

BSPS Course Descriptions

Required BSPS Coursework

Pharmacy 1100 – Pharmaceutical Sciences Survey – 1 credit hour

- ❖ Autumn semester only, 1st session
- ❖ Required only for new first-year students
- ❖ Introduction to the University, strategies for student success, academic programs, opportunities in the pharmaceutical sciences and practice, and contemporary issues.

PHR 2100 – Careers in Pharmaceutical Sciences – 0.5 credit hour

- ❖ Autumn semester only, 2nd session course
- ❖ Prerequisite: BSPS enrollment or permission of instructor
- ❖ Overviews clinical and research-based biomedical careers. Introduces roles and responsibilities, educational preparation, emerging trends, and opportunities in diverse career tracks (including clinical professions, pharmaceutical industry, academia, and regulatory affairs).

PHR 2101 – Career Development in Pharmaceutical Sciences II – 0.5 credit hour

- ❖ Spring semester only, 1st session course
- ❖ Prerequisite: PHR 2100, Junior standing, and BSPS enrollment or permission of instructor
- ❖ Introduces students to diverse careers in the field of pharmaceutical and health sciences. Students will be taken through multiple professional development initiatives, and will work closely with their instructor and peers to gain knowledge on various career paths. Through this class, students will engage with guest speakers and will come away with a plan of how to pursue their future goals.

PHR 2500 – Drug Discovery, Development, and Delivery – 3 credit hours

- ❖ This course provides a comprehensive overview of the drug discovery, development, and delivery process within the U.S. healthcare system, exploring the roles of vested stakeholders (e.g. patients, pharmaceutical industry, providers, insurers, society, etc.) during a drug's "bench to bedside" development. Additionally, the course discusses post-approval issues with respect to access, social impact, and safety.

Notes:

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PHR 2367 –Drug Use in American Culture– 3 credit hours

- ❖ Prerequisite: English 1110 or equivalent
- ❖ Both online and in-person sections will be offered.
- ❖ Investigates a given drug by assessing its historical use, clinical properties and risks, role in American culture, and other issues surrounding its use/abuse in the United States. Students will engage in activities that will teach them to appropriately analyze various sources of information and effectively communicate key messages using a variety of platforms. Fulfills General Education Second Writing requirement.
- ❖ PHR 2367 is the **recommended** 2nd Level Writing Course in the BSPS program.

PHR 3200 – Biochemistry for the Pharmaceutical Sciences – 5 credit hours

- ❖ Autumn semester only
- ❖ Prerequisite: CHEM 2520/2590H, BSPS enrollment or permission of instructor
- ❖ Fundamentals of biological chemistry for the study of the pharmaceutical sciences including molecular basis of structure, metabolism, genetic replication, transcription, and translation in humans. Ties to the drug processes will be highlighted.

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

- ❖ Distance-Learning course (100% online)
- ❖ In this course, we analyze America’s drug-taking culture through 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 – America’s opiate epidemic. The course will conclude with discussing ideas that promote a culture of health.
- ❖ PHR 3420 is the **recommended** Cultures & Ideas GE course in the BSPS program

PHR 3500 – Ethics and Professionalism in the Pharmaceutical Sciences – 2 credit hours

- ❖ Course goes live in SP18
- ❖ Spring semester only
- ❖ Prerequisite: Pharmacy 2500, enrollment in BSPS program or permission of instructor
- ❖ This course will develop core competencies in dealing with ethical issues in healthcare and research settings amidst a biologically, socially, and culturally diverse patient population. This will include a discussion of the ethical responsibilities and professional conduct of the pharmaceutical industry, including clinical drug trials and studies, research, and marketing and promotion. This course will also provide a discussion of basic principles of business ethics and proper ethical conduct in other healthcare industries.

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PHR 4000 – Integrated Pharmaceutical Sciences I – 5 credit hours

- ❖ Spring semester only
- ❖ Prerequisite: PHR 3200, EEOB 2520*
- ❖ The first course in a two-course series covering principles governing the design, synthesis, delivery, action, and use of drugs in disease treatment. Model disease pathophysiology and treatment will be investigated, discussing how biological differences can be targeted for therapeutic gain.

PHR 4010 – Integrated Pharmaceutical Sciences II – 5 credit hours

- ❖ Autumn semester only
- ❖ Prerequisite: PHR 4000, EEOB 2520
- ❖ The second course in a two-course series covering principles governing the design, synthesis, delivery, action, and use of drugs in disease treatment. Model disease pathophysiology and treatment will be investigated, discussing how biological differences can be targeted for therapeutic gain.

PHR 4600 – Pharmaceutical Sciences Laboratory – 2 credit hours

- ❖ Prerequisite: CHEM 2520/2920H, PHR 3200*, BSPS enrollment or permission of instructor
- ❖ Laboratory experience in isolation, synthesis, and evaluation of pharmaceutically relevant compounds.

Pathway-Specific Coursework

PHR 4610 – Experimental Techniques in Drug Discovery – 3 credit hours

- ❖ Required course under the *Drug Discovery and Development Pathway*
- ❖ Prerequisite: PHR 3200, enrollment in BSPS or instructor permission
- ❖ Examination of the laboratory instrumentation and methods used in the drug discovery process

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BSPS Electives

PHR 2400 – Addicting Drugs: Effects, Introductory Neurobiology, and Regulation – 2 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 – 2 credit hours

- ❖ Autumn semester only
- ❖ 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 2510 – Introduction to Pharmacy – 2 credit hours

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

PHR 2511H – Introduction to Pharmacy –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 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.

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PHR 3400 – Therapeutic Frontiers – 2 credit hours

- ❖ Spring semester only
- ❖ Prerequisite: BSPS enrollment or permission of instructor
- ❖ Overview of promising new strategies and technologies in disease treatment.

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 3520 – Principles of Therapeutics – 2 credit hours

- ❖ Spring semester only
- ❖ Prerequisite: PHR 4000*, BSPS enrollment or permission of instructor
- ❖ Designed to provide knowledge about medication therapies and treatment guidelines for common illnesses affecting patients.

PHR 4330 – Basic Pharmacokinetics – 2 credit hours

- ❖ Prerequisite: Math 1151
- ❖ Spring semester only
- ❖ 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 4998 – General Undergraduate Research – 1 to 18 credit hours

- ❖ 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 – 1 to 18 credit hours

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

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PHR 5402 – Introduction to Pharmacoeconomics – 3 credit hours

- ❖ Prerequisite: Junior standing in BSPS or permission of instructor (not open to students with credit for NURSING 7402)
- ❖ Distance-learning course (100% online)
- ❖ Introduction to economic evaluation of pharmaceutical interventions and pharmacy services, including evaluating costs and health outcomes, using results to inform resource allocation, interpretation and evaluation of pharmacoeconomics literature, and decision analysis in health care.

PHR 5500 – History of Pharmacy – 3 credit hours

- ❖ Autumn semester only
- ❖ Prerequisite: Sophomore standing in BSPS
- ❖ Evolution and development of the profession of pharmacy from antiquity to the present, with emphasis on its Anglo-American development since the 18th century.

PHR 5510 – Basics of Pharmaconutrition – 3 credit hours

- ❖ Autumn semester only
- ❖ Prerequisite: Senior standing in BSPS
- ❖ 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.

PHR 5520 – Advanced Pharmaconutrition – 2 credit hours

- ❖ Prerequisite: PHR 5510 and instructor permission
- ❖ Provides concepts needed by pharmacists necessary to include nutrition into their daily assessment of patients and integrate their findings into therapeutic gain.

PHR 5530 – Medical Applications of Radionuclides and Radiopharmaceuticals – 2 credit hours

- ❖ Autumn semester only
- ❖ Prerequisite: Junior standing in BSPS, or Allied Medical Professional plan, or instructor permission
- ❖ A Study of the theoretical and clinical aspects of the preparation, use, control, and handling of radionuclides and radiopharmaceuticals in medicine.

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PHR 5540 – Introduction to Clinical and Translational Pharmacy Research – 2 credit hours

- ❖ Autumn semester only
- ❖ Prerequisite: PHR 4000 or permission of instructor
- ❖ Course is graded S/U
- ❖ Introduction to conducting research in clinical pharmacy including research design issues and ethical considerations. Faculty conducting research in various populations will discuss their research, followed by class discussion.

PHR 5550 – Topics in International Pharmacy – 2 credit hours

- ❖ Prerequisite: Junior standing in BSPS or permission of instructor
- ❖ Course is graded S/U
- ❖ Seminar on global pharmaceutical issues and international practices of pharmacy.

PHR 5560 – Success & Leadership in Pharmacy – 1.5 credit hours

- ❖ Autumn semester only
- ❖ Prerequisite: enrollment in BSPS or instructor permission
- ❖ Course is graded S/U
- ❖ Explore the meaning of success and leadership, attributes of successful leaders, and what can be done to be a successful leader.

PHR 5570 – Seminar on Pharmacy Careers – 1 credit hour

- ❖ Autumn semester only
- ❖ Prerequisite: Sophomore standing in BSPS
- ❖ Discussion and analysis of career pathways in clinical pharmacy and preparation of a career plan paper.

PHR 5580 – Professional Ethics – 1.5 credit hours

- ❖ Spring semester only
- ❖ Prerequisite: Sophomore standing in BSPS
- ❖ The conceptual basis and content of pharmaceutical ethics; significance of codified ethics, inter-professionally considered; individual and group analysis of ethical issues; methods of encouraging compliance.

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PHR 5590 – Chemical Dependency and the Healthcare Professional – 3 credit hours

- ❖ Intended rank: Junior or Senior, Masters, Doctoral, Professional
- ❖ 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 – Introduction to Personalized Therapeutics and Pharmacogenomics – 3 credit hours

- ❖ 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

PHR 5798 – International Healthcare Experience in Pharmacy – 3 credit hours

- ❖ Prerequisite: enrollment in BSPS and instructor permission
- ❖ Repeatable to a maximum of 4 credit hours
- ❖ Course is graded S/U
- ❖ Preparation for traveling abroad to a destination country. Students will be introduced to the culture, history, and healthcare practice in the destination country. Students will be evaluated on their participation in individual class sessions, fulfillment of weekly assignments, and a group research project and presentation.

BSPS Advanced Electives

(Courses 7000 and above are graduate-level courses and require instructor permission to enter. Graduate-level courses may count as both honors courses and BSPS elective courses)

PHR 4210 – Problem Solving in Biomedical Chemistry – 1 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.

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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 – GCPR Pharmacology – 1 credit hour

- ❖ 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

- ❖ Autumn semester only
- ❖ 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 4460 – Current Addiction Neurobiology Literature – 1 credit hour

- ❖ Prerequisite: introductory knowledge of neurobiology and instructor permission
- ❖ Current research findings related to neurobiology of addiction are explained and interpreted.
- ❖ Course repeatable up to three times for credit (different articles will be discussed each semester).

PHR 4470 – Contemporary Pharmacology – 1 credit hour

- ❖ Prerequisite: PHR 4000, 4400 or 4460; 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

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Nursing/Pharmacy 7405 – Management of Clinical and Preclinical Studies – 3 credit hours

- ❖ Spring and Summer semesters only
- ❖ Prerequisite: PHR/Nursing 7770; instructor permission
- ❖ Distance-learning course
- ❖ Fundamental principles of clinical research operations from study site selection to study closure from the perspective of sponsors and clinical research sites including an introduction to database design, management, quality assurance, and reporting for site and sponsor operations.

Nursing/Pharmacy 7460 – Regulatory Strategy and Leadership – 3 credit hours

- ❖ Summer term only
- ❖ Prerequisite: PHR/Nursing 7405; instructor permission
- ❖ Distance-learning course
- ❖ Explores regulatory strategy and the variety of roles of regulatory professionals in new healthcare product development. Scholarly and technical writing skills for regulatory professionals for new product submissions and FDA Advisory Panels. Principles of strategic planning, leadership, communication and team building.

Pharmacy 7570 – Pharmaceutical Safety & Risk Management – 3 credit hours

- ❖ Autumn semester only
- ❖ Prerequisite: PHR/Nursing 7770; instructor permission
- ❖ Distance-learning course
- ❖ Comprehensive investigation of pharmacovigilance initiatives and pharmaceutical safety regulation. Pharmaceutical risk management in premarket testing and development, recognition of safety signals, post-approval experience, drug production, risk mitigation, and administration of pharmaceuticals.

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Pharmacy 7572 – Global Regulation of Medical Products – 3 credit hours

- ❖ Spring semester only
- ❖ Prerequisite: PHR/Nursing 7770; instructor permission
- ❖ Distance-learning course
- ❖ Exploring legal issues related to clinical research and regulatory affairs. Examining the role of regulatory authorities, regulations and guidelines (US, EU and global) in new product development.

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Pharmacy 7580 – Principles of Safety Pharmacology – 3 credit hours

- ❖ Spring semester only
- ❖ Prerequisite: PHR 4400 or PHR 4000; instructor permission
- ❖ Distance-learning course
- ❖ Introduction to organ system studies of current experimental models, risk assessment, and regulatory guidelines for evaluating drug candidates in various organ systems.

Pharmacy 7582 – Organ System Toxicology – 3 credit hours

- ❖ Spring semester only
- ❖ Prerequisite: PHR 4400 or PHR 4000; instructor permission
- ❖ Distance-learning course
- ❖ The course covers principles of toxicology, physiology and pharmacology as they relate to adverse and unanticipated drug effects, with emphasis on cardiovascular, brain, pulmonary, liver, and kidney systems.

Pharmacy 7584 – Applied Pharmacokinetics and Pharmacodynamics – 3 credit hours

- ❖ Spring semester only
- ❖ Prerequisite: PHR 4400 or PHR 4000; instructor permission
- ❖ Distance-learning course
- ❖ This course will introduce students to the concepts of pharmacokinetics (PK) and pharmacodynamics (PD) and demonstrate how these concepts are applied in pre-clinical and clinical research for the development of safe and effective new drug therapies. Case studies demonstrating how PK/PD is applied throughout the drug development process.

Nursing/Pharmacy 7770 – Fundamentals of Medical Product Development and Regulation – 3 credit hours

- ❖ Prerequisite: instructor permission
- ❖ Distance-learning course
- ❖ Function of clinical research in medical product development and the regulatory process of new medical products. Laws and regulations concerning the development, testing, commercialization, and total product life cycle for medical products. Regulations governing the conduct of clinical research, including study sponsors, investigators, and Institutional Review Boards.

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Nursing/Pharmacy 7782 – Research Design and Methods for Clinical and Preclinical Research
– 3 credit hours

- ❖ Prerequisite: instructor permission
- ❖ Distance-learning course
- ❖ Study of research design and methods used in clinical and preclinical research. Measurement issues, bias and confounding, statistical considerations, evaluation of published clinical and preclinical research designs, and protocol and proposal development.

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