PHARMACY

Interim Dean: Shelli Holt-Macey

Associate Deans: Dr. Jennifer Malinowski, Dr. Julie Olenak
Chairperson, Department of Pharmacy Practice: Dr. Judith DeLuca
Chairperson, Department of Pharmaceutical Sciences: Dr. Marie Roke-Thomas
Interim Director of Experiential Programs: Dr Kristina Powers

Faculty

Professors: Bolesta, DeLuca, Olenak
Associate Professors: J. Ference, K. Ference, Franko, Malinowski, Manning, McManus, Pezzino, Roke-Thomas, Trombetta, VanWert
Assistant Professors: Gruver, Kieck, Lewis, Mahato, Nguyen, Patel, Tucker, Warunek
Instructors: Holt-Macey, Powers
Professor Emeritus: Kibbe, Witczak
Dean Emeritus: Graham

The School of Pharmacy offers a program of professional study leading to the Doctor of Pharmacy (Pharm.D.) degree. The purpose of the program is to prepare graduates for a successful, lifelong career providing contemporary, patient-centered care in a variety of healthcare settings.

The U.S. healthcare system continues to undergo rapid change. The role of pharmacists and medication therapy in the healthcare system is evolving. We strive to prepare graduates who have the knowledge and skills to engage in innovative practice today and the desire for lifelong learning that will prepare them for what comes in the future.

We instill a strong foundation of knowledge in the basic sciences (e.g., pharmaceutics, pharmacology, medicinal chemistry, anatomy and physiology), clinical sciences (e.g., therapeutics, pharmacokinetics, pathophysiology), and social sciences (e.g., psychology, sociology, economics, health, policy, management) while honing the skills that are needed to provide optimal care for patients (e.g., physical assessment, patient counseling, clinical decision-making).

Our vision is to develop meaningful interprofessional education (IPE) activities where all students participate in both experiential and didactic settings. Through IPE, students understand the roles and responsibilities of health care professionals that are essential to patient care, gain first-hand experience in interdisciplinary collaboration, and develop their own individual professional identity as part of a larger team. These competencies are designed so that graduating students are trained to work as a team in optimizing patient health and outcomes. The goal of the IPE curriculum is to provide students with a set of skills and attitudes necessary to practice in an interprofessional environment.

While knowledge and skills are essential, we also ensure that our students develop as responsible citizens with highly professional demeanors who advocate, serve, care, and lead.

Our Mission

Our mission is to develop pharmacists who will provide high quality health care and to make meaningful contributions to the science and practice of pharmacy.

Our Vision

We will be recognized as an exceptional pharmacy program through innovative education, contemporary practice, and valuable scientific contributions.

Our Values

Teamwork, Professionalism, Lifelong Learning, Cultural Competency, Personalized Attention, Community Engagement

Accreditation

Wilkes University's Doctor of Pharmacy program is accredited by the Accreditation Council for Pharmacy Education, 190 South LaSalle Street, Suite 2850, Chicago, IL 60603-3410; 312-664-3575; FAX 312-228-2631; www.acpe-accredit.org.

Professional Program

The Professional Program is four years and leads to the Doctor of Pharmacy (Pharm.D.) degree after successful completion of a pre-professional program typically completed in two years. Graduates of the program are eligible for state examination to become

licensed pharmacists. The four years of education consist of three years of mostly in-class (i.e., lecture, laboratory, discussion group) and one full year of experiential education.

Professional Standards

Students enrolled in the program of the School of Pharmacy are expected to endorse professional standards by subscribing to the Oath of the Pharmacist. Students are also expected to abide by the American Pharmacists Association's Code of Ethics of the Profession.

Technical Standards

Students applying to and enrolling in the School of Pharmacy are expected to read, acknowledge, and understand the Technical Standards. These Technical Standards describe non-academic abilities that are required for admission to, continuation in, and graduation from the School of Pharmacy to obtain a Pharm.D. degree.

A candidate must have abilities and skills in the following five areas: 1) observational skills; 2) communication skills; 3) motor skills; 4) intellectual, conceptual, integrative, and quantitative skills; and 5) behavioral and social skills. Detailed descriptions of the Technical Standards are provided in the School of Pharmacy Application or by contacting the School of Pharmacy Dean's office.

The School of Pharmacy is committed to helping students with disabilities complete the course of study leading to the Doctor of Pharmacy degree by reasonable means or accommodations. Candidates with documented disabilities, in accordance with Wilkes University policy, and as defined by section 504 of 1973 Vocational Rehabilitation Act and the Americans with Disabilities Act of 1993, who may seek accommodations in order to meet the technical standards are encouraged to contact University College to discuss what reasonable accommodations, if any, the School of Pharmacy could make in order for the candidate to meet the standards.

The technical standards set forth by the School of Pharmacy are available at: https://www.wilkes.edu/academics/colleges/nesbitt-school-of-pharmacy/program-information/pre-pharmacy-guaranteed-seat-program/technical-standards.aspx

Progression Requirements

All students in the Professional Program of the School of Pharmacy are required to meet minimum standards for progression. Academic progression requirements include a minimum semester and cumulative pharmacy GPA of 2.0. In addition, no student shall be allowed more than 3 course grades less than 2.0 grades in required professional courses both inside and outside of the school. Any course with a grade of 0.0 must be repeated. At the end of each semester, the progress of each student in the Professional Program will be reviewed. Students who fail to meet academic progression requirements in the professional program are placed on academic probation by the Committee on Progression. In more severe cases, students may be suspended or dismissed. The Associate Dean of Academic Affairs of the Nesbitt School of Pharmacy notifies in writing such action to the student. Students should refer to the most recent version of the Nesbitt School of Pharmacy Student Handbook for more details.

More inclusive policies, including, but not limited to, Technical Standards, acceptable classroom and experiential site behavior, alcohol and substance abuse, and other issues impacting the image of the professional program and the student, adopted within these guidelines are distributed annually to all students in the Nesbitt School of Pharmacy Student Handbook. Advanced Pharmacy Practice Experiences (APPE) progression is described in the APPE Course Manual.

The Nesbitt School of Pharmacy (NSoP) does not replace grades for courses in which a 2.0 or higher passing grade has been earned. If the first time taking a course results in a passing grade of 2.0 or higher, this grade will be used to calculate prerequisite and overall GPA for all purposes in the NSoP This policy applies to the pre-professional and professional programs.

Experiential Curriculum Component

Experiential learning is a critical component of the curriculum at Wilkes. Before being placed in an experiential setting, all students are required to:

- possess an active Pennsylvania Pharmacy Intern License;
- possess professional liability insurance,
- have documentation of immunizations,
- pass a physical examination,
- be certified in Basic Cardiac Life Support (healthcare provider with live component) and Basic First Aid,
- have criminal background checks complete and clear, per site requirements, by an approved provider; and
- complete and clear other site-specific requirements, such as FBI fingerprint check, PA child abuse background check, drug screen, TB testing, etc.
- complete HIPAA and OSHA training
- maintain personal health insurance

These criteria are fully described throughout the curriculum, including deadlines and ramifications of non-compliance.

The Introductory Pharmacy Practice Experience (IPPE) consists of a number of different experiences. During the summer following successful completion of the P-1 year, students will complete a 2-week (80 hours) Introductory Pharmacy Practice Experience (IPPE I). The second professional year (the P-2 year) includes 40 hours of IPPE II during the fall and/or spring semester. In addition, students will complete a 2-week (80 hours) IPPE III during the summer after the P-2 year. In the third professional year (P-3) of the professional program, the curriculum includes 80 hours of IPPE IV (Clinical Telepharmacy). IPPE V is a self-directed IPPE and consists of 20 hours of independent pharmacy-related, service-oriented learning earned during the P1 through P3 years. IPPE's occur at practice sites and in the community in locations not on campus.

The Advanced Pharmacy Practice Experience (APPE) occurs during the fourth professional year (the P-4 year) of the professional program. Each student will be assigned to 7 rotations (5-6 weeks each) comprising a total of 1440 hours, some of which may be at some distance from the Wilkes-Barre area. As much as possible, The School of Pharmacy will assist in locating safe, affordable housing for APPEs. Since patient care is a continuous activity, some experiences may be conducted outside of regular school/business hours. Note also that APPE start and end dates do not adhere to the regular university calendar. The student is responsible for paying all transportation, site requirement, and housing costs for all experiential components of the curriculum, except where noted.

Graduation, Degree and Licensure Requirements

It is the student's responsibility to meet all graduation requirements, and it is expected that all students accepted into the Pharm.D. Program will meet regularly and frequently with their advisors to ensure timely progress toward their Doctor of Pharmacy degree. Graduation is dependent on successful completion of all required and elective course requirements in the School of Pharmacy (see Progression Requirements) AND completion of all General Education Requirements mandated by Wilkes University.

A student entering the Professional Program with a bachelor's degree from a four-year accredited college or university is exempted from the University's General Education Requirements, but is not exempted from the prerequisite entry requirements prescribed by the School of Pharmacy for entry into the Professional Program.
Students applying with degrees or courses from foreign colleges or universities will be evaluated to ensure significant portions of the General Education Requirements are satisfied. Prerequisite course requirements must still be met.

All non-degreed students entering the Professional Programs are encouraged to complete the General Education Requirements prior to beginning the Professional Curriculum. As mentioned, a student may be deficient in two General Education requirements and be granted admission into the program. Student will receive consultation and documentation from their advisor that these courses must be completed prior to graduation. Students with more than two deficient General Education courses may appeal to the Student Affairs Committee of the School of Pharmacy for consideration. This requirement is in place since there is no room within the professional curriculum, including summers, to complete the courses. As a matter of record, non-degreed students who have successfully completed the second professional year (P-2) in the School of Pharmacy AND completed all General Education Requirements will be awarded a Bachelor of Science in Science degree. The pass-through B.S. degree does not meet eligibility requirements for licensure as a pharmacist; it is only intended to acknowledge the academic achievement of students completing four years of university-level education.

Pharmacy licensure is governed by state law. All states require graduation from an accredited School or College of Pharmacy. Additional requirements for licensure should be requested from the state in which licensure is sought. It is the student's responsibility to fulfill all requirements for the state in which they seek licensure. Students must contact that State Board of Pharmacy for all appropriate paperwork. For further information, please contact the Dean's Office in the School of Pharmacy.

The School of Pharmacy reserves the right to revise the Pharmacy Curriculum at any time in order to prepare students for future practice roles, meet new accreditation requirements and to incorporate innovations in instruction.

DOCTOR OF PHARMACY

Recommended Course Sequence

P-1 Fall Semester

[[PHA-301]]	Found. of Pharm. Practice I	2
[[PHA-308]]	Pharm. and Health Care Delivery	3
[[PHA-311]]	Pharmaceutics I	4
[[PHA-313]]	Pharm. Calculations	1
[[PHA-327]]	Medical Microbiology	3
[[PHA-331]]	Anatomy/ Physiology I	4
Total Credits		**17**

P-1 Spring Semester

[[PHA-302]]	Pharmaceutical Care Lab I	1
[[PHA-304]]	Foundations of Pharm. Practice II	2
[[PHA-310]]	Clinical Research Design	3
[[PHA-312]]	Pharmaceutics II	4
[[PHA-332]]	Anatomy & Physiology II	4
[[PHA-365]]	Medical Biochemistry* or elective	2-4
[[PHA-360]]	Self-Directed IPPE I	0
Total Credits		**16-18**

P-1 Summer

[[PHA-335]]	Intro. Pharmacy Practice Experience I (IPPE I)	2

* [[PHA-365]] may be taken as [[CHM-365]] sophomore year; if successfully completed, 2-3 credit elective may be taken spring P1.

P-2 Fall Semester

[[PHA-401]]	Pharmacy Care Lab II	1
[[PHA-405]]	Pharmaceutical Care Systems	2
[[PHA-411]]	Biopharm/Clinical Kinetics	3
[[PHA-421]]	Pharmacotherapeutics I	2
[[PHA-423]]	Pharmacotherapeutics II	2
[[PHA-425]]	Pharmacotherapeutics III	3
	Elective	2-3
Total Credits		**16-17**

P-2 Spring Semester

[[PHA-402]]	Pharmacy Care Lab III	1
[[PHA-410]]	Biotechnology/ Immunology	3
[[PHA-412]]	Mgt. of Pharm. Operations	3
[[PHA-426]]	Pharmacotherapeutics IV	2
[[PHA-428]]	Pharmacotherapeutics V	4
[[PHA-430]]	Pharmacotherapeutics VI	2
[[PHA-440]]	IPPE II	1
[[PHA-460]]	Self-Directed IPPE II	0
	Elective	2-3
Total Credits		**18-19**

P-2 Summer

[[PHA-445]]	Intro. Pharmacy Practice Experience III (IPPE III)	2

P-3 Fall Semester

[[PHA-501]]	Pharmacy Care Lab IV	1
[[PHA-505]]	Pharmacy Law	2
[[PHA-509]]	Economic Evaluation of Pharm.	3
[[PHA-521]]	Pharmacotherapeutics VII	2

[[PHA-523]]	Pharmacotherapeutics VIII	4
[[PHA-525]]	Pharmacotherapeutics IX	2
	Elective	2-3
Total Credits		**16-17**

P-3 Spring Semester

[[PHA-502]]	Pharmacy Care Lab V	1
[[PHA-526]]	Pharmacotherapeutics X	3
[[PHA-528]]	Pharmacotherapeutics XI	2
[[PHA-530]]	Pharmacotherapeutics XII	3
[[PHA-532]]	Integrative Medicine/Nutrition	2
[[PHA-555]]	IPPE IV	2
[[PHA-560]]	Self-Directed III/ IPPE V	0.5
	Professional Elective	2-3
Total Credits		**15.5-16.5**

P-4 Experiential Year

The APPE portion of the curriculum consists of 7 rotations for a total of 35 credit hours in various settings. Rotation #1 is 6 weeks in duration. Rotations #2-7 are 5 weeks in duration.

There are four required APPE rotations. In addition there are three elective APPE rotations. Information will be provided during the P-3 year.

[[PHA-510]]	General Medicine
[[PHA-511]]	Ambulatory Care
[[PHA-512]]	Community Practice
[[PHA-513]]	Health System
[[PHA-515]]	Naplex Review (this is a course, not a rotation)

PHARMACY..... 9

PHARMACOLOGY AND MEDICINAL CHEMISTRY (M.S.)

Note: the MSPS program will not be offered during the 2022-2023 academic year.

Purpose

The demand for graduate students in the area of pharmaceutical sciences and related fields is expected to rise in the next 10 years and currently there are more than 200 job openings within the state of Pennsylvania in the area of pharmaceutical and biological sciences. The objective of this graduate program is to graduate students with highest level of knowledge and skills that suits the needs of the potential employers. The program is a 2-year research-oriented, thesis-track Master of Science program designed to build a solid foundation of the core knowledge in pharmacological and pharmaceutical sciences, with classical and contemporary topics and hands-on experimental experiences. Students in the program will also be trained to develop a high level of written and oral communication skills. One of the highlights of the program is to foster research techniques and methodology through exposure to a variety of molecular biology, synthetic chemistry and analytical techniques that are most commonly used in the current pharmaceutical and biochemical industry. This will be the first graduate program offered in the Nesbitt School of Pharmacy since its conception more than two decades ago in 1996. This proposed program will offer individualized learning and research experience with high standard to local, national and international students.

Master of Science Program Outcomes

Educational Outcomes for the Master's Degree Program in Pharmacology and Medicinal Chemistry

Goal 1:Develop foundational knowledge required in pharmacology and medicinal chemistry to support higher-level objectives.

1.1. Discuss the U.S. regulatory pathway for development and approval of new molecular entity drugs.

1.2. Discuss the U.S. regulatory pathway for development and approval of generic drugs with bioequivalence, and describe biosimilars.

1.3. Discuss the disposition of drugs in humans, including factors affecting absorption, distribution, metabolism, and elimination.

1.4. Describe the structural and chemical properties of drug molecules pertinent to pharmacokinetics and pharmacodynamics

1.5. Describe the location and function of organelle, cellular, tissue, and organismal macromolecules that are common drug targets

1.6. Describe the therapeutic mechanisms of action of major drug classes at the organellar, cellular, tissue, and organismal level.

1.7. Describe the mechanisms of toxicity of major drug classes at the organellar, cellular, tissue, and organismal level.

1.8. Describe common research techniques and instruments, and identify their appropriate use when presented with a research question.

1.9. Identify and employ appropriate statistical tests to determine significance of biological data.

Goal 2:Develop foundational laboratory skills necessary to address scientific questions.

2.1 Demonstrate competency in executing experiments employing in vitro and in vivo models.

2.2 Demonstrate competency in determining DNA, RNA, and protein identity, quality, and quantity using accepted methodology.

2.3 Demonstrate competency in utilizing small-scale and multi-well format instruments to measure cell death, signaling, and homeostasis.

2.4 Demonstrate competency in using High-Performance or Ultra-High-Performance Liquid Chromatography to identify and quantify analytes of interest from biological and non-biological matrices.

Goal 3:Effectively communicate verbally, visually, and in written format.

3.1 Demonstrate effective writing to express scientific background, hypotheses, research methods, and discoveries.

3.2 Demonstrate effective speaking to express scientific background, hypotheses, research methods, and discoveries.

3.3 Employ appropriate use of audio and visual tools when presenting scientific information to an audience.

3.4 Demonstrate professional verbal and nonverbal communication with scientists and non-scientists.

Goal 4: Practice science with the highest ethical standards.

4.1 When required, limit use of animals in research to the lowest quantity and shortest duration deemed necessary to achieve adequate statistical power, as determined by published standards or power analysis when required.

4.2 Choose the most humane methods for handling animal subjects, abiding by the Guidelines for Care and Use of Laboratory Animals.

4.3 Identify and follow the most ethical methods for reporting scientific findings.

Goal 5:Professional development

5.1 Demonstrate integrity, trustworthiness, flexibility and respect to colleagues and other personnel.

5.2 Display accountability and preparedness consistent with a commitment to excellence.

Admission Requirements

- 1) An online application through Wilkes University.

  2) Undergraduate degrees in biological, chemical, biomedical or closely related discipline. Undergraduate degrees in bioengineering or chemical engineering may also be considered upon admission committee review.

  3) Official undergraduate transcript with a minimum overall GPA of 3.0 or above on a 4.0 scale.

  4) GRE score is not required, but is encouraged for applicants with minimal required undergraduate GPA.

  5) Two letters of reference from scientists or engineers.

  6) International applicants with undergraduate degrees from non-English speaking countries are required to submit TOEFL scores with their applications.

The Curriculum

[[PHS-571]]	Responsible conduct in biomedical research	1 credit	
[[PHS-573]]	Literature Evaluation in Pharmaceutical and Pharmacological Sciences I	1 credit	
[[PHS-575]]	Introduction to Research Study Design and Proposal Writings	1 credit	
[[PHS-577]]	Experimental Methods in Pharmacology and Toxicology	2 credits	
[[PHS-579]]	Principle of Pharmacology Medicinal Chemistry & Fundamentals of Drug Disposition	3 credits and	
[[PHS-581]]	Research Orientation	1 credit	
[[PHS-576]]	Pharmacodynamics and Medicinal Chemistry of Major Drug Classes	3 credits	
[[PHS-552]]	Principles of Bioorganic Medicinal Chemistry	3 credits	
[[PHS-578]]	Research*	3 credits	
[[PHS-572]]	Literature Evaluation in Pharmaceutical and Pharmacological Sciences II	1 credit	
[[PHS-583]]	Thesis I	3 credits	
[[PHS-574]]	Literature Evaluation in Pharmaceutical and Pharmacological Sciences III	1 credit	
[[PHS-584]]	Thesis II	3 credits	
[[BIO-347]]	Biostatistics	3 credits	
Choose 4-5 courses: [[PHA-311]] [[PHA-312]] [[PHA-498]] [[PHA-558]] [[PHA-556]] [[PHS-598]]	Electives (7 credits; 3-4 courses) Pharmaceutics I Pharmaceutics II Introduction to nanomedicine Principles of toxicology Phytochemicals in health/ disease Independent study	 3 credits 3 credits 2 credits 2 credits 2 credits 1-4 credits	

**In addition to the research course, summer students are required to participate in a minimum of eight (8) weeks of summer research activities with their respective primary thesis advisor. Individual student will be paid up to $3000 for the summer experience (paid from program operating budget). This is a mandatory experience and are not counted for credit hours.*

PHARMACOLOGY AND MEDICINAL CHEMISTRY..... 16
PHARMACY..... 9

PHARMACOTHERAPEUTIC MODULES

(PHA 421, 423, 425, 426, 428 430, 521, 523, 525, 526, 528, and 530) - 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

[[PHA-421]] Pharmacotherapeutics I: Principles of Pharmacology & Medicinal Chemistry
Two credits

Prerequisites: [[PHA-310]], [[PHA-327]], [[PHA-331]], [[PHA-332]], and [[PHA-365]] or [[CHM-365]]

Corequisites: [[PHA-401]], [[PHA-423]], [[PHA-425]]

[[PHA-423]] Pharmacotherapeutics II: Principles of Pharmacotherapeutics
Two credits

Prerequisite: [[PHA-310]], [[PHA-327]], [[PHA-331]], [[PHA-332]], and [[PHA-365]] or [[CHM-365]]

Corequisites: [[PHA-401]], [[PHA-421]], [[PHA-425]]

[[PHA-425]] Pharmacotherapeutics III: Self-Care and Dermatology*
Three credits

Pre-Requisites: [[PHA-421]], [[PHA-310]], [[PHA-327]], [[PHA-331]], [[PHA-332]], and [[PHA-365]] or [[CHM-365]]

[[PHA-426]] Pharmacotherapeutics IV: Gastrointestinal Disorders*
Two credits

[[PHA-428]] Pharmacotherapeutics V: Infectious Diseases*
Four credits

[[PHA-430]] Pharmacotherapeutics VI: Hematology, Joint Disorders, Surgery*
Two credits

[[PHA-521]] Pharmacotherapeutics VII: Pulmonary Disorders*
Two credits

[[PHA-523]] Pharmacotherapeutics VIII: Cardiovascular Disorders*
Four credits

[[PHA-525]] Pharmacotherapeutics IX: Renal Disorders*
Two credits

[[PHA-526]] Pharmacotherapeutics X: Endocrine Disorders & Women's Health Issues*
Three credits

[[PHA-528]] Pharmacotherapeutics XI: Neoplastic Diseases*
Two credits

[[PHA-530]] Pharmacotherapeutics XII: Central Nervous System Disorders*
Three credits

* [[PHA-421]] and [[PHA-423]] are prerequisites to PHA 426-530.

PHA. PHARMACY

PHA-360, 460, 560. SELF-DIRECTED INTRODUCTORY PHARMACY PRACTICE EXPERIENCES I, II, III
Credits: 0.5 (PHA 560)

The Self-Directed (SD)-IPPE program is made up of three courses (SD-IPPE I, II, and III) over the span of the P 1 through P3 years. Collectively these courses consist of a total of 20 hours of pharmacy-related, service-oriented learning. 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.

Pre-Requisites

[[PHA-360]] pre-requisite is P1 standing
[[PHA-460]] pre-requisite is P2 standing and [[PHA-360]]
[[PHA-560]] pre-requisite is P3 standing and [[PHA-460]]

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-302, 401, 402, 501 & 502. PHARMACY CARE LAB I - V
Credits: 1 each

This five-semester sequence is designed to develop the student's ability to integrate and apply information as well as practice skills that are taught throughout the curriculum. The use of case studies, role-plays, presentations, and other active-learning strategies engages students in the learning process and requires them to synthesize information at increasing levels of complexity as the student moves through the course sequence. Requirement: P-1, P-2, or P-3 standing, as appropriate for each laboratory.

Pre-Requisites

Pre-requisites:
For [[PHA-401]], pre-requisite is [[PHA-302]]
For [[PHA-402]], pre-requisite is [[PHA-401]]
For [[PHA-501]], pre-requisite is [[PHA-402]]
For [[PHA-502]], pre-requisite is [[PHA-501]]

Co-Requisites

For [[PHA-401]], Co-requisites: [[PHA-421]], [[PHA-423]], and [[PHA-425]]
For [[PHA-402]], Co-requisites: [[PHA-426]], [[PHA-428]], and [[PHA-430]]
For [[PHA-501]], Co-requisites: [[PHA-521]], [[PHA-523]], and [[PHA-525]]
For [[PHA-502]], Co-requisites: [[PHA-526]], [[PHA-528]], and [[PHA-530]]

PHA-301 & 304. FOUNDATIONS OF PHARMACY PRACTICE I AND II
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-311 & 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-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-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

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]].

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

[[CHM-232]] or [[CHM-235]] with a grade of 2.0 or better or permission of the 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

Biopharmaceutics and Clinical Pharmacokinetics is designed to educate pharmacy students in the principles of pharmacokinetics and biopharmaceutics and how they assist in dosage regimen design and therapeutic efficacy evaluations. The impact of the physical and chemical forms nature of the drug and dosage forms will be studied as they relate to the absorption, distribution, metabolism, and elimination. The clinical pharmacokinetics of individual drugs will be examined with emphasis on clinical application based on patient presentations. Case studies, homework, and quizzes will be used to facilitate student learning. This course is roughly divided into two parts. The first is Biopharmaceutics/ Pharmacokinetics and the second is Clinical Pharmacokinetics. Lecture: three hours per week.

Pre-Requisites

P2 standing

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 1st 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]] or [[CHM-365]].

Co-Requisites

[[PHA-401]], [[PHA-423]], [[PHA-425]]

PHA-423. PHARMACOTHERAPEUTICS II: PRINCIPLES OF PHARMACOTHERAPEUTICS
Credits: 2

This course is the 2nd 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-310]], [[PHA-327]], [[PHA-331]], [[PHA-332]], and [[PHA-365]] or [[CHM-365]]

Co-Requisites

[[PHA-401]], [[PHA-421]], [[PHA-425]]

PHA-425. PHARMACOTHERAPEUTICS III: SELF-CARE AND DERMATOLOGY*
Credits: 3
Terms Offered: Fall

This course is the 3rd 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.

Pre-Requisites

[[PHA-310]], [[PHA-327]], [[PHA-331]], [[PHA-332]], and [[PHA-365]] or [[CHM-365]], [[PHA-421]]

Co-Requisites

[[PHA-401]], [[PHA-421]], [[PHA-423]]

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-421]], [[PHA-423]]

Co-Requisites

[[PHA-402]]

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-421]], [[PHA-423]]

Co-Requisites

[[PHA-402]]

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-421]], [[PHA-423]]

Co-Requisites

[[PHA-402]]

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
Terms Offered: Not Currently Offered

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
Terms Offered: Not Currently Offered

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.

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-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-506. CONCEPTS IN INFECTIOUS DISEASE
Credits: 2
Terms Offered: Fall

This course is offered to Fall semester to P3 students and is designed to allow students to explore and develop advanced knowledge and skills related to infectious diseases. This course will be of value to pharmacy students seeking careers in infectious diseases whether it be in ambulatory care pharmacy practice, community pharmacy, long-term care and population health management. Students will be heavily leading the course through presentations, cases and poster presentations. Active learning techniques are used throughout the course to build critical thinking and problem solving skills. Emphasis is placed on the integration of disease states and approaches to practice management. Assignments that engage students in lifelong learning and community engagement are additional features of the course.

Pre-Requisites

P3 standing

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-515. NAPLEX PREPARATION

PHA-521. PHARMACOTHERAPEUTICS VII: PULMONARY DISORDERS*
Credits: 2

This hybrid 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-421]], [[PHA-423]]

Co-Requisites

[[PHA-501]]

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-421]], [[PHA-423]]

Co-Requisites

[[PHA-501]]

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-421]] [[PHA-423]]

Co-Requisites

[[PHA-501]]

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-421]] [[PHA-423]]

Co-Requisites

[[PHA-502]]

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-421]] [[PHA-423]]

Co-Requisites

[[PHA-502]]

PHA-530. PHARMACOTHERAPEUTICS XII: CENTRAL NERVOUS SYSTEM DISORDERS*
Credits: 3

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-421]] [[PHA-423]]

Co-Requisites

[[PHA-502]]

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
Terms Offered: Not Currently Offered

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

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
Terms Offered: Not Currently Offered

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]] or [[CHM-235]], [[CHM-237]]; [[PHA-365]] or [[CHM-365]]

PHA-555. INTRODUCTORY PHARMACY PRACTICE EXPERIENCE IV
Credits: 2
Terms Offered: Spring

The course is designed to provide an introductory practice experience at a P3 level in the areas of Medication Therapy Management (MTM)/clinical telepharmacy and Intergenerational (IG) patient care. The course fosters the development of knowledge, skills, and attitudes needed for pharmacy practice through practical application in telepharmacy patient care and community settings.

Pre-Requisites

Completion of all required courses in P2 year.

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.

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Pre-Requisites

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

PHA-565. PUBLIC HEALTH CAPSTONE PROJECT SEMINAR

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.

PHS. PHARMACOLOGY AND MEDICINAL CHEMISTRY

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

BIO-347. BIOSTATISTICS AND EXPERIMENTAL DESIGN
Credits: 4
Terms Offered: Not Currently Offered

This course reviews the statistical paradigms and techniques involved in analyzing biological phenomena. Frequentist and Bayesian methods are employed when appropriate with an emphasis on applied statistics and experimental design. Laboratory exercises include designing, analyzing, and communicating experiments. Computation and computer coding is employed in laboratory exercises. Offered in alternate years.
Click here for course fee.

Pre-Requisites

[[BIO-225]], [[MTH-150]], or permission of the instructor.

PHS-571. RESPONSIBLE CONDUCT IN BIOMEDICAL RESEARCH
Credits: 1
Terms Offered: Not Currently Offered

This is an introductory course in ethics of science and scientific research. The course is designed to provide a foundation for thinking about and recognizing the ethical dimensions of a variety of issues.

Pre-Requisites

Enrolled in the MS program, or instructor permission

PHS-572. LITERATURE EVALUATION IN PHARMACEUTICAL AND PHARMACOLOGICAL SCIENCES (II)
Credits: 1
Terms Offered: Spring,Not Currently Offered

This course is a traditional scientific journal club. Students will present the background, content, and implications of a paper of their choosing to the audience.

Pre-Requisites

Enrolled in the MSPS program, or instructor permission

PHS-573. LITERATURE EVALUATION IN PHARMACEUTICAL AND PHARMACOLOGICAL SCIENCES (I)
Credits: 1
Terms Offered: Not Currently Offered

This course is a traditional scientific journal club. Students will present the background, content, and implications of a paper of their choosing to the audience.

Pre-Requisites

Enrollment in MSPS or instructor permission.

PHS-574. LITERATURE EVALUATION IN PHARMACEUTICAL AND PHARMACOLOGICAL SCIENCES (III)
Credits: 1
Terms Offered: Not Currently Offered

This course is a traditional scientific journal club. Students will present the background, content, and implications of a paper of their choosing to the audience.

Pre-Requisites

Enrollment in MSPS or instructor permission.

PHS-575. INTRODUCTION TO RESEARCH STUDY DESIGN AND PROPOSAL WRITINGS
Credits: 1
Terms Offered: Not Currently Offered

This is an introductory course in research methods and proposal writing. The course is designed to give students experience in hypothesis and specific aims development and an overview of the use of the scientific study design for solving basic science problems.

Pre-Requisites

Enrolled in the MSPS program, or instructor permission

PHS-576. PHARMACODYNAMICS AND MEDICINAL CHEMISTRY OF MAJOR DRUG CLASSES
Credits: 3
Terms Offered: Not Currently Offered

The objectives of the course is to prepare students with the knowledge of pharmacological agents. The main focus is on the pharmacology of agents used in the treatment of different ailments.

Pre-Requisites

Enrolled in the MSPS program, or instructor permission

PHS-577. EXPERIMENTAL METHODS IN PHARMACOLOGY AND TOXICOLOGY
Credits: 2
Terms Offered: Not Currently Offered

The objective of this course is to introduce students to scientific research tools and techniques that are widely used in the fields of pharmacology and toxicology. Portions of the course will focus on regulatory requirements in drug development.

Pre-Requisites

Enrolled in the MSPS program, or instructor permission

PHS-578. RESEARCH
Credits: 3
Terms Offered: Not Currently Offered

This course targets the developments of students' research skills with specific goals to 1) Provide research experience through participation in supervised research project prior to the thesis, 2) Involve students in doing research early in their master studies, 3) Increase students' research skills.

Pre-Requisites

Enrolled in the MSPS program, or instructor permission

PHS-579. PRINCIPLES OF PHARMACOLOGY AND MEDICINAL CHEMISTRY & FUNDAMENTALS OF DRUG DISPOSITION
Credits: 3
Terms Offered: Not Currently Offered

This course is an introductory course that will integrate pharmacology, medicinal chemistry, and pharmacokinetics fundamentals. This particular course will emphasize the most fundamental concepts central to drug therapy.

Pre-Requisites

Enrolled in the MS program, or instructor permission

PHS-581. RESEARCH ORIENTATION
Credits: 1
Terms Offered: Not Currently Offered

This course orients students to pharmaceutical and pharmacological bench research. Students will spend up to 3 weeks at each participating faculty's research group to gain exposure of the respective research topics.

Pre-Requisites

Enrolled in the MSPS program, or instructor permission

PHS-583. THESIS RESEARCH I
Credits: 3
Terms Offered: Not Currently Offered

All MS students are required to complete a thesis. The thesis should make an original contribution to knowledge in the field of Pharmaceutical and Pharmacological Sciences. There is no predetermined length, but the most theses range between 70 to 100 pages.

Pre-Requisites

Permission from Advisor and Directors of the MSPS program

PHS-584. THESIS RESEARCH II
Credits: 3
Terms Offered: Not Currently Offered

All MS students are required to complete a thesis. The thesis should make an original contribution to knowledge in the field of Pharmaceutical and Pharmacological Sciences. There is no predetermined length, but the most theses range between 70 to 100 pages.

Pre-Requisites

Permission from Advisor and Directors of the MSPS program