Drug and Biopharmaceutical Sciences - DBPS

Courses

DBPS 1010 INTRODUCTION TO DRUG AND BIOPHARMACEUTICAL SCIENCES I (1) LEC. 1. Departmental approval. This course explores the development of the field of drug and biopharmaceutical sciences and its' relationship to disease treatment from ancient to medieval to current day. This historical prospective provides the foundation for appreciation of human creativity in the advancement of health care and the treatment of human diseases.

DBPS 1020 INTRODUCTION TO DRUG AND BIOPHARMACEUTICAL SCIENCES II (1) LEC. 1. Pr. DBPS 1010. Departmental approval. This course introduces the field of drug and biopharmaceutical sciences to first-year students and provides exposure to a variety of major sub-disciplines and associated opportunities. The course will operate as a series of seminars presented by recognized authorities on subjects such as drug toxicity, drug dosages and routes, drug metabolism, drug distribution, drugs for cancer, drugs for Alzheimer's disease, monoclonal antibody-based drugs, antibiotics, forensic chemistry, drug synthesis, etc. These seminars and lectures will allow the student to recognize the breath of the field and future career opportunities. The exact set of seminars and subject matter will vary from year-to-year.

DBPS 2010 FUNDAMENTALS OF BIOMEDICINAL CHEMISTRY I (4) LEC. 4. Pr. CHEM 1030 and CHEM 1031 and CHEM 1040 and CHEM 1041 and (BIOL 1020 or BIOL 1027) and BIOL 1021 and DBPS 1010 and DBPS 1020. Departmental approval. This course explores the relationships between the structural features of drugs and biomolecules and their physicochemical properties including solubility, ionization, intermolecular interactions and reactivity. These concepts are the foundation principles for understanding the actions of drugs at their biologic targets and how the biologic environment processes drugs.

DBPS 2020 FUNDAMENTALS OF BIOMEDICINAL CHEMISTRY II (4) LEC. 4. Pr. CHEM 1030 and CHEM 1031 and CHEM 1040 and CHEM 1041 and (BIOL 1020 or BIOL 1027) and BIOL 1021 and DBPS 1010 and DBPS 1020 and DBPS 2010 and DBPS 2030. Departmental approval. This course explores the relationships between the structural features of biomolecules and their physicochemical properties including solubility, ionization, intermolecular interactions and reactivity. These concepts are the foundation principles for understanding the properties of biologic targets and how drugs interact with targets to produce their therapeutic effects.

DBPS 2030 DRUG TARGETS I (4) LEC. 4. Pr. (BIOL 1020 or BIOL 1027) and BIOL 1021 and DBPS 1010 and DBPS 1020. Departmental approval. This is the first of a two-course survey sequence designed to explore various biological targets (cells, tissues, organs, micro-biomolecules, and macro-biomolecules) present in the central nervous system (brain and spinal cord), eye, ears, respiratory tract, and gastrointestinal tract for a drug to interact and to impose/enforce its effect in the body. This course will further explain the natural substances (ligands) that interacts with the above targets. These basic concepts are the fundamental principles for understanding the actions of drugs in the body (centrally or peripherally).

DBPS 2040 DRUG TARGETS II (4) LEC. 4. Pr. (BIOL 1020 or BIOL 1027) and BIOL 1021 and DBPS 1010 and DBPS 1020 and DBPS 2030. Departmental approval. This course explores various biological targets (cells, tissues, organs, micro-biomolecules, and macro-biomolecules) present in the cardiovascular, renal system, skin, endocrine system, sexual organs, and bones for a drug to interact and to impose/enforce its effect in the body. This course will further explain the natural substances (ligands) that interacts with the above targets. The above basic concepts are the fundamental principles for understanding the actions of drugs in the body (centrally or peripherally).

DBPS 2050 BIOPHARMACEUTICAL DATA ANALYSIS I (1) LEC. 1. Pr. DBPS 1010 and DBPS 1020. Departmental approval. This course introduces the methods and mathematical concepts of analysis and sampling, as specifically applied to drug and biopharmaceutical sciences. Topics include descriptive measures, probability and distributions, estimation, tests of hypotheses, types of error, significance, confidence levels, sample size and power.

DBPS 2060 BIOPHARMACEUTICAL DATA ANALYSIS II (1) LEC. 1. Pr. DBPS 1010 and DBPS 1020 and DBPS 2050. Departmental approval. This course is a continuation of Biopharmaceutical Calculations & Statistics I and focuses on mathematical concepts of analysis and sampling in biopharmaceutical sciences research and production. Topics include estimation, tests of hypotheses, types of error, significance, confidence levels, sample size and power.

DBPS 3010 MEDICINAL CHEMISTRY I (4) LEC. 4. Pr. DBPS 2020 and DBPS 2040 and DBPS 2060. Departmental approval. This course will combine a discussion of the nature and function of drug targets (including enzymes, receptors, ion channels, pumps, RNA and DNA) with study of molecular mechanisms by which drugs interact with these targets and the basic principles of drug design. The course will use currently relevant examples for each target class and is not intended to provide a comprehensive review of all drug classes at all targets. Course materials will include class lecture notes and assigned readings from the current literature. With this knowledge, the student will be better equipped to understand the molecular basis of drug action and the challenges of drug design in a wide variety of therapeutic situations.

DBPS 3020 MEDICINAL CHEMISTRY II (3) LEC. 3. Pr. DBPS 3010 and DBPS 3050. Departmental approval. This course will provide a comprehensive description and analysis of the relationships between drug/dosage form properties and biodisposition, including absorption, distribution, metabolism and elimination. Methods of drug design to optimize drug biodisposition and pharmacokinetics also will be summarized in overview. This course will serve as a foundational instructional unit for all students interested in pursuing advanced study in the areas of drug discovery and development.

DBPS 3030 DRUG ACTION I (4) LEC. 4. Pr. DBPS 2020 and DBPS 2040 and DBPS 2060. Departmental approval. This is the first of a two-course sequence focused on the mechanism of drug action, adverse drug reactions, and drug-interactions as a drug interacts with its' biological target sites. This course will identify the etiology, understand the disease state effects on target sites, and symptoms of major diseases related to the central nervous system (brain and spinal cord), eye, ears, respiratory tract, and gastrointestinal tract.

DBPS 3040 DRUG ACTION II (4) LEC. 4. Pr. DBPS 3030. Departmental approval. This course will identify the etiology, understand the various pathophysiology, and symptoms of major disease states related to the renal system, endocrine system, cardiovascular system, infection, tumor/cancer, bones, integumentary system, sexual organs, for a drug to exert its prophylactic and therapeutic actions. This course will further explain the mechanism of drug action, adverse drug reactions, and drug-interactions.

DBPS 3050 DRUG FORMULATIONS (3) LEC. 3. Pr. DBPS 2020 and DBPS 2060. Departmental approval. Physical-chemical principles and technologies used in the formulation, manufacture and compounding of solid and oral liquid (solution) pharmaceutical dosage forms and novel drug delivery systems.

DBPS 3060 DRUG PHARMACOKINETICS (4) LEC. 4. Pr. DBPS 3010 and DBPS 3030 and DBPS 3050. Departmental approval. The course deals with absorption, plasma protein binding, tissue distribution and elimination of drugs by liver and kidneys and how these processes determine the overall disposition of the drug in the organism. In addition, the relationships between dose and plasma concentration and of plasma concentration and effect are described, both for a given drug and its metabolites. A brief introduction to the use of pharmacokinetic methods for drug development is given. The course also deals with calculation and evaluation of mathematical parameters that describe pharmacokinetic and pharmacodynamic processes, both regarding single dose and repeated dose administration. Finally, it describes the theoretical basis for clinical drug dosing, reasons for and rational handling of inter-individual variation (genomics) in drug disposition as well as drug-drug interactions.

DBPS 3070 DRUG RESEARCH SEMINAR I (1) LEC. 1. SU. Pr. DBPS 2020 and DBPS 2040. Departmental approval. This research seminar course will feature weekly presentations by graduate students, postdoctoral fellows, faculty and visiting scholars. The presentations will introduce DBPS students to current drug discovery and development research advancements in the fields of medicinal chemistry, pharmacology and pharmaceutics.

DBPS 3080 DRUG RESEARCH SEMINAR II (1) LEC. 1. SU. Pr. DBPS 2020 and DBPS 2040. Departmental approval. This research seminar course will feature weekly presentations by graduate students, postdoctoral fellows, faculty and visiting scholars. The presentations will introduce DBPS students to current drug discovery and development research advancements in the fields of medicinal chemistry, pharmacology and pharmaceutics.

DBPS 4980 RESEARCH (5) LAB. 15. Pr. DBPS 3020 and DBPS 3040 and DBPS 3060 and DBPS 3080. Departmental approval. Course Description for each discipline of DBPS Program: Pharmacological/Biomedical Sciences research areas include molecular and cellular disease mechanisms, physiological and pathological processes of disease development, identification of new therapeutic targets, therapeutic and toxicological mechanisms of drug action, and novel approaches to therapeutics, including tissue engineering, genomics, and immunotherapy. Pharmaceutics and Drug Delivery research areas include formulation science, biomaterials, biopharmaceutics, pharmaceutical compounding, nanotechnology, and pharmacokinetics. Medicinal Chemistry and Drug Development research areas include the synthesis of new drug molecules, structure-activity relationship of drug classes, the use of modern methods of drug design and analysis and the development of assays to test drug candidates. Course may be repeated for a maximum of 10 credit hours.