

# INTRODUCTORY PHARMACY EXPERIENCE

## PHA. PHARMACY

### PHA-395-396, 495-496, 595-596. INDEPENDENT STUDY

**Credits:** 1-6

Independent study and research for advanced students in the field of the major under the direction of a faculty member.

#### Pre-Requisites

Approval of the department chairperson.

### PHA-421, 423, 425, 426, 428, 430, 521, 523, 525, 526, 528 & 530 PHARMACOTHERAPEUTIC MODULES

**Credits:** 2 - 4

A four-semester, twelve-module sequence (three modules per semester) that integrates pharmacology, medicinal chemistry, pathophysiology, and pharmacotherapy. This team-taught, interdisciplinary course provides students with the opportunity to learn and apply concepts from these four disciplines.

#### Pre-Requisites

\*PHA 423 is prerequisite to PHA 425-530.

### PHA-301. & PHA 304 FOUNDATIONS OF PHARMACY PRACTICE

**Credits:** 2

The purpose of this two-semester course is to provide the student with the foundational knowledge, skills and attitudes needed to practice pharmacy in the 21ST century. In particular, this course will focus on skills (communication, teamwork), attitudes and other content relevant to the practice of pharmacy. The school's team-focused approach to learning is emphasized throughout. This course fulfills experiential requirements and so students will have the opportunity to interact with pharmacists and patients.

#### Pre-Requisites

P-I standing.

### PHA-308. PHARMACEUTICAL AND HEALTH CARE DELIVERY

**Credits:** 3

Examination of health and pharmaceutical delivery in the U.S. conducted from a societal perspective. Emphasis is on public policy, economic behavior and outcomes. Application will be made to various pharmaceutical sectors (e.g., retail, health systems, manufacturing). Students should gain an understanding of the factors driving transformation of health care delivery and the implications for future pharmacy practice. Lecture: three hours per week.

#### Pre-Requisites

P-I standing or consent of the instructor.

### PHA-310. CLINICAL RESEARCH AND DESIGN

**Credits:** 3

In order to apply current research to patient care activities, one must first develop the skills to interpret studies. The purpose of this course is to learn how research studies are designed to answer specific clinical questions, and how the study design is important in interpreting the results of the studies. Students will apply research design concepts and statistical techniques to design, critically analyze, and interpret preclinical, clinical, and economic studies of pharmaceuticals and treatment plans. Lecture: three hours per week.

#### Pre-Requisites

[[MTH-150]] or equivalent and P-1 standing or consent of the instructor.

### PHA-311. & PHA 312 PHARMACEUTICS I & II

**Credits:** 4

The study and application of physical chemical principles that are necessary for the design, development and preparation of pharmaceutical dosage forms. The study of quantitative skills necessary for an understanding of the basic and clinical pharmaceutical sciences, including skills in pharmaceutical calculations and extemporaneous preparation of dosage forms. Lecture: three hours per week. Laboratory and Recitation: three hours per week.

#### Pre-Requisites

P-1 standing or consent of the instructor. [[PHA-311]] is a prerequisite for [[PHA-312]].

### PHA-313. PHARMACY CALCULATIONS

**Credits:** 1

The common mathematical processes that a pharmacist may encounter in professional practice are covered. Interpretation of the prescription, including Latin abbreviations, will be discussed. Medical terminology and the generic name, trade name, manufacturer, and classification of the top 100 drugs will also be presented. Lecture one hour per week.

#### Pre-Requisites

P-1 standing or permission of the instructor.

### PHA-327. MEDICAL MICROBIOLOGY

**Credits:** 3

An overview of microbiology with special emphasis on pathogenic microbiology. Lecture: three hours per week.

#### Pre-Requisites

P-1 standing or consent of the instructor.

### PHA-331. & PHA 332 MEDICAL ANATOMY AND PHYSIOLOGY I & II

**Credits:** 4

**Terms Offered:** On Demand

In-depth principles of human anatomy and physiology as well as an introduction to pathophysiology will be presented. Lecture: Two hours per week. Recitation and Lab: two hours per week.

#### Pre-Requisites

P-1 standing or consent of the instructor.

This course is restricted to enrolled Pharmacy students. Consideration may be given to non-pharmacy students with overall GPAs of 3.0 or greater, if there is room in the lecture and lab sessions, and with instructor approval. NOTE: [[PHA-331]] is a prerequisite for [[PHA-332]].

## Introductory Pharmacy Experience

### PHA-335. INTRODUCTORY PHARMACY PRACTICE EXPERIENCE I

**Credits:** 2

This course will provide introductory practice experience to students in the community setting. The course fosters the development of professionalism in an environment of practical application of knowledge, skills, and attitudes. Students will be faced with a variety of issues practical to community pharmacy. The student will take an independent learning approach under the supervision of a practicing community pharmacist. The course is two full-time weeks (80 hours) of experience.

#### Pre-Requisites

Successful completion of all required courses in the P-1 year, or permission of instructor.

### PHA-365. MEDICAL BIOCHEMISTRY

**Credits:** 4

Introduction to basic biochemistry concepts, focusing on the structure and function of vitamins, proteins, and lipids as well as bioenergetics and major catabolic pathways. The catabolism of carbohydrates, fats and amino acids will be discussed including reactions and regulation. Common metabolic pathways of drugs, enzyme induction and metabolism down regulation will also be presented. Lecture: Four hours per week. Cross-listed with [[CHM-365]], [[BEGR-465]].

#### Pre-Requisites

P-1 standing or consent of instructor.

### PHA-405. PHARMACEUTICAL CARE SYSTEMS: DESIGN AND CONTROL

**Credits:** 2

Examines delivery of pharmaceutical products and services from a systems perspective in a variety of patient care settings. Focus is upon effectiveness, efficiency, and quality. Covers design of systems, establishment and monitoring of key indicators, total quality management and quality assurance agencies (e.g., JCAHO, NCQA). Lecture: two hours per week.

### PHA-410. IMMUNOLOGY AND BIOTECHNOLOGY

**Credits:** 3

A discussion of nonspecific host defense mechanisms and a detailed description of specific immunity. Products that impart artificial active and passive immunity are presented. The concept of biotechnology is discussed together with the currently available products of genetic engineering that relate to immunology. The various immunological disorders and the immunology of cancer and HIV are discussed. Lecture: three hours per week.

#### Pre-Requisites

[[PHA-331]], [[PHA-332]], [[PHA-365]] or consent of the instructor.

### PHA-411. BIOPHARMACEUTICS AND CLINICAL PHARMACOKINETICS

**Credits:** 3

The fundamentals of biopharmaceutics and pharmacokinetics are presented. The physical and chemical properties of the drug, dosage form, route of administration, patient characteristics, and disease state will be related to the absorption, distribution, metabolism, and elimination in the body. Students will become familiar with calculations for individual drugs to determine regimens that optimize the safety and effectiveness of medications for individual patients. Lecture: three hours per week.

#### Pre-Requisites

[[PHA-311]], [[PHA-312]], or consent of the instructor.

### PHA-412. MANAGEMENT OF PHARMACY OPERATIONS

**Credits:** 3

The principles of management, including personnel and financial management, will be covered as they apply to management of pharmacy operations in a variety of settings (e.g., community, health system, managed care). Lecture: three hours per week.

#### Pre-Requisites

[[PHA-308]] or consent of the instructor.

### PHA-421. PHARMACOTHERAPEUTICS I: PRINCIPLES OF PHARMACOLOGY & MEDICINAL CHEMISTRY

**Credits:** 2

This course is the 1<sup>st</sup> of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This particular course will emphasize the most fundamental concepts central to drug therapy. A major emphasis will be placed on the interactions of drugs with their cellular targets in the human body, and the chemical properties of drugs that dictate their biological activity.

#### Pre-Requisites

[[PHA-310]], [[PHA-327]], [[PHA-331]], [[PHA-332]] and [[PHA-365]].

### PHA-423. PHARMACOTHERAPEUTICS II: PRINCIPLES OF PHARMACOTHERAPEUTICS

**Credits:** 2

This course is the 2<sup>nd</sup> of a twelve module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for understanding Pharmacotherapeutics principles.

#### Pre-Requisites

[[PHA-421]].

### PHA-425. PHARMACOTHERAPEUTICS III: SELF-CARE AND DERMATOLOGY\*

**Credits:** 3

**Terms Offered:** Winter

This course is the 3<sup>rd</sup> of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of dermatological disorders and self-care issues.

#### Co-Requisites

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]].

**PHA-426. PHARMACOTHERAPEUTICS IV: GASTROINTESTINAL DISORDERS\*****Credits: 2**

This course is the 6th of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of gastrointestinal diseases.

**Pre-Requisites**

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]].

**PHA-428. PHARMACOTHERAPEUTICS V: INFECTIOUS DISEASES\*****Credits: 4**

This course is the 4th of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of infectious diseases.

**Pre-Requisites**

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]].

**PHA-430. JOINT, AUTOIMMUNE AND MUSCULOSKELETAL DISORDERS****Credits: 2**

This course is the 5th of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of joint autoimmune and musculoskeletal diseases.

**Pre-Requisites**

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]].

**PHA-435. PHARMACOGENOMICS****Credits: 2**

Students will learn to understand how human genetics and genomics can be used to provide optimized drug therapy and patient care. Learning about this emerging field will enable students to better understand and manage new genomics-based diagnostic tools and make personalized treatment choices. Students will also spend time discussing societal and ethical implications of genetic testing and the resultant individualization of drug therapy, explain basic principles of human genetics and heredity, and more. Requirement: P-3 standing.

**Pre-Requisites**

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]].

**PHA-440. INTRODUCTORY PHARMACY PRACTICE EXPERIENCE II****Credits: 1**

This course will provide introductory practice experience to students in two health care settings: prescriber's clinics and a clinical pharmacy site. Students will have an independent approach to learning and gain a broader understanding of these settings and the role that pharmacists may play.

**Pre-Requisites**

Requirement: successful completion of all required courses in the P1 year, or permission of instructor.

**PHA-445. INTRODUCTORY PHARMACY PRACTICE EXPERIENCE III****Credits: 2**

This course will provide introductory practice experience to students in the health-system setting. The course fosters the development of professionalism in an environment of practical application of knowledge, skills, and attitudes. Students will be faced with a variety of issues practical to this area of practice. The student will take an independent learning approach under the supervision of a practicing community pharmacist.

The course is two full-time weeks (80 hours) of experience.

**Pre-Requisites**

Requirement: Successful completion of all required courses in P-2 year, or permission of instructor.

**PHA-450. NEUROPHARMACOLOGY OF DRUGS OF ABUSE****Credits: 3**

In-depth analysis of drugs of abuse, including pharmacokinetics, pharmacodynamics, tolerance, sensitization, physical dependence, and effects of drug use during pregnancy. Drug testing and substance abuse treatment strategies will also be discussed. Lecture: three hours.

**Pre-Requisites**

[[PHA-421]] or consent of the instructor.

**PHA-452. EXTEMPORANEOUS COMPOUNDING****Credits: 3**

Students will achieve basic and advanced skills in compounding pharmaceutical dosage forms for individualized patient therapy to replace a lack of commercially available products, and enhance therapeutic problem-solving between the pharmacist and physician to enhance patient compliance. Students will work independently on research assignments and compounding preparations. Lecture: one hour per week. Lab six hours per week.

**Pre-Requisites**

[[PHA-311]] and [[PHA-312]] and consent of the instructor.

## Introductory Pharmacy Experience

### **PHA-456. CONCEPTS IN PRIMARY CARE**

**Credits:** 2

The course is designed to allow students to explore and develop advanced knowledge and skills related to diseases and medications commonly encountered in a primary care environment. This course will be of value to pharmacy students seeking careers in ambulatory care pharmacy practice, community pharmacy, long-term care and population health management. Topics are presented in a case-based discussion format that includes multiple diseases and medications and through student-led mini topic discussions.

#### **Pre-Requisites**

[[PHA-311]] and [[PHA-312]]

### **PHA-488. ASPECTS OF CARING FOR THE PAIN PATIENT**

**Credits:** 2

This course is an interactive and interprofessional approach to the assessment and management of pain. Various teaching and learning strategies will allow students to develop and appreciate the understanding of the social, psychological, physical, spiritual and ethical implications of pain.

#### **Pre-Requisites**

[[PHA-331]], [[PHA-332]] and [[PHA-421]], P3 standing or consent of instructor.

### **PHA-503. AND PHA 504 LONGITUDINAL CARE LAB I & II**

**Credits:** 1

Students will follow a patient or patients over an extended period of time in a medical or home setting. Pharmaceutical knowledge and skills will be applied in communications, health assessment, monitoring or pharmacotherapy, evaluation of both humanistic and clinical outcomes. Issues of health care, cost access, and quality as revealed through each patient's interaction with health and pharmaceutical care systems will be addressed. Three hours per week. Students are responsible for transportation to and from all off-campus experiential sites.

#### **Pre-Requisites**

[[PHA-503]] is the prerequisite for [[PHA-504]].

### **PHA-505. PHARMACY LAW**

**Credits:** 2

**Terms Offered:** Fall

The study of federal and state statutes, regulations and court decisions which control the practice of pharmacy and drug distribution. Civil liability in pharmacy practice and elements of business and contract law will be covered. Lecture: two hours per week.

### **PHA-509. ECONOMIC EVALUATION OF PHARMACEUTICAL PRODUCTS AND SERVICES**

**Credits:** 3

Introduction to commonly used economic evaluation methods (e.g., cost-minimization, cost-utility, cost-benefit, cost-effectiveness) as applied to pharmaceutical products and services. Quality of life and outcomes research will also be explored. Emphasis is on understanding evaluation methods and research design and interpreting the relevant literature for practice applications. Lecture: three hours per week.

#### **Pre-Requisites**

[[PHA-308]] and [[PHA-310]] or consent of the instructor.

### **PHA-510. GENERAL MEDICINE ADVANCED PHARMACY PRACTICE EXPERIENCE**

**Credits:** 5-6

Integration of the basic pharmacy related concepts to the delivery of pharmaceutical care in general medicine practice. Clinical practice: 40 hours per week for a total of five to six weeks.

#### **Pre-Requisites**

Successful completion of P1-P3 curriculum in full.

### **PHA-511. AMBULATORY CARE ADVANCED PHARMACY PRACTICE EXPERIENCE**

**Credits:** 5-6

Integration of the basic pharmacy related concepts to the delivery of pharmaceutical care in ambulatory care settings. Clinical practice: 40 hours per week for a total of five to six weeks.

#### **Pre-Requisites**

Successful completion of P1-P3 curriculum in full.

### **PHA-512. COMMUNITY ADVANCED PHARMACY PRACTICE EXPERIENCE**

**Credits:** 5-6

Integration of the basic pharmacy related concepts to the delivery of pharmaceutical care in community practice settings. Clinical practice: 40 hours per week for a total of five to six weeks.

#### **Pre-Requisites**

Successful completion of P1-P3 curriculum in full.

### **PHA-513. HEALTH SYSTEM ADVANCED PHARMACY PRACTICE EXPERIENCE**

**Credits:** 5-6

Integration of the advanced pharmacy related concepts to the delivery of pharmaceutical care in the health system setting. Clinical practice: 40 hours per week for five to six weeks.

#### **Pre-Requisites**

Successful completion of P1-P3 curriculum in full.

### **PHA-521. PHARMACOTHERAPEUTICS VII: PULMONARY DISORDERS\***

**Credits:** 2

This course is the 7th of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of pulmonary diseases.

#### **Pre-Requisites**

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]].

**PHA-523. PHARMACOTHERAPEUTICS VIII: CARDIOVASCULAR DISORDERS\*****Credits:** 4

This course is the 8th of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of cardiovascular diseases.

**Pre-Requisites**

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]].

**PHA-525. PHARMACOTHERAPEUTICS IX: RENAL DISORDERS\*****Credits:** 2

This course is the 9th of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of renal diseases.

**Pre-Requisites**

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]].

**PHA-526. PHARMACOTHERAPEUTICS X: ENDOCRINE DISORDERS & WOMEN'S/MEN'S HEALTH ISSUES\*****Credits:** 3

This course is the 10th of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of endocrine diseases.

**Pre-Requisites**

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]].

**PHA-528. PHARMACOTHERAPEUTICS XI: NEOPLASTIC DISEASES\*****Credits:** 2

This course is the 11th of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of neoplastic diseases.

**Pre-Requisites**

\*[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]]

**PHA-530. PHARMACOTHERAPEUTICS XII: CENTRAL NERVOUS SYSTEM DISORDERS\*****Credits:** 4

This course is the 12th of a twelve-module sequence that will integrate pharmacology, medicinal chemistry, pathophysiology and therapeutics. This team taught course is designed to provide students with an opportunity to learn, observe and apply concepts of these four content areas in an integrated manner. Concepts in each of these content areas will be emphasized to provide the necessary information for pharmaceutical management of CNS and mental health disorders.

**Pre-Requisites**

[[PHA-423]] is prerequisite to [[PHA-425]] - [[PHA-530]]

**PHA-532. INTEGRATIVE MEDICINE AND NUTRITION****Credits:** 3

The purpose of the Alternative Medicine and Nutrition course is to help students learn to integrate nonconventional treatments (natural medicines, manipulation therapy, acupuncture, etc.) into traditional treatment strategies. Additionally, students will learn about nutrition support practices, including enteral and parenteral care.

**Pre-Requisites**

[[PHA-331]], [[PHA-332]], [[PHA-365]] or consent of the instructor.

**PHA-534. INTRODUCTION TO HOSPITAL PHARMACY PRACTICE****Credits:** 2

This course introduces students to the practice of pharmacy within a hospital setting. Topics discussed include the accreditation process for hospitals, career options and residency or fellowship training, medication formulary management, automation and technology in hospital pharmacies, medication calculations, medication safety, clinical pharmacy practice, and sterile product preparation.

**PHA-536. PRINCIPLES OF ADVANCED COMMUNITY PHARMACY MANAGEMENT****Credits:** 2

This course is designed to provide a foundation for students interested in pursuing the development and implementation of advanced clinical programs in a community pharmacy. The student will be introduced to principles in pharmacy and fiscal management, professional development, and the management and legal issues relating to clinical pharmacy services. Didactic and active learning techniques will be employed throughout the course and the student will be required to develop a business plan. Lecture two hours per week.

**Pre-Requisites**

P-2 or P-3 standing or consent of the instructor.

**PHA-538. PEDIATRIC PHARMACOTHERAPY****Credits:** 2

This course is designed to expand the students current knowledge base regarding the pediatric population and to introduce the core concepts involved in the care of this special population. The course prepares students to identify and address drug-related problems in pediatric patients and to demonstrate competency within those areas. This will be accomplished by completion of case scenarios, actual patient presentations, and a take-home examination. An on-site visit to the Children's Hospital of Philadelphia (CHOP) is required. Lecture two hours per week.

**Pre-Requisites**

P-2 or P-3 standing

## Introductory Pharmacy Experience

### **PHA-540. COMPREHENSIVE DIABETES MANAGEMENT**

**Credits:** 3

**Terms Offered:** Spring

This course provides a multidisciplinary foundation for health professionals in the principles of diabetes management. Students who successfully complete the course will have knowledge and the basic skill set that is needed to begin practicing diabetes management. The majority of this course is independent self-study of online lectures, but there are mandatory on-campus discussions and exams.

#### **Pre-Requisites**

Requirement: P-2 or P-3 standing.

### **PHA-544. MANAGED CARE PHARMACY**

**Credits:** 2

**Terms Offered:** Spring

This elective is intended to help future pharmacists interested in any area of practice better understand the clinical and business decision-making processes of the health care system. The elective will introduce and reinforce the concepts of population health and value, explore tools available to limit healthcare spending, and discuss unique ways pharmacists can be involved in improving patient care. This course will be offered during the spring semester each year.

#### **Pre-Requisites**

P2 or P3 standing.

### **PHA-552. PRINCIPLES OF BIOORGANIC AND MEDICINAL CHEMISTRY**

**Credits:** 3

This will be an introductory course, the aims of which are to provide the principles of bioorganic and medical chemistry, including an understanding of drug structure-activity relationships, prediction of the physicochemical properties of a drug, basic knowledge of the major pathways of drug metabolism, and factors that can contribute to drug-drug interactions.

#### **Pre-Requisites**

[[CHM-231]], [[CHM-232]], [[PHA-327]], [[PHA-365]].

### **PHA-555. INTRODUCTORY PHARMACY PRACTICE EXPERIENCE IV**

**Credits:** 1-half

This course will provide introductory practice experience to students in the clinical telepharmacy setting. Students will gain a broader understanding of this setting and the role that pharmacists may play. Requirement: successful completion of all required courses in the P3 year, or permission of instructor.

#### **Pre-Requisites**

P-3 standing.

### **PHA-556. ROLE OF PHYTOCHEMICALS ON HEALTH AND DISEASE**

**Credits:** 2

Students will learn the basic concepts and classification of phytochemicals present in our daily diet, followed by the study of specific phytochemicals and their relation to human health and disease. Basic mechanisms and pathways through which phytochemicals act and alter will be discussed.

Students will have an opportunity to gain an in-depth understanding of a specific phytochemical of their choice or any other phytochemical designated by the instructor through a research review paper and an in-class presentation.

#### **Pre-Requisites**

P-3 standing.

### **PHA-558. PRINCIPLES OF TOXICOLOGY: FROM BEAKER TO BEDSIDE**

**Credits:** 2

This toxicology elective is designed to provide the student with introductory knowledge of the molecular mechanisms of action and clinical management of poisons. The course will begin with introductory concepts such as history, mechanisms of cell injury and toxicant disposition. The student will then be exposed to the fundamental principles of managing an acutely poisoned patient. Toxicology lectures on each major organ system will prepare students for group presentations. The aims of student presentations will be to achieve a greater understanding of the clinical management of the poisoned patient, and to hone presentation skills. To the extent that is feasible, the course will involve lectures, or other learning experiences, led by external specialists.

The scope of poisons that will be discussed is broad, and includes environmental toxins, industrial toxicants, and drugs. Specific agents will include heavy metals, volatile solvents, common plant toxins, rodenticides, and several drugs. Students may be expected to participate in one laboratory exercise, wherein they will learn a fundamental method to characterize the mechanism and/or extent of cell death induced by a toxicant.

#### **Pre-Requisites**

P-2 or P-3 standing or permission of the instructor.

### **PHA-560. INTRODUCTORY PHARMACY PRACTICE EXPERIENCE V**

**Credits:** 1-half

The Self-Directed Introductory Pharmacy Practice Experience (SD-IPPE) course is designed to expose students to various service-learning opportunities throughout their P1 through P3 years. This experience consists of 3 components: participation in and development of service-learning projects, reflection, and self-directed learning. Students may develop their own experiences or participate in opportunities offered by the School or professional organizations.

Requirements for service-learning hours will increase as the student progresses through the curriculum. Each student must complete a minimum of 2, 8, and 10 hours during the P1, P2, and P3 years, respectively (total 20 hours). Additional details are provided in the SDIPPE syllabus conveniently posted in E\*Value.

**PHA-599. A, B, AND C ELECTIVE ADVANCED PHARMACY  
PRACTICE EXPERIENCE ROTATIONS**

**Credits:** 5-6

**Terms Offered:** Fall

Advanced pharmacy practice experience involved in different aspects of pharmaceutical care. (Courses to be determined.) Clinical practice 40 hours per week for a total of five weeks.

**Pre-Requisites**

Successful completion P-1 - P-3 curriculum in full.