Pharmaceutical Sciences Undergraduate Courses – Spring 2020

All courses are available for registration via UAccess. Contact Rebecca Field at rfield@pharmacy.arizona.edu with any registration questions. Interested in the Bachelor of Science in Pharmaceutical Sciences major or minor? Email Rebecca for more information!

Spring 2020 course options include the following. Course details and times can be found below.

1-Unit Electives:
- PCOL 196D - The Joy of Drugs: An Introduction to Pharmaceutical Sciences
- PCOL 396 (001) – Special Topics in Pharmacy: Controversies in Pharmacological Sciences
- PCOL 396 (002) – Special Topics in Pharmacy: Professional Pharmacy Pathways
- PCOL 396 (003) – Special Topics in Pharmacy: The History of Pharmacy

Major/Minor Courses:
- PCOL 300 – Pharmacology of Cosmetics and Self Care Products
- PCOL 305 – Scientific Writing for Health Sciences
- PCOL 310 – Drug Approval: The 3 Billion Dollar Bet
- PCOL 350 – ADME: How the Body Changes Drugs
- PCOL 410 – Integrated Medicinal Chemistry
- PCOL 473 – Pharmacogenomics
- PHCL 460 – Designing Drugs: From Chemistry to Cure

**PCOL 196D – The Joy of Drugs: An Introduction to Pharmaceutical Sciences (1 unit)**

**Wednesdays 1:00 – 1:50 PM**  
Instructor: Jennifer Schnellmann

This seminar will offer students who may be unfamiliar with the breadth and reach of pharmaceutical sciences as a discipline a timely and entertaining overview of this field. Topics will include an introduction to drug discovery and development, drug pricing and advertising, drug dosage forms and delivery vehicles, the science of drug efficacy and toxicity, pharmacokinetics and pharmacodynamics, a review of common drug classes (mechanism of action, indication, side effects), and the most problematic human diseases for which we have no cures (and why!). The series will conclude with hilarious stories about impromptu drug re-purposing when crazy side effects emerged. Taught using plain language and current cultural references, this course proves that you don't have to be a scientist to understand science. Pass/fail course.

**PCOL 396 (001) – Special Topics in Pharmacy: Controversies in Pharmacological Sciences (1 unit)**

**Mondays 12:00 – 12:50 PM**  
Instructor: Jennifer Schnellmann

In this seminar, we will cover the most controversial concepts in pharmacology. Topics include healthcare conscience clauses that allow providers to deny any patient a drug or device, price gouging of needed treatments by the pharmaceutical industry, an exploration of the true meaning of addiction, and medicating others for our benefit, among other highly charged scientific topics.

**PCOL 396 (002) – Special Topics in Pharmacy: Professional Pharmacy Pathways (1 unit)**

**Tuesdays 11:00 – 11:50AM (online)**  
Instructor: Beth Zerr

The purpose of this seminar is to expose undergraduate students to different professional paths and opportunities that are available with a Doctorate of Pharmacy (PharmD) degree. Students will have the opportunity to learn from various professionals working in a multitude of different settings as they present on their career experiences. Students will also have the opportunity to interact with these professionals during structured question and answer sessions. This will be a synchronous online course, meaning that students must participate online during the designated course time. This course will be assessed through class participation and reflection assignments.

**PCOL 396 (003) – Special Topics in Pharmacy: The History of Pharmacy (1 unit)**

**Mondays 3:00 – 3:50 PM**  
Instructors: Richard Vaillancourt & Stephen Hall

Pharmacy is a time-honored profession, dating back to ancient Mesopotamia. This seminar will explore pharmacy’s rich history, and further students’ understanding of the role that pharmacists, apothecaries, and medicinal healers have played over the centuries. A special emphasis will be placed on the history of pharmacy in the old west and Arizona territory. Course meetings will include frequent visits to the University of Arizona’s own History of Pharmacy museum.
PCOL 300 – Pharmacology of Cosmetics and Self-Care Products (3 units)

Wednesdays 2:00 – 2:50 PM + online  
Instructor: Jennifer Schnellmann
Students will expand their knowledge of pharmaceutics, pharmacology, and toxicology and apply this information to an array of substances that they encounter or deliberately use daily. Students will also learn the regulatory aspects of cosmetic creation, advertising, and sale; the chemistry behind ingredient selection for each category of product; and the efficacy that can be expected due to the pharmacological and toxicological characteristics of these formulations. At the end of the course, students will be better-informed consumers, better equipped to select and purchase beauty and self-care products that deliver meaningful results, avoiding products of limited efficacy or which may be unsafe. Prerequisite: CHEM 152 (or equivalent). Approved for use in the PharmSci minor, does not count toward PharmSci major requirements.

PCOL 305 - Scientific Writing for Health Sciences (3 units)

Wednesdays 12:00 – 12:50 PM + online  
Instructor: Jennifer Schnellmann
In this three-credit course, students will learn to read and interpret basic and clinical science papers and to write scientific manuscripts and research proposals. Emphasis will be placed on conveying the significance of research, outlining aims, and discussing results for scientific papers and grant proposals. Students will learn the traditional sections of a scientific paper (and why), how methods are used and presented, how results are communicated, and what a discussion contains (and does not). Best practices for figures and tables (data presentation) will be described and students will be shown how to craft an abstract from a work of literature. Next, students will learn what a research proposal contains (modeled after the R01) and how they are constructed. Students will also learn about peer-review and participate in drug information retrieval. Writing Emphasis Course. Prerequisite: ENGL 102 or ENGL 109H. PharmSci/pre-PharmSci majors and minors receive priority registration. Required PharmSci major course.

PCOL 310 – Drug Approval: The 3 Billion Dollar Bet (2 units)

Mon/Wed 10:00 – 10:50AM  
Instructor: Elizabeth Hall-Lipsy
Almost 60 billion dollars (2016) are spent annually on pharmaceutical research and development in the United States and almost 425 billion dollars (2015) are spent annually in drug purchasing. Drugs are key economic and therapeutic factors in the health care arena; yet, among patients and consumers the pharmaceutical industry lacks public trust and the process of drug approval is often shrouded in mystery. In this course we'll address the decisions drug manufacturers consider, including time, cost, risk and value in bringing a new drug product to market. We will explore how a new drug product is developed from concept to bedside. Prerequisite: ENGL 102 or ENGL 109H. Required PharmSci major course.

PCOL 350 – ADME: How the Body Changes Drugs (3 units)

Tues/Thurs 2:00 – 3:15PM  
Instructor: Richard Vaillancourt
ADME, an acronym for absorption, distribution, metabolism, excretion, is often the determining factor in whether drugs generate the desired effect, or no effect, or a harmful effect. PCOL 350 provides students with a rounded education in the ways that the body changes the chemical form of drugs, as well as the ways that the body directs the movement of drugs over time, from administration through excretion. Prerequisites: (CHEM 241B+243B prerequisite) and (PSIO 202 co-requisite or PSIO 380 prerequisite). Required PharmSci major course.

PCOL 410 – Integrated Medicinal Chemistry (5 units)

M/T/W/Th 8:00 - 8:50 AM AND Fri 10:00 – 10:50 or 11:00 – 11:50  
Instructor: Eli Chapman
PCOL 410 will be a lecture course delivering content in the application of the foundation sciences to drug design. At an appropriate level of content targeting, students will draw on prior math, physics, and chemistry courses in the study of how drugs are conceptualized, designed, and developed. Content will build from basic concepts (structural factors associated with drug activity, drug solubility, pharmacophores) to a consideration of relevant biological drug targets, as well as basic content in structural biology analytical approaches. Prerequisites: CHEM 241B+243B Required PharmSci major course.

PCOL 473 – Pharmacogenomics (3 units)

Tues/Thurs 9:30 – 10:45AM  
Instructor: Bernard Futscher
One of the most exciting areas of the pharmaceutical sciences is "Precision Medicine." Faced with 8-10 different anti-hypertension drugs, intuition and generic recommendations currently guide the choice of which drug to start with. Often this leads to frustrating and dangerous rounds of waiting to see if the drug works safely, and if not, trying the next drug in line. PCOL 473 will introduce the student to the field of pharmacogenomics, which involves measuring the subtle differences in the biological blueprint and its expression in different individuals, and from that drawing conclusions about the likelihood of that individual having a beneficial drug effect, no effect, or a toxic effect. That information is then used to guide the choice and dose of drugs for the patient. Prerequisite: PCOL 350. Required PharmSci major course.

PHCL 460 – Designing Drugs: From Chemistry to Cure (3 units)

Wednesdays 3:00 – 5:30PM  
Instructor: May Khanna
This course, conducted in collaboration with the College of Medicine Department of Pharmacology, will integrate content from the entire BSPS curriculum in an advanced course focused on identification of diseases of interest, identification of disease targets, and considerations of the design of drugs targeting these molecules. This will happen at a depth of knowledge greater than that of the introductory drug discovery course (PCOL 410), and will introduce students to computational approaches to designing drug molecules based on a protein target of known 3-dimensional structure using in-class work and homework assignments. Prerequisites: PCOL 410 and PCOL 406. Required PharmSci major course.