PHM(PH)-MEDICINAL CHEMISTRY

**PHA 6354 Natural Medicinal Products 3 Credits**
*Grading Scheme: Letter Grade*
Chemistry of compounds derived from plants and animals.

**PHA 6356 Structure Determination of Complex Natural Products 3 Credits**
*Grading Scheme: Letter Grade*
Rigorous structure determination of natural products, using modern spectroscopic methods. Become able to elucidate the structure of any organic small molecule.

**Prerequisite:** CHM 5235 or consent of instructor.

**PHA 6357 Herbal & Dietary Supplements 3 Credits**
*Grading Scheme: Letter Grade*
Herbal Dietary supplements are extensively used by consumers. This course provides an overview of commonly used supplements to assist healthcare practitioners in providing patients with adequate counseling to avoid drug interactions and false claims.

**PHA 6416 Pharmaceutical Analysis I 3 Credits**
*Grading Scheme: Letter Grade*
Theory and applications of relevant analytical techniques for analysis of drugs in biological samples. Offered spring term in odd-numbered years.

**PHA 6417 Pharmaceutical Analysis II 3 Credits**
*Grading Scheme: Letter Grade*
Absorption, fluorescence, phosphorescence, and spectroanalysis of drugs and related compounds.

**PHA 6425 Drug Biotrans and Molecular Mechanisms of Toxicity 3 Credits**
*Grading Scheme: Letter Grade*
Enzymology and mechanisms of drug biotransformation pathways. Examples of drugs and other xenobiotics that exhibit toxicity related to biotransformation.

**Prerequisite:** introductory organic chemistry, biochemistry.

**PHA 6432 Fundamentals of Pharmaceutical Chemistry 1 Credit**
*Grading Scheme: Letter Grade*
This is a foundation course whose aims are providing an introduction to the principles of Pharmaceutical chemistry, including an understanding of drug structure-activity relationships, prediction of the physico-chemical properties of a drug, basic knowledge of the major pathways of drug metabolism, and factors that can contribute to drug-drug interactions.

**PHA 6435 Biosynthetic Logic of Medicinal Natural Products 3 Credits**
*Grading Scheme: Letter Grade*
Covers topics of biosynthesis of the major families of medical natural products, structural and biochemical understanding of their biosynthetic logic, gene cluster identification, genome mining, and production of bioactive “unnatural products” for drug discovery and development.

**Prerequisite:** Students are expected to have the background of Biochemistry, Enzymology, and Bioorganic Chemistry. Or permission of instructors.

**PHA 6444 Pharmaceutical Chemistry I 3 Credits**
*Grading Scheme: Letter Grade*
Students are shown how to predict the solubilities, structure-activity relationships, basic synthesis routes for selected structures, metabolism and pharmacological activity/potency of various drug classes. In particular, anticoagulants, ACE inhibitors, glucocorticoid steroids, nitrate esters, adrenergics, cholinerics, diuretics, anesthetics, antihyperlipidemics, muscle relaxants, anxiolytics, antidepressants, sedative hypnotics and vitamins are covered.

**PHA 6447 Drug Design 3 Credits**
*Grading Scheme: Letter Grade*
Relevant disciplines and their effect on new drug development, from discovery of a new active lead compound to final refinement as a commercial product.

**Prerequisite:** organic chemistry, biochemistry, pharmacology, or consent of instructor.

**PHA 6448 High Throughput Drug Discovery 2 Credits**
*Grading Scheme: Letter Grade*
Introduction to combinatorial chemistry, multi-compound based technologies, and their use in screening bioassays to discover lead compounds.

**Prerequisite:** organic chemistry, biochemistry, or consent of instructor.

**PHA 6471 Synthetic Medicinal Chemistry 3 Credits**
*Grading Scheme: Letter Grade*
Review of acid and base properties of pharmacologically active molecules. Review of mechanisms of synthetic reactions, and their applications.

**PHA 6472 Organic Synthesis of Drug Molecules 3 Credits**
*Grading Scheme: Letter Grade*
Covers advanced topics in drug molecule synthesis, including: organic reaction mechanisms, retrosynthetic analysis, asymmetric synthesis, heterocyclic chemistry, natural product synthesis, drug design and synthesis, structure-activity relationships. Secondary topics that will be included in this course include: anticancer/antibacterial agents, screening approaches.

**Prerequisite:** CHM 5224 or permission of instructor.

**PHA 6476 Advanced Combinatorial Chemistry in Drug Discovery 3 Credits**
*Grading Scheme: Letter Grade*
Designed to introduce students combinatorial chemical synthesis to fully understand the functions and mechanism of action of biopolymers for medical purpose.

**Prerequisite:** Students are expected to have previous knowledge on general chemistry and organic synthesis.

**PHA 6534 Toxicology of Chemical Weapons 3 Credits**
*Grading Scheme: Letter Grade*
Providing healthcare providers, first responders, and others that may be exposed to chemical weapons with an understanding of their toxicology and treatment approaches.

**PHA 6535 Principles of Nucleotide Activity 2 Credits**
*Grading Scheme: Letter Grade*
This course will be introducing the students to the chemical structure of DNA and RNA; the synthetic processes for DNA and RNA synthesis; biochemical reactions and pathways for nucleotide synthesis; DNA replication, transcription and translation; covalent and reversible interactions of nucleic acids with small molecules and proteins and an overview of techniques for the analysis of nucleic acids.
PHM(PH)-Medicinal Chemistry

PHA 6543 Pharmaceutical Chemistry II 3 Credits
Grading Scheme: Letter Grade
Showing students how to predict the solubilities, structure-activity relationships, basic synthesis routes for selected structures, metabolism and pharmacological activity/potency of various drug classes. In particular antidiabetics, anticonvulsants, H1 and H2 antagonists, analgetics, nonsteroidal antiinflammatory drugs, hormones, antibiotics, antiviral agents, and antineoplastic agents are covered.

PHA 6556 Introduction to Clinical Toxicology 3 Credits
Grading Scheme: Letter Grade
Introducing the basic methods and procedures commonly employed in Clinical Toxicology as well as the concept of Clinical Toxicology as an interdisciplinary science within the field of healthcare.

PHA 6557 Clinical Toxicology 1 3 Credits
Grading Scheme: Letter Grade
Providing students with an understanding of the toxic effects and clinical applications of various therapeutic drug classes including cardiovascular, CNS, analgetic, anesthetic, antineoplastic, and antibiotic drugs.
Prerequisite: VME 6602

PHA 6840 Medicinal Chemistry of Drugs of Abuse 3 Credits
Grading Scheme: Letter Grade
Pharmacological effects of commonly encountered licit and illicit pharmaceutical compounds.

PHA 6850 Principles of Forensic Science 3 Credits
Grading Scheme: Letter Grade
Introducing the basic disciplines of forensic science. The course is composed of twelve modules.

PHA 6851 Forensic Analysis of DNA 3 Credits
Grading Scheme: Letter Grade

PHA 6852 Mammalian Molecular Biology 3 Credits
Grading Scheme: Letter Grade
Focus on the principles of modern molecular biology and biochemistry and expand on the concepts you may have already encountered in other classes in this program. The content will also include the applications of experimental techniques and procedures routinely used in this field.

PHA 6853 Biological Evidence and Serology 3 Credits
Grading Scheme: Letter Grade

PHA 6854 Forensic Immunology 3 Credits
Grading Scheme: Letter Grade

PHA 6855 Forensic Genetics 3 Credits
Grading Scheme: Letter Grade
Principles of inheritance. Genetic polymorphisms and forensic implications, population genetics and paternity testing.

PHA 6856 Blood Spatter and Distribution 3 Credits
Grading Scheme: Letter Grade
Blood spatter creation and interpretation. Recording, collection, and processing of bloodstains and blood spatter evidence.

PHA 6905C Research Procedures in Medicinal Chemistry 1-4 Credits
Grading Scheme: Letter Grade
Research Procedures in Medicinal Chemistry

PHA 6910 Supervised Research 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Research

PHA 6934 Seminar in Medicinal Chemistry 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Weekly presentation and discussion of research reports based on college programs or literature.

PHA 6935 Selected Topics in Pharmacy 1-4 Credits, Max 12 Credits
Grading Scheme: Letter Grade
Open to all departments in the College of Pharmacy.

PHA 6936 Advanced Topics in Pharmaceutical Sciences 1-2 Credits, Max 4 Credits
Grading Scheme: Letter Grade
Written and oral presentation of research designs, protocols, papers, and critical appraisals with discussion and critical review of such topics.

PHA 6938 Research Seminar 1 Credit, Max 3 Credits
Grading Scheme: Letter Grade
Seminar required of graduate students in the College of Pharmacy.

PHA 6940 Supervised Teaching 1-5 Credits, Max 5 Credits
Grading Scheme: S/U
Supervised Teaching

PHA 6971 Research for Master’s Thesis 1-15 Credits
Grading Scheme: S/U
Research for Master’s Thesis

PHA 7979 Advanced Research 1-12 Credits
Grading Scheme: S/U
Research for doctoral students before admission to candidacy. Designed for students with a master’s degree in the field of study or for students who have been accepted for a doctoral program. Not appropriate for students who have been admitted to candidacy.

PHA 7980 Research for Doctoral Dissertation 1-15 Credits
Grading Scheme: S/U
Research for Doctoral Dissertation