

# DEPARTMENT OF PHARMACOLOGY AND EXPERIMENTAL THERAPEUTICS

Dr. Frederick Williams, Chair

The Department of Pharmacology and Experimental Therapeutics consists of faculty members who seek to integrate both basic and applied research in the pharmaceutical sciences into the academic programs in order to provide students with the information they need to be successful in the challenging fields of pharmacy and the pharmaceutical industry. The department offers degree programs in the pharmaceutical sciences at the baccalaureate and graduate level and contributes to the training of students in the Pharm.D. program. Departmental courses cover a broad range of disciplines, including pharmacology, toxicology, drug development, and experimental therapeutics. The department's faculty have research interests in toxicology, pharmacokinetics, biopharmaceutics, neurochemistry, behavioral neuropharmacology, molecular pharmacology, gene therapy, drug metabolism and cancer chemotherapeutics, and pharmacology of the cardiovascular and renal systems.

Pharmacology and toxicology are biomedical sciences that study how to develop safe, effective drugs and prevent the harmful effects of chemicals. Pharmacology focuses on the way drugs interact with various living systems, including the properties, effects and mechanisms of drug action. Toxicology focuses on the interaction of toxic compounds in the body, including exposure assessment, dose response assessment and hazard identification.

## Degrees Offered

- BSPS in Pharmacology and Toxicology (PTOX) (<https://catalog.utoledo.edu/undergraduate/pharmacy-pharmaceutical-sciences/pharmacology/bsps-pharmacology-toxicology/>)
- BSPS/MS in Law with regulatory compliance-early admission-bridge program (<https://catalog.utoledo.edu/undergraduate/pharmacy-pharmaceutical-sciences/pharmacology/bsps-ms-in-law-with-regulatory-compliance-early-admission-bridge-program/>)
- BS/MS Pharmaceutical Sciences – Pharmacology Toxicology (<https://catalog.utoledo.edu/undergraduate/pharmacy-pharmaceutical-sciences/pharmacology/bsps-ms-in-pharmaceutical-science-pharmacology-toxicology-program/>)

### PHCL 2220 Drugs, Medicine And Society

[3 credit hours]

The course conveys a general knowledge of drugs, including how and where drugs act and the general pharmacology of specific classes of drugs, e.g., central nervous system active agents, bronchodilators, etc.

**Term Offered:** Spring

### PHCL 2600 Functional Anatomy And Pathophysiology I

[4 credit hours]

A study of functional anatomy, physiology and pathophysiology to serve as background for the understanding of the action of drugs.

**Prerequisites:** (CHEM 1240 with a minimum grade of D- and CHEM 1290 with a minimum grade of D- and BIOL 2150 with a minimum grade of D- and BIOL 2160 with a minimum grade of D- and BIOL 2170 with a minimum grade of D- and BIOL 2180 with a minimum grade of D-)

**Term Offered:** Fall

### PHCL 2610 Introductory Physiology

[3 credit hours]

This class is designed to give students a thorough introduction to human physiology and prepare them for success in the Pharmacy/Pharmaceutical Science curriculum.

**Prerequisites:** BIOL 2170 with a minimum grade of D-

**Term Offered:** Spring, Fall

### PHCL 2620 Functional Anatomy And Pathophysiology II

[4 credit hours]

A continuation of PHCL 2600.

**Prerequisites:** PHCL 2600 with a minimum grade of D-

**Term Offered:** Spring

### PHCL 2900 Pharmacology Research Introduction

[1-3 credit hours]

The course will introduce the undergraduate student to research in pharmacology. Students will work with faculty members throughout the semester to learn a variety of fundamental laboratory procedures, including record keeping, pharmacological calculations, experimental design, set-up and conduct of assays, data analysis and research presentation.

**Term Offered:** Spring, Summer, Fall

### PHCL 3700 Pharmacology I: Principles of Pharmacology, Autonomic Pharmacology and Related Pharmacology

[3 credit hours]

An introduction to the principles of pharmacology and the pharmacology of the autonomic nervous system."

**Term Offered:** Fall

### PHCL 3720 PHARMACOLOGY II: ENDOCRINE, NSAID AND CARDIOVASCULAR PHARMACOLOGY

[2 credit hours]

The pharmacology of drugs acting upon the endocrine and reproductive systems will be discussed followed by a discussion of the non-steroidal antiinflammatory agents and the drugs used to treat hypertension and hyperlipidemia.

**Prerequisites:** PHCL 3700 with a minimum grade of C

**Corequisites:** MBC 3320, PHPR 3140

**Term Offered:** Spring

### PHCL 3730 BSPS Pharmacology II: Endocrine and CNS Pharmacology

[3 credit hours]

The pharmacology of drugs acting upon the endocrine and reproductive systems as well as for the management of sleep disorders, anxiety, affective illness, schizophrenia and seizure disorders.

**Prerequisites:** PHCL 3700 with a minimum grade of D-

**Term Offered:** Spring

**PHCL 3810 Pharmacology And Toxicology Laboratory**

[1 credit hour]

The course will teach undergraduate students current methods in pharmacology and toxicology with an emphasis on practical, hands-on experience. Students will learn a variety of techniques commonly used in the pharmaceutical and toxicology industries.

**Prerequisites:** PHCL 3700 with a minimum grade of D-

**Term Offered:** Spring

**PHCL 4160 Biopharmaceutics & Pharmacokinetics**

[3 credit hours]

This course will provide the theoretical basis and clinical application of pharmacokinetics as relates to drug dosing, absorption, distribution, biotransformation, and excretion.

**Term Offered:** Spring

**PHCL 4400 Cannabis Science – Risks & Benefits**

[3 credit hours]

Cannabis Science – Risks and Benefits – delves into the pharmacology, biochemistry, pharmacokinetics, and toxicology of cannabis products.

The course will also cover the neuropsychopharmacology of cannabis and the effects of short term and long term uses of cannabis in the central nervous and peripheral systems.

**Term Offered:** Spring, Fall

**PHCL 4700 Pharmacology III: Cns And Cardiovascular Pharmacology**

[2 credit hours]

The pharmacology of central nervous system active agents. Continues from PHCL 3720. Agents acting on the cardiovascular and renal systems are also discussed.

**Prerequisites:** PHCL 3700 with a minimum grade of C

**Term Offered:** Fall

**PHCL 4720 Pharmacology IV: Chemotherapeutic Agents**

[2 credit hours]

The pharmacology of anti-infective chemotherapeutic agents is presented. Issues such as the mechanism of antimicrobial action, disposition, resistance and problems attending the use of antimicrobial drugs will be discussed.

**Prerequisites:** (PHCL 3700 with a minimum grade of C and MBC 3800 with a minimum grade of C)

**Term Offered:** Spring

**PHCL 4730 Toxicology I**

[3 credit hours]

A synopsis of the basic elements of toxicology including dose-response, lethal dose-50, margin of safety, mechanisms of toxicity and nature of toxic injuries including mutagenesis, carcinogenesis, reproduction, and systemic toxicology. The toxicities of heavy metals and pesticides are also discussed.

**Corequisites:** PHCL 3700

**Term Offered:** Fall

**PHCL 4750 Toxicology II**

[3 credit hours]

This course provides the students with an overview of environmental toxicology, which emphasizes both air and water pollution. It also reviews the applications of different areas of toxicology, such as food toxicology emphasizing the safety standards of food and methods of evaluation of food safety, analytic toxicology and its applications in forensic toxicology and occupational toxicology. It also discusses general methods for toxicity evaluation.

**Prerequisites:** PHCL 3700 with a minimum grade of D-

**Term Offered:** Spring

**PHCL 4760 Toxicokinetics**

[3 credit hours]

The theory and practice of using kinetic principles to model the time course of toxic chemicals in the body and in the environment. Relation of the chemical time course to negative outcomes and application to risk assessment. Hands-on practice with kinetic analysis methods and software.

**Term Offered:** Summer, Fall

**PHCL 4780 Internship in Pharmacology/Toxicology**

[6-12 credit hours]

In this experiential course, students will acquire practical knowledge through hands-on experience in the area of Pharmacology and / or Toxicology by working at an academic, private, or governmental laboratory or a professional site.

**Prerequisites:** (PHCL 3730 with a minimum grade of D- and PHCL 3810 with a minimum grade of D- and MBC 3320 with a minimum grade of D- and MBC 3560 with a minimum grade of D-)

**Term Offered:** Spring, Summer, Fall

**PHCL 4810 BSPS Pharmacology III: CNS and Cardiovascular Pharmacology**

[3 credit hours]

The pharmacology of central nervous system active agents and agents acting on the cardiovascular and renal systems.

**Prerequisites:** PHCL 3730 with a minimum grade of D-

**Term Offered:** Fall

**PHCL 4820 BSPS Pharmacology IV: Chemotherapeutic Agents**

[3 credit hours]

The pharmacology of anti-infective chemotherapeutic agents including their mechanism of antimicrobial action, disposition, resistance and issues related to use.

**Prerequisites:** PHCL 4810 with a minimum grade of D-

**Term Offered:** Spring

**PHCL 4900 Honors Seminar In Pharmacology**

[1-3 credit hours]

To examine a specific question in the context of the primary literature in pharmacology and be able to present that in a seminar

**Term Offered:** Spring, Summer, Fall

**PHCL 4910 Problems In Pharmacology**

[1-3 credit hours]

An examination of a specific question in pharmacology which can be answered through application of experimental work.

**Term Offered:** Spring, Summer, Fall

**PHCL 4960 Honors Thesis In Pharmacology**

[2-5 credit hours]

An examination of a specific question in pharmacology which can be answered through application of experimental work, and a presentation in a thesis format.

**Term Offered:** Spring, Summer, Fall