

**PHARMACOLOGY  
AND TOXICOLOGY PHM**

**Department of Pharmacology  
and Toxicology  
College of Human Medicine  
College of Osteopathic Medicine  
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.

**430 Drug Abuse**  
Fall of odd years. 3(3-0) R: Not open to freshmen and sophomores.

Pharmacology, physiology, and neuroscience related to the pharmacodynamics of drugs of abuse.

**450 Introduction to Chemical Toxicology**  
Spring. 3(3-0) P:M: (BS 110 or LBS 144) and (BS 111 or LBS 145) 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) R: 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) R: 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: Graduate-professional students in colleges of Human and Osteopathic Medicine.

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

**658 Research Problems in Pharmacology and Toxicology**  
Fall, Spring, Summer. 1 to 3 credits. A student may earn a maximum of 6 credits in all enrollments for this course. R: Completion of 4 semesters of the graduate-professional program in the College of Veterinary Medicine. Approval of department.

Selected research problems in pharmacology or toxicology.

**804 Molecular and Developmental Neurobiology**  
Fall. 3(3-0) Interdepartmental with Neuroscience; Psychology; Pathology; Zoology. Administered by Department of Neuroscience. RB: Bachelor's degree in a Biological Science or Psychology. R: Open only to graduate students in the Neuroscience major.

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

**806 Advanced Neuroscience Techniques Laboratory**  
Summer. 3(0-9) Interdepartmental with Neuroscience; Psychology; Radiology; Physical Medicine and Rehabilitation. Administered by Department of Neuroscience. P:M: (NEU 804 or concurrently) P:NM: (PHM 827 and ANT 839 and PSY 811) R: Open only to doctoral students in the Neuroscience major.

Methods of neuroscience research and the underlying principles on which these methods are based.

**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 pathophysiologic states.

**814 Advanced Principles of Toxicology**  
Spring of even years. 3(3-0) P:NM: (PHM 819)

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

**815 Concepts in Tumorigenesis**  
Spring of odd years. 2(2-0) P:NM: (BMB 462 and PSL 432 and PSL 460) R: Approval of department.

Examination and discussion of literature in tumorigenesis.

**819 Principles of Drug-Tissue Interactions**  
Spring. 3(3-0) R: Approval of department. Not open to students with credit in PHM 820.

General principles relevant to the interaction of chemicals with biological systems.

**820 Cellular and Molecular Mechanisms in Pharmacology and Toxicology**  
Summer. 3(3-0) P:M: (BMB 801 and BMB 802 and PHM 819) R: Approval of department.

Comprehensive overview of the cellular and molecular mechanisms of drug and chemical actions in biological systems.

**821 Principles of Systemic and Integrated Pharmacology and Toxicology**  
Fall. 5(5-0) P:M: (PHM 820) R: Approval of department.

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

**827 Physiology and Pharmacology of Excitable Cells**  
Fall. 4(4-0) Interdepartmental with Physiology; Zoology; Neuroscience. 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.

**839 Systems Neuroscience**  
Spring of odd years. 4(4-0) Interdepartmental with Anatomy; Physiology. Administered by Department of Anatomy. R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Agriculture and Natural Resources, Natural Science, and Veterinary Medicine.

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

**841 Advanced Endocrine Physiology and Pharmacology**

Fall. 4(4-0) Interdepartmental with Physiology; Animal Science; Psychology. Administered by Department of Physiology. P:NM: (BMB 461 and PSL 432) R: Open only to graduate students in the Colleges of Human Medicine, Osteopathic Medicine, Veterinary Medicine, Natural Science, and Agriculture and Natural Resources.

Basic and advanced concepts of endocrine and reproductive physiology and pharmacology.

**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. R: Open only to first year graduate students in Pharmacology and Toxicology. 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 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 36 credits in all enrollments for this course. R: Open only to graduate students in Pharmacology and Toxicology. Approval of department.

Doctoral dissertation research.