



## Pharmaceutical Sciences Undergraduate Courses – Spring 2022

All courses are available for registration via UAccess. Contact Rebecca Field at [rfield@pharmacy.arizona.edu](mailto:rfield@pharmacy.arizona.edu) with any registration questions. Interested in the Pharmaceutical Sciences major or minor? Email Rebecca for more information!

**Spring 2022 course options include the following. Course details and times can be found below.**

### Core Major Courses:

- PCOL 305 – Scientific Writing for Health Sciences
- PCOL 350 – ADME: How the Body Changes Drugs
- PCOL 410 – Integrated Medicinal Chemistry
- PCOL 440 – Rigor & Reproducibility – Bridging Academia and Pharma
- PCOL 473 – Pharmacogenomics
- PHCL 460 – Designing Drugs: From Chemistry to Cure

### PharmSci Electives

- PCOL 196D - The Joy of Drugs: An Introduction to Pharmaceutical Sciences
- PCOL 300 – Pharmacology of Cosmetics and Self Care Products
- PCOL 395B – The History of Pharmacy
- PCOL 396 (001) – Special Topics in Pharmacy: What’s your Poison? Toxicology of the Substances That Surround Us
- PCOL 396 (002) – Special Topics in Pharmacy: Professional Pharmacy Pathways

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

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**Wednesdays 2:00 – 2:50 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.

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### PCOL 300 – Pharmacology of Cosmetics and Self-Care Products (3 units)

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**Wednesdays 1:00 – 1:50 PM + online (hybrid course)**

**Instructor: Jennifer Schnellmann**

Students will expand their knowledge of pharmaceuticals, 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.

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

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**Wednesdays 12:00 – 12:50 PM + online (hybrid course)**

**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 102/109H AND CHEM 151/141/161. PharmSci majors and minors receive priority registration. Required PharmSci major course.

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

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**Tues/Thurs 2:00 – 3:15 PM**

**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) and (PSIO 202 co-requisite or PSIO 380 prereq). Open to PharmSci majors w/advanced standing and PharmSci minors. Required major course.

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## **PCOL 395B – The History of Pharmacy (1 unit)**

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**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.

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## **PCOL 396 (001) – Special Topics in Pharmacy: What's Your Poison? Toxicology of the Substances that Surround Us (3 units)**

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**Mondays 2:00 – 2:50 PM + online (hybrid course)**

**Instructor: Jennifer Schnellmann**

This course covers the toxicology of plants, fish, insects and reptiles, foods, drugs of abuse, and other common poisonous substances in addition to information about carcinogens, teratogens, and risk assessment. In this three-credit hybrid course, students will learn about snake, spider, and scorpion venoms; marine toxins produced by exotic underwater creatures; and common food poisonings. We will cover non-food plant toxicities, drugs of abuse, and approaches to risk assessment. Finally, students will learn about compounds that cause cancer and birth defects. Open to students in all majors..

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

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**Tuesdays 11:00 – 11:50AM – LIVE 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 professional 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.

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## **PCOL 410 – Integrated Medicinal Chemistry (5 units)**

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**M/T/W/Th 9:00 – 9:50 AM + F 9:00, 10:00, or 11:00 discussion**

**Instructor: Eli Chapman**

PCOL 410 delivers 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, BIOC 384 or 385 strongly recommended. Open to PharmSci majors with advanced standing and PharmSci minors. Required PharmSci major course.

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## **PCOL 440 – Rigor & Reproducibility - Bridging Academic and Pharma (2 units)**

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**Mon/Wed 10:00 – 10:50AM**

**Instructor: Bernard Futscher**

PCOL 440 will introduce students to a timely issue of intense focus, both at the level of funding agencies, as well as at the level of academic-pharma/biotech partnerships in drug commercialization. In both of these environments serious concerns have been raised regarding the level of rigor and reproducibility in academic science. This course will expose students to the spectrum of rigor and reproducibility, and engage students in discussions that aim to link the particular rigor applied to an experiment with the demands that exist for the data; for example, contrasting the demands of a pilot experiment to initially test an idea Vs. the measurement of the response to a new drug that will be used as data to seek investment from a pharmaceutical company. Students will be challenged to develop plans for assays that include clearly described validation schemes. Prerequisite: MCB 181R+L or PSIO 201. PharmSci majors receive priority registration. Required PharmSci major course.

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## **PCOL 473 – Pharmacogenomics (3 units)**

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**Tues/Thurs 11:00AM – 12:15PM**

**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. Open to PharmSci majors with advanced standing and PharmSci minors. Prerequisites: PCOL 350 and PCOL 406. Required PharmSci major course.

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

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**Wednesdays 3:00 – 5:30PM**

**Instructor: TBA**

This course, conducted in collaboration with the College of Medicine Department of Pharmacology, will integrate content from the entire BSPharm 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. Prerequisites: PCOL 410, PCOL 406 and BIOC. Open to PharmSci majors only. Required major course.

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