

## PHARMACOLOGY AND TOXICOLOGY PHM

### Department of Pharmacology and Toxicology College of Veterinary Medicine

**350 Introductory Human Pharmacology**  
Spring. 3(3-0) P:M: PSL 250 or (PSL 431 and PSL 432) R: Not open to freshmen.

General principles of pharmacology. Central and autonomic nervous systems. Cardiovascular and renal drugs. Chemotherapy. Anti-infective drugs and endocrine agents.

**431 Pharmacology of Drug Addiction**  
Fall. 3(3-0) RB: Zoology or Human Biology or Psychology or Biochemistry or Physiology.

Introduction to pharmacology and neuropharmacology. Understanding of the biological basis for drug abuse and addiction.

**450 Introduction to Chemical Toxicology**  
Spring. 3(3-0) P:M: (BS 110 or LBS 144) and (BS 111 or LBS 145 or BS 111) and CEM 251 R: Not open to freshmen or sophomores.

Mammalian toxicology. Disposition of chemicals in the body, detoxication, elimination, and mechanisms of toxicity in major organ systems. Selected toxic agents.

**480 Special Problems**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 9 credits in all enrollments for this course. R: Approval of department.

Individual work on selected research problems.

**556 Veterinary Pharmacology**  
Fall. 5(5-0) RB: Completion of semester 2 of the graduate professional program in the College of Veterinary Medicine.

Drug absorption, disposition, biotransformation, excretion, pharmacokinetics. Pharmacologic agents of the autonomic nervous, cardiovascular, renal, central nervous, endocrine, and gastrointestinal systems.

**557 Veterinary Toxicology**  
Spring. 2(2-0) RB: Completion of semester 3 of the graduate professional program in the College of Veterinary Medicine.

Determinants of toxic responses, analytical toxicology, genetic toxicology, and toxin management. Diagnosis, prevention, and treatment of common toxicoses.

**563 Medical Pharmacology**  
Summer. 3(3-0) R: Open only to graduate-professional students in the colleges of Human and Osteopathic Medicine.

General principles of pharmacology and selected drugs. Rational drug therapy.

**590 Case Studies in Clinical Pharmacology**  
Spring. 2(2-0) P:M: PHM 563 RB: Completion of Year 2 in the College of Osteopathic Medicine or College of Human Medicine. R: Open to graduate-professional students in the College of Osteopathic Medicine or in the College of Human Medicine or approval of department.

Selected case studies emphasizing clinical applications of pharmacological principles. Evaluation of new drugs, drug advertising, and adverse drug reactions.

**658 Research Problems in Pharmacology or Toxicology**

Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. RB: Completion of Semester 4 of the graduate-professional program in the College of Veterinary Medicine. R: Approval of department.

Selected research problems in pharmacology or toxicology.

**804 Molecular and Developmental Neurobiology**

Fall. 3(3-0) Interdepartmental with Neuroscience and Pathobiology and Diagnostic Investigation and Psychology and Zoology. Administered by Neuroscience. RB: Bachelor's degree in a Biological Science or Psychology. R: Open to graduate students in Neuroscience major.

Nervous system specific gene transcription and translation. Maturation, degeneration, plasticity, and repair in the nervous system.

**806 Advanced Neuroscience Techniques Laboratory**

Spring. 3(0-9) Interdepartmental with Neuroscience and Physical Medicine and Rehabilitation and Psychology and Radiology. Administered by Neuroscience. RB: PHM 827 R: Open only to doctoral students in the Neuroscience major.

Methods and underlying principles of neuroscience research.

**810 Synaptic Transmission**  
Spring of odd years. 3(3-0) R: Approval of department.

Chemical and electrical aspects of nerve impulse transmission at synaptic and neuroeffector junctions. Influence of drugs.

**813 Cardiovascular Pharmacology**  
Spring of even years. 3(3-0) R: Approval of department.

Cardiovascular signal transduction and control in normal and pathophysiological states.

**814 Advanced Principles of Toxicology**  
Fall of odd years. 3(3-0) RB: PHM 819

Biochemical, molecular and physiological mechanisms of toxicology. Responses of major organ systems to chemical insult. Mechanisms of mutagenesis and carcinogenesis.

**816 Integrative Toxicology: Mechanisms, Pathology and Regulation**  
Fall of odd years. 3(3-0) Interdepartmental with Animal Science and Biochemistry and Molecular Biology and Pathobiology and Diagnostic Investigation. Administered by Pharmacology and Toxicology. P:M: PHM 819

Biochemical, molecular, and physiological mechanisms of toxicology. Functional and pathological responses of major organ systems to chemical insult. Mechanisms of mutagenesis, carcinogenesis, and reproductive toxicology. Concepts in risk and safety assessment.

**819 Principles of Drug-Tissue Interactions**  
Summer. 1 to 2 credits. R: Approval of department.

General principles relevant to the interaction of chemicals with biological systems. Topics include pharmacokinetics and/or pharmacodynamics.

**820 Cellular, Molecular and Integrated Systems Pharmacology and Toxicology**  
Fall. 4(4-0) P:M: BMB 801 and BMB 802 and PHM 827 and PSL 828 R: Approval of department.

Comprehensive overview of the cellular and molecular mechanisms of drug and chemical actions on the major organ systems of humans and other mammals.

**827 Physiology and Pharmacology of Excitable Cells**  
Fall. 4(4-0) Interdepartmental with Neuroscience and Physiology and Zoology. Administered by Pharmacology and Toxicology. RB: PSL 431 or PSL 432 or BMB 401 or BMB 461 or ZOL 402

Function of neurons and muscle at the cellular level: membrane biophysics and potentials, synaptic transmission, sensory nervous system function.

**829 Neuropharmacology**  
Fall. 2(2-0) P:M: PHM 819 RB: Some background in physiology. R: Open to graduate students.

Description of targets in the mammalian central nervous system of clinically useful drugs and the mechanism of action, clinical use, and side effects of those drugs.

**830 Experimental Design and Data Analysis**  
Fall. 3(3-0) RB: Undergraduate degree in biology, chemistry or related field. R: Not open to undergraduate students. Not open to students with credit in PHM 980.

Practical application of statistical principles to the design of experiments and analysis of experimental data in pharmacology, toxicology, and related biomedical sciences.

**831 Endocrine Pharmacology**  
Fall. 2(2-0) P:M: PHM 819 Not open to students with credit in PHM 820.

Physiology, pharmacology, and toxicology of the endocrine system. Endocrine diseases, pharmacological intervention, hormone therapy, endocrine disruptors, role of hormones in normal metabolism and metabolic disorders, and animal models of endocrine and metabolic disorders.

## Pharmacology and Toxicology—PHM

### 839 Systems Neuroscience

Spring. 4(4-0) Interdepartmental with Human Anatomy and Neuroscience and Physiology and Psychology and Zoology. Administered by Neuroscience. R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Agriculture and Natural Resources, Natural Science, Social Science, and Veterinary Medicine. SA: ANT 839

Anatomy, pharmacology, and physiology of multicellular neural systems. Sensory, motor, autonomic, and chemo-regulatory systems in vertebrate brains.

### 851 Intellectual Property and Patent Law for Biomedical Sciences

Fall. 2(2-0) RB: Strong reading and writing skills helpful.

Fundamentals of intellectual property and patent law encountered by biomedical scientists, including issues of prevention, patent prosecution, and enforcement of patents in a litigation setting.

### 854 Leadership and Team-Building for Biomedical Research

Fall. 2(2-0) RB: Experience supervising others and/or participation in workplace teams is strongly suggested. Not open to students with credit in CMBA 804 or CMBA 805 or CMBA 806 or CMBA 832.

Evaluation of current leadership methods. Models of leadership. Practice of specific skills and development of a plan to increase their influence and extend learning beyond the class.

### 858 Project Management and the Drug Development Process

Fall. 3(3-0) RB: Some experience working on laboratory or clinical research projects is useful.

Project management standards and best practices in drug development process, including clinical trials.

### 870 Research Rotation

Fall, Spring, Summer. 1 to 4 credits. A student may earn a maximum of 12 credits in all enrollments for this course. RB: Open only to first year graduate students in Pharmacology and Toxicology. R: Approval of department.

Individual work on selected research problems.

### 899 Master's Thesis Research

Fall, Spring, Summer. 1 to 8 credits. A student may earn a maximum of 12 credits in all enrollments for this course. R: Open only to graduate students in the Department of Pharmacology and Toxicology. Approval of department.

Master's thesis research.

### 910 Seminar

Fall, Spring. 1(1-0) A student may earn a maximum of 3 credits in all enrollments for this course. R: Open only to graduate students. Approval of department.

Discussion of recent topics in pharmacology and toxicology by faculty or invited outside speakers. Students research reports.

### 980 Problems

Fall, Spring, Summer. 2 to 5 credits. A student may earn a maximum of 20 credits in all enrollments for this course. R: Open only to graduate students. Approval of department.

Limited work in selected research projects.

### 999 Doctoral Dissertation Research

Fall, Spring, Summer. 1 to 24 credits. A student may earn a maximum of 70 credits in all enrollments for this course. R: Open to graduate students in the Department of Pharmacology and Toxicology. Approval of department.

Doctoral dissertation research.