



Drug Discovery Development Pathway Approved BSPS Electives

PHR 2367.01 or 2367.02 – Drug Use in American Culture (3 credit hours)

- ❖ Also approved GE second-level writing. **May not be used for both GE and BSPS Electives.**
- ❖ In-person (.01) or Distance-learning (.02)
- ❖ This course investigated a given drug by assessing its historical use, clinical properties, and risks, its role in American culture, and other issues surrounding its use/abuse in the United State. Students will analyze various sources of information and effectively communicate key messages using a variety of platforms.
- ❖ Prerequisite: English 1110 or equivalent

PHR 2400.01 – Addicting Drugs: Effect, Introductory Neurobiology and Regulation (3 credit hours)

- ❖ Overview of effects, regulation, and mechanism of action of addicting drugs with an introduction to function of the nervous system and how this function is altered by drugs.

PHR 2410 – Drugstore Science (3 credit hours)

- ❖ Distance-learning course (100% online)
- ❖ This course introduces the science behind common drugstore products, including over-the-counter (OTC) medications and drug-cosmetics, including how these products work, potential non-drug alternatives, and various drug-related issues involving their use. Note: Content of this course is not intended to be considered as professional medical advice or to replace advice from a healthcare provider.

PHR 2420 – Drug Culture and Genetics: Revelations from Otzi to Ozzy (3 credit hours)

- ❖ Also approved GE Cultures & Ideas. **May not be used for both GE and BSPS Electives.**
- ❖ Humans have been experimenting with chemicals for therapeutic use and taking mind-altering substances for thousands of years. In this course we investigate the genetic evidence of past human drug use, the genetic revelations and techniques involved in therapeutic drug use addiction behavior today, and the role of genetics in the future of therapeutics.

PHR 2510 – Introduction to Pharmacy (2 credit hours)

- ❖ A survey of the profession of pharmacy, dealing with its history, educational requirements, organization, regulation, and contemporary developments.

PHR 2511H – Introduction to Pharmacy Honors (3 credit hours)

- ❖ Spring semester only
- ❖ Prerequisite: Student must be in University Honors standing, enrolled in the BSPS-EAP program, or seek permission of instructor.
- ❖ A survey of the profession of pharmacy including its history, scope of practice, educational pathways, ethical foundations, regulation, contemporary issues, career opportunities, and

prospects for the future; as well as topics related to medication use and drug discovery/development.

PHR 2520 – Patient Perspectives (2 credit hours)

- ❖ This course will provide students with the unique opportunity to learn directly from patient speakers (and caregivers if available) about the impact disease states and therapy have on them. In addition to listening to these first-hand accounts, students will be able to thoughtfully engage and meaningfully reflect each week to develop their understanding and empathy for the patient experience.

PHR 3191 – Experiential Learning in Pharmaceutical Sciences (1 credit hour)

- ❖ Pre-requisite: BSPS enrollment and permission of instructor
- ❖ Allows students to reflect on their hands-on pharmacy or health care-related internships, jobs, or other experiences through course lectures and assignments. Students will work closely with their supervisors and instructors to explore the skills they have gained and to receive constructive feedback.

PHR 3210 – Nature’s Medicine Cabinet (2 credit hours)

- ❖ Pre-requisite: Chemistry 1110, 1210, 1250, 1610, 1910H, Biology 1101, 1113 or 1114, or permission of instructor
- ❖ This course covers basic information on natural products that have exerted an effect on human health to be utilized as a foundation in solving simulated practical cases.

PHR 3400 – Therapeutic Frontiers (2 credit hours)

- ❖ Spring semester only
- ❖ Prerequisite: BSPS enrollment or permission of instructor
- ❖ Investigation of newly emerging (and at times) controversial strategies for treating disease, including biologics, cell replacement therapy, and vaccines among others. This course also explores the science behind important therapeutic factors such as the placebo effect, the microbiome, and pharmacogenomics.

PHR 3410 – Science Communication and Engagement (1 – 6 credit hours)

- ❖ Prerequisite: Junior standing, BSPS enrollment or permission of instructor
- ❖ Repeatable to a maximum of 6 credit hours
- ❖ Course is graded S/U
- ❖ With the Generation Rx Laboratory at the Center of Science and Industry (COSI), students will practice science communication as they create and lead live, hands-on experiments teaching basic drug science.

PHR 3420 – Generation Rx: America’s Drug-Taking Culture (3 credit hours)

- ❖ Also approved GE Cultures & Ideas. **May not be used for both GE and BSPS Electives.**
- ❖ Distance-Learning course (100% online)
- ❖ This course analyzes America's drug-taking culture by examining its past, present, and future. Students will identify factors that fuel it, discuss its influence on a patient's medication

experience, and evaluate its role in a current public health crisis. The course will conclude with discussing ideas that promote a culture of health.

PHR 3430 – Quest for the Cure (3 credit hours)

- ❖ In this course we discuss the ongoing quest for a cure for cancer, including recent investigations in how cancer is treated, prevented, and detected. Like in many quests, cancer has proven an evasive and adaptable villain and our heroic cancer patients, advocates, researchers, and healthcare providers face additional obstacles in the form of cancer health disparities.

PHR 3520 – Principles of Therapeutics (2 credit hours)

- ❖ Spring semester only
- ❖ BSPS enrollment or permission of instructor
- ❖ Designed to provide knowledge about medication therapies and treatment guidelines for common illnesses affecting patients.

PHR 3530 – Drugs, Human Enhancement, and the Mastery of Nature (3 credit hours)

- ❖ Also approved GE Cultures & Ideas. **May not be used for both GE and BSPS Electives.**
- ❖ How should we navigate questions of identity in the world of cognitive and mood enhancing drugs? Where do we draw the line on 'smart drugs' for intellectual endeavors or the use of performance enhancing drugs in athletic pursuits? More broadly, we will debate whether and how as a society we might enact particular restraints on our pursuit of human enhancements.

PHR 3540 – Health Citizenship: Advocacy and Change-making (3 credit hours)

- ❖ Distance-learning course (100% online)
- ❖ The goal of the Health Citizenship: Advocacy and Change-making elective is to build a foundation of knowledge of historical and current state and federal issues that impact healthcare and cultivate skills to become effective changemakers to improve the healthcare system. Students will participate in distance learning and discussion activities to evaluate opportunities for improvement for healthcare. By the end of the elective, students will have developed enhanced knowledge, communication and relationship skills to leverage their role to advance patient care.

PHR 3708 – Vaccines: A Global History (3 credit hours)

- ❖ Also approved GE Historical Study. **May not be used for both GE and BSPS Electives.**
- ❖ This course examines the history and biology of vaccines. We explore the discovery and development of vaccines, along with the political and cultural controversies that have surrounded them for centuries. Team-taught course with faculty member in History.

PHR 4193 –Independent Study in Pharmaceutical Sciences (Credit hours Vary)

- ❖ Laboratory and library work designed to give the qualified student an opportunity to complete an original investigation or pursue an interest in a special problem.
- ❖ Prereq: CPHR 2.5 or above, and Soph standing, and enrollment in the BSPS program, and permission of instructor. Not open to students with credit for Pharmacy 493. Repeatable to a maximum of 30 cr hrs or 12 completions. This course is progress graded (S/U).

PHR 4210H –Problem Solving in Biomedical Chemistry (2 credit hours)

- ❖ Spring semester only
- ❖ Prerequisite: PHR 3200, enrollment in BSPS or instructor permission
- ❖ A course designed to use problem-based learning to promote understanding of biomedical concepts. Case studies will be assigned, allowing students to apply biochemical principles and communicate with their colleagues in the course.
- ❖ Non-honors students may enter with permission from instructor

PHR 4330 –Basic Pharmacokinetics (2 credit hours)

- ❖ Prerequisite: Math 1151
- ❖ An elementary course designed to introduce the student to the topic of pharmacokinetics. The application of biopharmaceutics and pharmacokinetic principles as they relate to drug absorption, distribution and elimination will be discussed.

PHR 4420 – Molecular Pharmacology: From DNA to Biopharmaceutical Products (2 credit hours)

- ❖ Autumn semester only
- ❖ Prerequisite: PHR 3200 or instructor permission
- ❖ Introduces students to pharmacological research and drug discovery through readings, discussions, and presentations.

PHR 4430 – GPCR Pharmacology (2 credit hours)

- ❖ Spring semester only
- ❖ Prerequisite: enrollment in BSPS or instructor permission
- ❖ Focuses on the pharmacology of G-protein-coupled receptors (GPCRs). GPCRs constitute a large and diverse family of proteins whose importance is underscored by the fact that at least one third of the currently marketed drugs target these proteins.

PHR 4440 – Pharmacology of Neurologic and Psychiatric Disorders (3 credit hours)

- ❖ Prerequisite: NEUROSC 3000 or PHR 3200 or equivalent or instructor permission
- ❖ This course is designed for pharmaceutical science majors, neuroscience majors, or non-majors with a basic knowledge of biology. This course will serve as an introduction to principles of pharmacological therapy of neurologic and psychiatric diseases.

PHR 4470 – Contemporary Pharmacology (1 credit hours)

- ❖ Prerequisite: PHR 4000, 4400 or 5460; and permission of instructor
- ❖ Exploration of current research topics in pharmacology through discussions of recently published pharmacology papers.
- ❖ Repeatable up to a maximum of 3 credit hours

PHR 4997 – BSPS Honors Project (Credit hours Vary)

- ❖ Course is graded S/U
- ❖ Prerequisite: Honors standing and enrollment in BSPS Program

- ❖ Designed to provide undergraduate students with practical experience in the pharmaceutical sciences through research, outreach and engagement, internships and other activities.

PHR 4998 – General Undergraduate Research (Credit hours Vary)

- ❖ Repeatable to a maximum of 60 credit hours or 12 completions
- ❖ Course is graded S/U
- ❖ Course credit earned by conducting research while enrolled as an undergraduate student.

PHR 4999 – Undergraduate Research Thesis (Credit hours Vary)

- ❖ Repeatable to a maximum of 60 credit hours or 12 completions
- ❖ Culmination of undergraduate research in the form of written thesis.

PHR 5270 – Antibiotics and Microbial Natural Products (3 credit hours)

- ❖ Spring Only
- ❖ Prerequisite: PHR 4000 with a C- or higher
- ❖ This course is organized into four distinct modules. First, we examine the different classes of natural products through the lens of biosynthesis -- how the molecules are constructed and diversify. Second, we focus on their function -- not only as antibiotics against human pathogens (mode of action and resistance) but also their proposed functions for the producing organisms. Third, we explore the methods and challenges in natural product discovery and how genomics is revolutionizing the field. The most recent and significant developments in microbial natural products are presented in the final section of the class through student research presentations on select topics

PHR 5402 – Economic Evaluation of Pharmaceutical and Health Care Interventions (3 Credit hours)

- ❖ Distance-learning course (100% online)
- ❖ Introduction to economic evaluation of pharmaceutical and other health care interventions and services, including evaluating costs and health outcomes, using results to inform resource allocation, interpretation and evaluation of economic evaluations in the literature, and decision analysis in health care.
- ❖ Prereq: Grad, Jr, or Sr standing. Not open to students with credit for Nursing 7402.

PHR 5410 - Understanding and Changing Vaccine Hesitancy Perspectives (3 Credit Hours)

- ❖ Distance-learning course (100% online)
- ❖ Vaccines are among the most significant achievements in modern medicine, providing a safe and highly effective means to prevent disease. However, an increasing number of individuals are refusing vaccination. In this course, we analyze contributing factors to the anti-vaccine movement, discuss the psychology behind vaccine hesitancy, and evaluate the implications of under vaccination.

PHR 5460 - Current Addiction Neurobiology Literature (1 Credit Hour)

- ❖ Current research findings relating to neurobiology of addiction are explained and interpreted. Students should have some introductory knowledge of neurobiology.

- ❖ Repeatable to a maximum of 9 cr hrs.

PHR 5500 - History of Pharmacy (3 Credit Hours)

- ❖ Distance-Enhanced
- ❖ Evolution and development of the profession of pharmacy from antiquity to the present, with emphasis on its Anglo-American development since the 18th century.
- ❖ Prereq: Soph standing in BSPS, or enrollment in PharmD program. Not open to students with credit for 5130.

PHR 5510 - Basics of Pharmaconutrition (3 Credit Hours)

- ❖ Covers basic information on the effects of dietary factors on pharmaconutrition to be utilized as a foundation in solving patient-related cases in pharmacy practice.
- ❖ Prereq: Undergrad standing, enrollment in the PharmD program, or permission of instructor.

PHR 5525 – Advocacy in Pharmacy (2 Credit Hours)

- ❖ Informs and engaged students in legislation, the role of advocacy in Pharmacy, current healthcare issues, and how students and organization can make a difference in the future of Pharmacy practice.
- ❖ Prereq: Enrollment in BSPS program or Doctor of Pharmacy program, or permission of instructor. Completion of PHR 2510 or PHR 2511H recommended for undergraduates.

PHR 5540 - Introduction to Clinical & Translational Pharmacy Research (2 Credit Hours)

- ❖ Introduction to conducting research in clinical pharmacy including research design issues and to ethical considerations. Faculty conducting research in various populations will discuss their research, followed by class discussion.
- ❖ Prereq: 4000, and enrollment in the PharmD or BSPS program. Not open to students with credit for 5170. This course is graded S/U.

PHR 5550 - Topics in International Pharmacy (2 Credit Hours)

- ❖ Distance-Learning (100% online)
- ❖ Seminar on global pharmaceutical issues and international practices of pharmacy.
- ❖ Prereq: Jr or Sr standing. Not open to students with credit for 5180. This course is graded S/U.

PHR 5560 - Success & Leadership in Pharmacy (1.5 Credit Hours)

- ❖ Explore the meaning of success and leadership, attributes of successful leaders and what can be done to be a successful leader.
- ❖ Prereq: Enrollment in College of Pharmacy, or permission of instructor. Not open to students with credit for 5610. This course is graded S/U.

PHR 5580 - Professional Ethics (1.5 Credit Hours)

- ❖ The conceptual basis and content of pharmaceutical ethics; significance of codified ethics, interprofessionally considered; individual and group analysis of ethical issues; methods of encouraging compliance.
- ❖ Prereq: Soph standing in BSPS program, or enrollment in PharmD program. Not open to students with credit for 5140.

PHR 5590 - Chemical Dependency and the Healthcare Professional (3 Credit Hours)

- ❖ This lecture- and discussion-based course provides instruction, debate and exploration relating to the impact of chemical dependency on healthcare professionals, including the concepts of addiction, individuals at risk, intervention, withdrawal, emotions, recovery networks, regulatory actions and returning to practice.

PHR 5700/CBG 5700 - Introduction to Personalized Therapeutics and Pharmacogenomics (3 Credit Hours)

- ❖ Distance-Learning (100% online)
- ❖ Exploration of the trend to therapy tailored to the individual patient rather than "one drug fits all;" inter-individual differences in drug responses, with emphasis on genetic and genomic factors; ethical, regulatory, and economic issues that impact drug therapies. Credit for introductory biology course recommended prior to enrollment.
- ❖ Cross-listed in BioPhrm and CBG.

PHR 5798 - International Healthcare Experience in Pharmacy (3 Credit Hours)

- ❖ Preparation for traveling abroad to a destination country. Students will be introduced to the culture, history, and healthcare practice in the destination country. Evaluation will be based on participation in individual class sessions and fulfillment of assignments.
- ❖ Prereq: Permission of instructor. Repeatable to a maximum of 24 cr hrs. This course is graded S/U.