine kinase receptors, enzymes as receptors, and structure-guided drug design. Grading is based on homework assignments, midterm exam, and a mini-proposal on a receptor system of choice. Course previously listed as CORE 6450.
Grading: Standard Letter

MPET 6205 Clinical Pharmacology and Pharmacogenomics Journal Club (1 Credit)
R. Weinshilboum, L. Wang (993: Fall, Winter, Spring, Summer) – This journal club meets once monthly. At each meeting, one participant chooses, along with their mentor, an original research article and leads the discussion. Articles deal with any aspect of the interactions between xenobiotics and man, spanning articles of fundamental laboratory-based science to clinical trials. This journal club will be of interest to graduate students in pharmacology, post-doctoral students in pharmacology, and trainees in clinical pharmacology. Register in fall quarter only (1 cr./yr.). Attendance required fall, winter, spring, and summer. Learners must have completed their written and oral examinations for their respective tracks (to be considered graduate candidate).
Grading: Sat / Unsat

MPET 6400 Introduction to Principles of Pharmacokinetics (2 Credits)
J. Reid (Spring) – This 12-week course will focus on the qualitative and quantitative description of the kinetics of drug absorption, distribution, and elimination. Learners will gain a basic and practical understanding of the physiological factors that influence these processes and will develop the skills necessary to fine tune dosing regimens for the purpose of optimizing drug levels. Rigorous mathematical derivation of important concepts will be minimized. This course will prepare learners to work in the pharmaceutical industry or take the board examination in clinical pharmacology.
Grading: Standard Letter

MPET 6450 Applied Data Science and Artificial Intelligence in Pharmacology (2 Credits)
A. Athreya (Fall) – Introduction of engineering foundations of data science (DS) and artificial intelligence (AI) in the context of studying drug response and identifying biomarkers for laboratory experiments. In a hands-on approach using state-of-the-art computing infrastructure, the students will implement DS/AI concepts using real-world omics datasets and interpret results with the rigor needed for publications and grant preparations.
Grading: Standard Letter

MPET 6655 Mechanisms of Cell Growth and Death (2 Credits)
L. Karnitz, S. Kaufmann (Even: Fall) – This tutorial provides in-depth coverage of a series of cellular signaling pathways including those activated by receptor tyrosine kinases, cell death receptors, and DNA damage. Specific topics include receptor tyrosine kinases and the Ras and phosphatidylinositol 3-kinase pathways, cell death receptors and caspase activation, and the ATM/ATR-dependent signaling pathways. Alterations in the signaling pathways in disease states are discussed.
Prerequisites: (CORE 6100 or BMB 5100) and (CORE 6250 or BMB 5150)
Grading: Standard Letter

MPET 6700 Cell Death Journal Club (1 Credit)
S. Kaufmann (993: Fall, Winter, Spring, Summer) – The course is a journal club reviewing recent articles on the mechanisms of cell death in health and disease. An emphasis is placed on reviewing articles describing new, universal molecular and biochemical pathways of apoptosis and other cell death mechanisms. The course meets monthly throughout the year. No prerequisites are required. Register in fall quarter only (1 cr./yr.). Attendance required fall, winter, spring and summer for 1 year.
Grading: Sat / Unsat

MPET 6800 Research Seminars in Pharmacology (1 Credit)
A. Kanakkanthara (993: Fall, Winter, Spring) – The purpose of this course is to provide a forum for development of graduate speaking skills in a seminar setting. Students prepare talks presented to students, faculty, fellows, and research technicians. Register in fall quarter only (1 cr./yr.) Attendance required fall, winter, and spring.
Grading: Sat / Unsat

MPET 6805 Drug Metabolism and Pharmacogenomics (2 Credits)
R. Weinshilboum, J. Reid (Winter) – Principles of disposition of drugs in biological systems. Lectures on absorption, distribution, excretion, and metabolic transformation of drugs; descriptions of enzyme systems and factors affecting them. General principles of pharmacogenomics are also presented.
Grading: Standard Letter

MPET 6811 Tutorial Cardiovascular Pharm. (2 Credits)
N. Norton (Even: Winter) – Advances in physiology, pharmacology, genomics, and regenerative medicine are in the process of creating new therapeutic opportunities in cardiovascular medicine. The present course will examine recent literature to explore advanced topics related to understanding innovative pharmacological approaches to treating cardiovascular disease..
Grading: Sat / Unsat

MPET 6813 Tutorial in Systems Pharm. (2 Credits)
H. Li, K. Robertson (Odd: Fall) – Changes in biomedical research have greatly increased the opportunities for clinical impact. These new opportunities were born in large part through the emergence of large-scale genomics, transcriptomics, epigenomics, proteomics, and metabolomics research efforts that yielded huge databases from large patient cohorts and laboratory studies. This explosion of data necessitates the use of quantitative, machine learning and systems approaches more broadly than ever. This course will cover an introduction to computational techniques such as machine learning, systems biology and pharmacology as applied to various 'omics' datasets, network algorithms, and data science application methodology. We then discuss how these techniques are applied to large multi-layer datasets and more importantly, how they are integrated to yield new information on disease and drug response mechanisms, deregulated pathways, and biomarkers of disease and drug response. The class format is a combination of didactic lecture and computation laboratory-based study that is geared toward advanced graduate students and postdoctoral fellows learning how to generate and analyze 'omics' data, and what the pitfalls and limitations are in this field. MPET 6805/5808 encouraged.
Grading: Standard Letter

MPET 6814 Cellular Pharmacology of Agents that Target Cancer (2 Credits)
S. Kaufmann (Even: Winter) – This tutorial will examine the mechanisms of action of selected pharmacological agents of the cellular and subcellular level. Drug targets to be examined during the quarter will include plasma membrane receptors, enzymes involved in signal transduction, cell cycle regulation, chromatin modification and DNA repair, selected pathways in intermediary metabolism, and/or regulators of apoptosis. Emphasis will be placed on 1) understanding the variety of experimental approaches that are applicable to the study of drug action in different subcellular compartments and, 2) developing an ability to critically evaluate recent literature.
Grading: Standard Letter

MPET 6815 Neurobehavioral Pharmacology (2 Credits)
D. Choi (Even: Winter) – This course will cover the most recent neuropharmacological aspects of behavior disorders. The emphasis will be on understanding the advancement of neurogenetics, neurobiology, neuroimaging, and human genomics, which are enabling us to decipher behavioral disorders in molecular levels, and thereby to develop more precise pharmacological treatment methods.
Grading: Standard Letter