Pharmacy Courses (College of Pharmacy) (PHAR)

This is a list of all pharmacy courses. For more information, see College of Pharmacy.

PHAR:1000 First-Year Seminar 1 s.h.
Small discussion class taught by a faculty member; topics chosen by instructor; may include outside activities (e.g., films, lectures, performances, readings, visits to research facilities).

PHAR:1100 Introduction to Pharmaceutical Sciences: Drug Development 1-2 s.h.
Introduction to drug discovery, development, and approval pathways used in the United States; specific focus on career pathways related to pharmaceutical development including the natural and biomedical sciences, clinical, regulatory and legal affairs, sales and marketing, and business development.

PHAR:1111 Need a New Drug? 1 s.h.
Introduction to drug discovery, development, and approval process in the United States; focus on preclinical and clinical development activities and role of the FDA and other regulatory bodies in approval and oversight of available drug products.

PHAR:1200 Medicines That Changed or Will Change the World 1 s.h.
Herbal remedies and ancient traditional medicines have led to the discovery of life-saving drug therapies; as science has evolved, how the discovery of other important medicines have come about through advances in chemistry and biology and how they are used and marketed.

PHAR:1800 Introduction to Nutraceuticals: Activity and Action 2 s.h.
Introduction to the role and actions of nutritional supplements in health and disease; evidence-based information regarding roles of common nutritional supplements available to consumers. Prerequisites: BIOL:1140 or BIOL:1141 or BIOL:1411 or BIOL:1412.

PHAR:3740 End-of-Life Care for Adults and Families 3 s.h.

PHAR:3745 Drug Delivery I arr.
Advanced design and development of drug delivery systems; emphasis on selection of materials and designs suitable for specific applications; comparison and evaluation of available and emerging technologies. Requirements: introductory-level courses in biochemistry and anatomy/physiology.

PHAR:3994 Undergraduate Research in Pharmaceutical Sciences 1-4 s.h.
Individual scientific research conducted under the guidance of a faculty member.

PHAR:4146 Drug Disposition and Pharmacokinetics 2 s.h.
Introduction to drug absorption, distribution, and elimination processes controlling overall drug exposure in humans; basic quantitative measurements presented and used to demonstrate the influence of drug properties and physiologic action on drug disposition. Prerequisites: (MATH:1380 or MATH:1460) and (BIOL:1140 or BIOL:1141) and (STAT:1020 or PSQF:1020 or STAT:1030 or STAT:2010).

PHAR:4501 Basic Principles of Toxicology 1 s.h.
Basic principles and mechanisms of toxicology as it relates to drugs and environmental agents. Prerequisites: BIOL:3110.

PHAR:4502 Toxic Agents 1 s.h.
Specific toxicants and toxicity not related to organ systems including carcinogenesis and oxidative stress; clinical toxicology and antidotes. Prerequisites: BIOL:3110.

PHAR:4512 Principles of Drug Discovery 3 s.h.
Focus on understanding drug targets as receptors, receptor theory, drug discovery, and new drug approval processes; areas of novel drug target identification, pharmacological characterization of new drugs, G protein coupled receptors as targets, and analysis of drug-receptor interactions. Prerequisites: BIOL:3110.

PHAR:4537 Principles of Drug Metabolism 3 s.h.
Principles of drug metabolism based on current knowledge of involved enzymes. Prerequisites: (CHEM:2220 or CHEM:2240) and (BIOC:3120 or BIOL:3110).

PHAR:4736 Properties of Dosage Forms I 2 s.h.
Introduction to principles of physical and chemical sciences important in drug product development; solubility, colligative properties, and partitioning behavior, as well as ionic equilibria, pH control, and chemical stability are evaluated in context of their importance in liquid dosage forms; emphasis on issues impacting drug product quality. Prerequisites: CHEM:2220 and (MATH:1460 or MATH:1380 or MATH:1350 or MATH:1850).

PHAR:4737 Properties of Dosage Forms II 2 s.h.
Physical and chemical properties and measurements of materials used in pharmaceuticals; introduction to material properties of drugs and excipients used in development of semi-solid and solid pharmaceuticals; emphasis on material selection, dosage form performance characteristics, and evaluation of drug product quality. Prerequisites: PHAR:4736.

PHAR:4740 Materials in Drug and Gene Delivery 3 s.h.
Different types of materials used in drug and gene delivery including synthetic and natural polymers (poly lactic-co-glycolic acid and chitosan respectively); different forms of delivery systems including (but not limited to) liposomes, micelles, biodegradable nanoparticles, nondegradable nanoparticles, and solid porous scaffolds; applications of these material-based delivery systems from targeted chemotherapy to bone regeneration to vaccination applications.

PHAR:4745 Drug Delivery I arr.
Advanced design and development of drug delivery systems; emphasis on selection of materials and designs suitable for specific applications; comparison and evaluation of available and emerging technologies. Prerequisites: (BIOL:3110 or BIOC:3120) and (MATH:3600 or MATH:2560) and (CHEM:2220 or CHEM:2240) and PHAR:4146 and PHAR:4737. Requirements: one semester of human anatomy and physiology.

PHAR:5110 Clinical Pharmaceutical Sciences Seminar 1-2 s.h.  Research by faculty, graduate students.

PHAR:5310 Pharmaceutical Socioeconomics Seminar 1-2 s.h.  Recent research in pharmacy administration.

PHAR:5350 Introduction to Research Methods 3 s.h.  Scientific inquiry, experimental design, data collection, statistical methods used in the study of health services and clinical investigations; focus on understanding the research process and evaluating published studies. Recommendations: introductory statistics.

PHAR:5510 Medicinal and Natural Products Chemistry Seminar 1-2 s.h.  Contemporary research in medicinal chemistry and natural products.

PHAR:5512 Drug Discovery and Mechanisms 3 s.h.  Process of modern drug discovery, focus on high throughput screening strategies, target validation, pharmacological characterization of new compounds; mechanism of drugs targeting G protein coupled receptors, ion channels and transporters, targets in biological systems.

PHAR:5515 Perspectives in MNPC Research 2 s.h.  Modern techniques used in drug discovery; important drug classes, their chemical mechanism of action.

PHAR:5545 Current Medicinal Chemistry 3 s.h.  Modern techniques used in drug discovery; important drug classes, their chemical mechanism of action.

PHAR:5549 Analytical Biochemistry 3 s.h.  Application of modern chromatographic and detection methods used to isolate, characterize, and quantify drugs and macromolecules.

PHAR:5550 Synthetic Strategies in Medicinal Chemistry 3 s.h.  Modern chemical methods for construction of carbon-carbon bonds commonly used in synthesis of natural products; strategic disconnections for the syntheses of these molecules.

PHAR:5700 Quantitative Research Methods in Pharmacy I 3-4 s.h.  Collection and interpretation of analytical data; instrumental analysis and separation techniques.

PHAR:5702 Basic Pharmacokinetics and Pharmacodynamics 2 s.h.  Fundamental concepts in pharmacokinetics and pharmacodynamics; application in dose regimen optimization and rational drug use.

PHAR:5745 Drug Delivery: Principles and Applications I arr.  Advanced design and development of drug delivery systems with emphasis on selection of materials and designs suitable for specific applications; comparison and evaluation of available and emerging technologies.


PHAR:5875 Perspectives in Biocatalysis 1-3 s.h.  Advanced design and development of drug delivery systems with emphasis on selection of materials and designs suitable for specific applications; comparison and evaluation of available and emerging technologies.

PHAR:6120 Clinical Pharmaceutical Sciences Research arr.  Issues related to pharmacy administration, social and behavioral pharmacy, pharmacy education.

PHAR:6305 Foundation Literature in Pharmaceutical Socioeconomics arr.  Issues related to pharmacy administration, social and behavioral pharmacy, pharmacy education.

PHAR:6320 Pharmaceutical Socioeconomics Research arr.  Issues related to pharmacy administration, social and behavioral pharmacy, pharmacy education.

PHAR:6330 Models of Patient Behavior and Choice 3 s.h.  Theoretical models used to describe behavior and choice in pharmaceutical socioeconomic research; models from economics, health services research, health behavior, clinical decision making.

PHAR:6331 Models of Provider Behavior and Choice 3 s.h.  Theoretical background for study of provider decision making and behavior; models based on a classic economic approach, models used to study provider behavior.

PHAR:6501 Principles and Mechanisms of Chemical Toxicology 1 s.h.  General principles and basic mechanisms of chemical and pharmaceutical toxicology; drug/toxicant disposition, including biotransformation and bioactivation to electrophiles.
PHAR:6502 Toxic Agents and Concepts in Toxicology 1 s.h.
Specific classes of toxicants and non-organ directed toxicity, including chemical carcinogenesis, oxidative stress, teratogenesis; clinical toxicology, antidotes, methods and models in toxicology.

PHAR:6503 Target-Organ Toxicity 1 s.h.
Role of drugs/toxicants in systems toxicity (target organ); hepatotoxicity, neurotoxicity, cardiotoxicity, and toxic responses of immune system.

PHAR:6700 Advanced Pharmacokinetics and Pharmacodynamics 3 s.h.
Application of pharmacokinetics and pharmacodynamics principles in pharmaceutical research. Requirements: two semesters of calculus and one semester of statistics.

PHAR:6701 Stability of Pharmaceuticals 3 s.h.
Mechanisms of degradation of pharmaceuticals; prediction of shelf life of pharmaceuticals, stabilization. Prerequisites: CHEM:4432.

PHAR:6706 Equilibria Processes 3 s.h.
Equilibria pertaining to ionic systems, complexation, partitioning, solubility. Prerequisites: CHEM:4431.

PHAR:6710 Pharmaceutics Graduate Seminar 1-2 s.h.

PHAR:6720 Pharmaceutics Research arr.

PHAR:7100 Translational Research and Clinical Drug Development 3 s.h.
Clinical drug development; preclinical studies and clinical trials; phase I, II, and III clinical trials, including regulatory considerations.

PHAR:7101 Principles of Experimental Therapeutics 3 s.h.
Introduction to key principles and concepts for research in experimental therapeutics; basic principles related to drug disposition, toxicity, and efficacy.

PHAR:7102 Applied Clinical and Translational Science 3 s.h.
Application of clinical and translational science in a multidisciplinary collaborative environment to develop, conduct, and report research.

PHAR:7331 Analytic Issues in Health Services Research II 3 s.h.
Continuation of HMP:7960; advanced applications, including panel data and qualitative response models. Prerequisites: HMP:7960. Same as HMP:7965.

PHAR:7701 Surface Phenomena 2 s.h.
Behavior of matter in phase boundaries, especially adsorptive processes at liquid-solid and vapor-solid interfaces. Prerequisites: CHEM:4431.

PHAR:7702 Transport Phenomena 3 s.h.
Diffusion and mass transport phenomena related to pharmaceutical systems. Prerequisites: CHEM:4431.

PHAR:8100 Introduction to Pharmacy Practice 1 s.h.
Exposure to the pharmacy profession through varied shadowing experiences in practice settings. Requirements: P1 standing.

PHAR:8102 Pharmacy Practice Lab II 2 s.h.
Practical application of scientific and clinical knowledge used in the provision of pharmaceutical care; activities include prescription compounding, pharmacy calculations, communication skills, prescription counseling, and applications of drug information skills through secondary searching of the primary literature. Requirements: P1 standing.

PHAR:8103 Fundamentals of Evaluating Clinical Research 1 s.h.
Basic concepts for evaluation of clinical trials published in primary biomedical and pharmacy literature; design, methods, outcomes, statistical analysis, and generalizability of results. Requirements: P1 standing.

PHAR:8104 Pharmacy Law and Ethics 2 s.h.
Legal and moral aspects involved in the practice of pharmacy. Requirements: P3 standing.

PHAR:8105 Social Aspects of Pharmacy Care 2 s.h.
Conceptual issues related to social and behavioral components of pharmacy care; social construction of health and illness, medication use process, health communications, cultural competence, health disparities, public health. Requirements: P1 standing.

PHAR:8111 Pharmaceutics I: Solutions 4 s.h.
Application of physical and chemical principles to formulation, preparation of liquid dosage forms, including solution, colloids, ointments, emulsions. Requirements: P1 standing.

PHAR:8112 Pharmaceutics II: Solids and Semi-Solids 4 s.h.
Properties of solids; formulation, preparation, evaluation of solid dosage forms. Requirements: P1 standing.

PHAR:8121 Medicinal and Natural Products Chemistry I: Biotechnology and Chemotherapy 3 s.h.
Organic and inorganic medicinal and therapeutic agents of natural and synthetic origin; physical, chemical, biological, and biochemical properties as they relate to medicinal and therapeutic effects; comparative biological activity and toxicity; detoxication mechanisms; functional group chemistry; nomenclature; chemistry of radiodiagnostic and therapeutic agents; introduction to biopharmaceutical analysis. First in a three-course sequence. Prerequisites: CHEM:2220 and MIRC:3112. Requirements: P1 standing.

PHAR:8122 Medicinal and Natural Products Chemistry II: Pharmacodynamic Agents 3 s.h.
Medicinal chemistry of pharmacodynamic agents; introduction to peptides and proteins, thyroid hormone, diabetes, vaccines, gene therapeutics, NSAIDs, cardiovascular drugs, antihistamines, anticancer drugs. Second in a three-course sequence. Prerequisites: PHAR:8121. Requirements: P2 standing.

PHAR:8123 Medicinal and Natural Products Chemistry III: Medicinal Neurochemistry 3 s.h.
Receptor site theory; steroids, lipids, and prostaglandins; sedatives and hypnotics; drugs of abuse; cholinergics; excitatory amino acids and anticonvulsants; major analgesics; adrenergics; psychotherapeutics. Third in a three-course sequence. Prerequisites: PHAR:8121 and PHAR:8122. Requirements: P2 standing.

PHAR:8130 Foundations of Pharmacy Practice I 4 s.h.
Introduction to contemporary pharmacy practice; small-group discussion, application of core concepts through active hands-on learning approaches; for first-year student pharmacists. Requirements: P1 standing.
PHAR:8131 Professional Engagement 1 s.h.
Opportunity for student engagement in the College of Pharmacy prior to Professionalism Ceremony; development as a responsible partner in learning process by nurturing collaboration, leadership, service, compassion, community, self development, and social enrichment among students, faculty, and staff. Requirements: P1 standing.

PHAR:8132 Continuing Professional Development 1 s.h.
Engagement with profession of pharmacy and community through service and leadership activities, reflection; use of Continuous Professional Development Cycle (CPD) approach to learning. Requirements: P1 standing.

PHAR:8133 Introductory Pharmacy Practice Experience Career Exploration 1 s.h.
Hands-on exposure to various pharmacist career opportunities in four different pharmacy practice patient care settings; settings include practice areas and rotation types required for P4 Advanced Pharmacy Practice Experience (APPE) sites in community pharmacy, hospital pharmacy, ambulatory care/family practice, acute care medicine, and other elective practice settings; work with faculty mentor. Requirements: P1 standing.

PHAR:8134 Foundations of Health Services 3 s.h.
Foundation issues for pharmacist practice related to social, cultural, behavioral, economic, and organization design components of pharmacy care. Requirements: P1 standing.

PHAR:8135 Health Information Retrieval and Informatics 3 s.h.
Introduction and overview of health care information retrieval, organization, and dissemination; retrieval and organization of health information from pharmacy and medical primary and tertiary literature using secondary resources; knowledge and skills to manage, analyze, and legally share health information in electronic health records, pharmacy information systems, and automated systems. Requirements: P1 standing.

PHAR:8136 Foundations of Pharmaceutical Sciences I 3 s.h.
Introduction and overview of foundations of pharmaceutical sciences. Requirements: P1 standing.

PHAR:8137 Foundations of Pharmaceutical Sciences II 2 s.h.

PHAR:8140 Foundations of Pharmacy Practice II 4 s.h.
Introduction to contemporary pharmacy practice for first-year student pharmacists; classroom methods include small group discussion-based and active hands-on learning approaches where students will apply core concepts.

PHAR:8141 Discovery: Introduction and Background 3 s.h.
Create and disseminate new knowledge related to pharmacy or health care; broadly-based scholarly effort with topics ranging from patient case studies, literature reviews, and analysis of pharmacy practice problems or basic research.

PHAR:8142 Foundations of Health, Wellness, and Disease 2 s.h.
Overview of the basic processes of good health and practices that promote wellness; emphasis on the mechanistic causes of human disease.

PHAR:8146 Foundations of Pharmaceutical Sciences III 2 s.h.
Continuation of PHAR:8137.

PHAR:8147 Foundations of Pharmaceutical Sciences IV 3 s.h.
Continuation of PHAR:8146.

PHAR:8200 Introduction to Community Pharmacy Practice 3 s.h.
Exposure to community pharmacy through activities focusing on drug distribution, legal requirements, communication, patient interaction; during breaks in P2 year. Requirements: P2 standing.

PHAR:8201 Clinical Practice Skills I: Theory and Application 2 s.h.
Exploration and development of professional skills required for delivery of patient care; patient assessment, clinical decision making, communication (written and oral), teamwork. Corequisites: PHAR:8242.

PHAR:8203 Pharmacy Practice Lab III 2 s.h.
Practical application of scientific and clinical knowledge in the provision of patient-centered care; activities include prescription interpretation and counseling, compounding, applications of drug information, use of patient screening tools, physical assessment, and pharmacy law. Corequisites: PHAR:8240 and PHAR:8241, if not taken as prerequisites.

PHAR:8204 Pharmacy Practice Lab IV 2 s.h.
Practical application of scientific and clinical knowledge in the provision of patient-centered care; activities include providing medication therapy management for patients, prescription and self-care counseling, and application of drug information skills. Corequisites: PHAR:8242 and PHAR:8243, if not taken as prerequisites. Requirements: P2 standing.

PHAR:8205 Student Pharmacist Professionalism 1 s.h.
Participation in activities promoting leadership and professional learning, and service learning; required participation P1 through P3 years.

PHAR:8206 Introduction to Hospital Pharmacy Practice 2 s.h.
Exposure to hospital pharmacy through activities focusing on drug distribution, legal requirements, communication, patient interaction; during breaks in P2 year. Requirements: P2 standing.

PHAR:8207 Introductory Pharmacy Practice Experiences Community 3 s.h.
Exposure to the provision of care in a community pharmacy setting; activities focus on those experiences related to the community pharmacy environment, medication distribution, special products and populations, and related professional activities; delivered in set time blocks over winter break and during summer session before or after the P2 year.

PHAR:8208 Introductory Pharmacy Practice Experiences Hospital 80 2 s.h.
Exposure to the provision of care in a hospital pharmacy setting; activities focus on those experiences related to the hospital pharmacy environment, medication distribution, special products and populations, and related professional activities.

PHAR:8209 Introductory Pharmacy Practice Experiences Hospital 3 s.h.
Exposure to the provision of care in a hospital pharmacy setting; activities focus on those experiences related to the hospital pharmacy environment, medication distribution, special products and populations, and related professional activities.
PHAR:8213 Pharmacokinetics and Biopharmaceutics 3 s.h.
Qualitative and quantitative description of kinetics of drug absorption, distribution, and elimination, including physiological factors that influence each process; adjustment of dosing regimens for optimizing therapeutic drug levels in the body; dosing considerations in special populations.

PHAR:8230 Clinical Pharmacokinetics 3 s.h.
Application of pharmacokinetics to the clinical setting.
Requirements: P2 standing.

PHAR:8240 Introduction to Therapeutics/Special Populations 2 s.h.
Treatment modalities that promote health and treat common diseases; common laboratory and diagnostic procedures used to diagnose and monitor diseases; basic types of adverse drug reactions. Requirements: P2 standing.

PHAR:8241 Endocrinology, Ophthalmology, Women’s and Men’s Health Therapeutics 2 s.h.
Pharmacotherapy for endocrine and ophthalmologic disorders; review of disorders, treatment goals, treatment plans, patient counseling, monitoring of patient outcomes. Requirements: P2 standing.

PHAR:8242 Respiratory and Dermatologic Therapeutics 2 s.h.
Pharmacotherapy for respiratory and dermatology disorders; review of disorders, treatment goals, treatment plans, patient counseling, monitoring of patient outcomes. Requirements: P2 standing.

PHAR:8243 Cardiovascular Therapeutics 2 s.h.

PHAR:8250 Applications of Pharmacy Practice I 1 s.h.
Expands on skills and concepts taught in the foundations of pharmacy practice course series and includes skills relevant to the disease states in the specific aligned component courses; taught using a variety of classroom methods including small-group, discussion-based, and active hands-on learning approaches where students will apply core concepts.

PHAR:8251 Integrated Pharmacotherapy: Dermatology and Sensory 3 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8252 Integrated Pharmacotherapy: Musculoskeletal 3 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8253 Integrated Pharmacotherapy: Genitourinary and Reproductive 3 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8254 Integrated Pharmacotherapy: Endocrine 3 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8255 Discovery II: Design and Methods arr.
Create and disseminate new knowledge related to pharmacy or health care with emphasis on design methods and data collection.

PHAR:8260 Integrated Pharmacotherapy: Cardiovascular 4 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8261 Integrated Pharmacotherapy: Neurology and Psychiatry 4 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8262 Integrated Pharmacotherapy: Oncology 3 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8263 Integrated Pharmacotherapy: Infectious Diseases 4 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8264 Discovery III: Data Collection and Results 1 s.h.
Create and disseminate new knowledge related to pharmacy or health care with emphasis on data collection and results.

PHAR:8265 Applications of Pharmacy Practice II 1 s.h.
Expands on skills and concepts taught in the foundations of pharmacy practice course series and includes skills relevant to the disease states in the specific integrated pharmacotherapy courses; taught using a variety of classroom methods including small group, discussion-based, and active hands-on learning approaches where students apply core concepts.

PHAR:8300 Introduction to Clinical Pharmacy Practice 1 s.h.
Clinical practice experience observing and participating in clinical activities with P4 students, faculty, and other health care providers. Requirements: P3 standing.

PHAR:8301 Introductory Pharmacy Practice Experience Clinical 1 s.h.
This third IPPE clinical is completed as an introduction to the Advanced Pharmacy Practice Experiences (APPE) to which student pharmacists are exposed during their P4 year; the IPPE clinical involves a P3 student observing and participating with a P4 student currently on an APPE rotation.

PHAR:8302 Clinical Practice Skills II: Critical Patient Analysis 2 s.h.
Continuation of PHAR:8201; development of professional skills required for delivery of patient care; patient assessment, clinical decision making, communication (written and oral) skills. Corequisites: PHAR:8340. Requirements: P3 standing.

PHAR:8303 Clinical Practice Skills III: Applied Patient Management 2 s.h.
Continuation of PHAR:8302; development of professional skills required for delivery of patient care; patient assessment, clinical decision making, communication (written and oral), teamwork. Corequisites: PHAR:8342. Requirements: P3 standing.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8343 Infectious Disease Therapeutics 2 s.h.
Pharmacotherapy for infectious diseases; review of disease, therapeutic goals, treatment plans, patient counseling, monitoring of patient outcomes. Requirements: P3 standing.

PHAR:8370 Integrated Pharmacotherapy: Respiratory and Allergy 3 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8372 Integrated Pharmacotherapy: Gastroenterology and Nutrition 3 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8340 FEN, GI, and Renal Therapeutics 2 s.h.
Pharmacotherapy for fluid/electrolyte/nutrition disorders; gastrointestinal and renal diseases; review of disorders, treatment goals, treatment plans, patient counseling, monitoring of patient outcomes. Requirements: P3 standing.

PHAR:8341 Rheumatology, Immunology, Hematology, Oncology, and Transplantation Therapeutics 2 s.h.
Pharmacotherapy for rheumatology, immunology, hematology, oncology, and transplantation; review of disorders, treatment goals, treatment plans, patient counseling, monitoring of patient outcomes. Requirements: P3 standing.

PHAR:8342 Neurology/Psychiatry Therapeutics 2 s.h.
Pharmacotherapy for psychiatric and neurologic disorders; review of disorders, therapeutic goals, treatment plans, patient counseling, monitoring of patient outcomes. Requirements: P3 standing.

PHAR:8376 Discovery IV: Presentation of Results 1 s.h.
Dissemination and presentation of new knowledge related to pharmacy or health care with emphasis on design methods and data collection.

PHAR:8379 Advanced Pharmacy Practice Experiences Preparation 1 s.h.
Guidance provided for advanced pharmacy practice experiences.

PHAR:8380 Learning Portfolio 1 s.h.
Compilation of student work.

PHAR:8387 Capstone: Skills-Based Assessment 1 s.h.
Compilation of student work.

PHAR:8388 Capstone: Skills-Based Assessment 1 s.h.
Further development of assessment skills.

PHAR:8377 Integrated Pharmacotherapy: Capstone 3 s.h.
Capstone serves as a culminating academic and research project for students and mentors, integrating all areas of professional discovery.

PHAR:8378 Pharmacy Law and Ethics 2 s.h.
Topics include ethical behavior for pharmacists and student of pharmacy law.

PHAR:8373 Integrated Pharmacotherapy: Renal, Fluids, and Electrolytes 2 s.h.
Key elements of the science and practice of pharmacy presented in an integrated manner focused on particular organ systems or disease states.

PHAR:8500 Advanced Drug Literature Evaluation and Application 2 s.h.
Critical evaluation, utilization, and clinical application of drug literature.

PHAR:8501 Introduction to Nuclear Pharmacy 2 s.h.
Nuclear pharmacy as a specialty area of pharmacy practice that involves preparation of radioactive materials for patient administration.

PHAR:8502 Advanced Pharmacopalliation of Pain 2 s.h.
Exploration of symptom management across the trajectory of serious illness through a series of longitudinal patient cases.
PHAR:8503 Advanced Pharmacopalliation of Non-Pain Symptoms  3 s.h.
Terminal extubation, terminal agitation, discontinuing life sustaining therapies, and pharmacokinetic and pharmacetic issues in advanced illness.

PHAR:8504 Sustained Clinical Pharmacy Services  2 s.h.
Pharmacists may find themselves needing to justify their salary, the cost effectiveness of their pharmacy services, or may wish to create a new clinical service; introduction to pharmacists’ role in initiating and sustaining clinical services in the ambulatory setting; writing a business plan; identifying and communicating with key stakeholders; finding billable opportunities.

PHAR:8505 Advanced Topics in Infectious Disease, HIV, and Antimicrobial Therapy  2 s.h.
Topics in antimicrobial treatment of infectious diseases beyond those in the required pharmacy curriculum, including topics covered in the infectious disease therapeutics course; lectures, case discussion, class participation, and summary presentations of an uncommon organism or antimicrobial agent.

PHAR:8506 Health Informatics Essentials  2 s.h.
Health informatics as a multidisciplinary field that uses health information technology to improve health care services for patients.

PHAR:8507 Personal and Professional Transformation  2 s.h.
How to maximize personal and professional goals; focus on what students want to achieve in their personal and professional life.

PHAR:8702 Dean’s Pharmacy Forum II  2 s.h.
Contemporary issues in pharmacy practice, pharmacy education, and health care.

PHAR:8706 Pharmacy Projects  arr.
Basic and applied research problems of pharmaceutical interest.

PHAR:8708 Substance Abuse  2 s.h.
Themes and concepts in substance abuse and treatment; stimulants, depressants, alcohol, opiates, hallucinogens, steroids; drug abuse prevention and treatment, including dual diagnosis, from cradle to the grave.

PHAR:8712 Nonprescription Pharmacotherapy and Self-Care  2 s.h.
Introduction to nonprescription medications; development of patient assessment and consultation skills; understanding of pharmacist’s role in patient self-care. Requirements: P3 standing.

PHAR:8715 Health Disparities and Cultural Competence  2-4 s.h.
Characteristics, causes, and effects of health disparities in the U.S. health care system; foundation for development of knowledge, attitudes, and skills required of culturally competent health care providers; definitions and models of cultural competence, characteristics of culturally effective practitioners and workplaces; health disparities among specific populations, evidence for cultural competence as a remedy; taking a culturally appropriate history; working with interpreters; legal and professional imperatives for cultural competence. Same as NURS:3715.

PHAR:8717 Ambulatory Care Pharmacy  2 s.h.
Additional experience in the practice of clinical pharmacy; focus on key therapeutic areas where ambulatory care clinical pharmacists currently have a significant impact improving patient care, including anticoagulation management, hyperlipidemia management, and diabetes management; opportunity to develop expertise in clinical decision making, improve problem solving abilities, and continued development in writing and oral presentation skills. Prerequisites: PHAR:8241 and PHAR:8243. Requirements: P3 standing.

PHAR:8718 Special Topics in Acute Care  2 s.h.
Pharmacotherapy for common but varied inpatient medicine topics; review of disorder, therapeutic goals, treatment plans, patient education, monitoring; lecture or case-based classes; anticoagulation, hemostasis, diabetic ketoacidosis, ICU overview, hepatic failure, renal replacement therapies, ACLS, antimicrobial and antifungal selection, septic shock, cardiogenic shock, neurogenic shock and neuro/neurosurgical emergencies, burns, sedation.

PHAR:8719 Overview of Pediatric Pharmacotherapy  2 s.h.
Discussion of issues and problems in pediatric pharmacotherapy; clinical practicum. Prerequisites: PHAR:8230 and PHAR:8240. Requirements: P3 standing.

PHAR:8721 Leadership and Political Advocacy  arr.
Contemporary issues in pharmacy; role of leadership and advocacy in shaping profession; becoming effective advocates within political and policy making process; development of advocacy and leadership skills essential to improve self, profession, and community. Requirements: P1, P2, or P3 standing. Recommendations: PHAR:8702 and PHAR:8722.

PHAR:8722 Current Topics in Health Policy  2 s.h.
Legislative process and broad range of current issues in health policy; general- and pharmacy-specific health policy topics at state and federal levels. Requirements: P1, P2, P3, or graduate standing.

PHAR:8723 Infectious Disease for Acute Care Practice  1 s.h.
Contemporary issues related to infectious diseases; unusual pathogens such as Ebola, tropical medicine, bioterrorism, resistance, travel medicine, epidemiology.

PHAR:8724 Hospital Pharmacy Practice Management Elective  2 s.h.
Organizational structure of pharmacy departments in hospitals and health care systems; models for delivery of pharmaceutical care; pharmacy’s role in drug-policy decision making; provision of drug information; clinical and distributive pharmacy services; control of pharmacy and pharmacy costs; use of information technology and automation for service delivery; supervisory management; quality improvement. Requirements: P3 standing.

PHAR:8725 Career Pathways in Pharmacy  1 s.h.
Career preparation through writing, speaking, reading, and listening; writing résumés, curricula vitae, cover letters; interviewing techniques; electronic portfolios; web-based career information; guest speakers from pharmacy associations, major chains; workshop approach. Requirements: P3 standing.

PHAR:8788 International Perspectives: Xicotepec  2-3 s.h.
Introduction to providing service to a community in a less developed country; student projects intended to improve community life in Xicotepec. Requirements: P3 standing. Same as CEE:4788, GHS:4126, THTR:4265.
PHAR:8790 Topics in Community Pharmacy Management 2 s.h.
Focus on building practical knowledge and understanding of business principles.

PHAR:8791 Survey of Basic Pharmaceutical Sciences 1 s.h.
Aspects of drug discovery and development; seminar with guest speakers from industry. Requirements: admission to Pharm.D. program.

PHAR:8792 Spanish for the Pharmacy Profession 2 s.h.
Intermediate to advanced professional Spanish communication skills for the pharmacist. Requirements: one year of college-level Spanish.

PHAR:8793 Introduction to Global Health Studies 1 s.h.
Overview of topics pertaining to international health and cultural diversity in relation to pharmacy and global health; preparation for student pharmacists to become health care practitioners who optimize the health of patients and society; inspires students to advance the profession by fostering collaboration, global and public health leadership, professionalism and civic engagement; introduction and discussion of important topics in global health, focusing specifically on care of the underserved in a global context.

PHAR:8794 Emergency Medicine and Toxicology 2 s.h.
Pharmacology in the world of emergency medicine and toxicology; students learn through lecture, case discussion, class participation, and evaluation of evidence-based medicine literature in emergency medicine and toxicology.

PHAR:8795 Foundations of Palliative Care 2 s.h.
Introduction to palliative care as a public health issue; exploration of the principles and practice of palliative care including interdisciplinary care of the whole person and family, communication, and self care.

PHAR:8796 Introduction to Travel Medicine 1 s.h.
Overview of services provided to travelers to prevent and management conditions that may arise prior to, during, and after international travel; students learn about topics pertaining to each of these areas.

PHAR:8797 Ethics and Spirituality in Health Care 3 s.h.
Case-based examination of ethical issues in caring for patients with serious illness; exploration of suffering, spirituality, death, and dying. Requirements: P2 or P3 standing.

PHAR:8798 Continuing Professional Development in Palliative Care 1 s.h.
Self-directed learning and development in palliative care; creation and implementation of a professional development plan including activities in service, scholarship and education, leadership and advocacy, and self-care and personal resilience.

PHAR:8811 New Drugs for New Therapies: Introduction to Drug Discovery, Development, and Registration 1-2 s.h.
From "magic bullets" to "personalized medicine," the quest for new drugs to treat disease involves serendipity, science, and business success; through lectures, presentations, readings, and discussion, students will learn how potential new drug therapies are identified and what happens between finding a drug that seems to work and the launch of a commercial drug product.

PHAR:8818 Nutritional Supplements in Health and Disease: Mechanisms and Actions 3 s.h.
Mechanisms of action and current use of common dietary supplements including vitamins, minerals, herbs and botanicals, amino acids, and enzymes; focus on evidence-based approaches to functional use of supplements and their roles in achieving and maintaining health.

PHAR:9401 Ambulatory Care Rotation 6 s.h.
Clinical experience in providing pharmaceutical care in outpatient clinic settings. Requirements: P4 standing.

PHAR:9402 Elective Ambulatory Care Rotation 6 s.h.
Clinical experience providing pharmaceutical care in specialty outpatient settings. Requirements: P4 standing.

PHAR:9403 Elective Nuclear Pharmacy Rotation 6 s.h.
Practical experience in the handling and clinical use of radiopharmaceuticals. Requirements: P4 standing.

PHAR:9404 Community Pharmaceutical Care Rotation 6 s.h.
Clinical experience in the community setting; emphasis on delivery of pharmaceutical care. Requirements: P4 standing.

PHAR:9405 Elective Hospice and Palliative Care Rotation 6 s.h.
Clinical experience providing pharmacotherapy for end-of-life care. Requirements: P4 standing.

PHAR:9406 Elective: Drug Information Rotation 6 s.h.
Practice experience applying drug information knowledge to service and research projects. Requirements: P4 standing.

PHAR:9407 Elective Family Medicine Rotation 6 s.h.
Clinical practice experience applying primary care therapeutics in family medicine practice settings. Requirements: P4 standing.

PHAR:9408 Elective Hematology/Oncology Rotation 6 s.h.
Drug therapy management of oncology patients and patients with hematologic malignancies, aplastic anemia, sickle cell disease, hemophilia. Requirements: P4 standing.

PHAR:9409 Elective Home Health Care Rotation 6 s.h.
Clinical experience in the team approach to health care delivery, including total parenteral nutrition, chemotherapy, intravenous antibiotics, lab analysis, hospice care, and pain management. Requirements: P4 standing.

PHAR:9410 Hospital Pharmacy Rotation 6 s.h.
Instruction and practical experience in various components of hospital pharmacy; emphasis on hospital organization, inpatient and outpatient services, IV admixtures, unit dose, and clinical services. Requirements: P4 standing.

PHAR:9411 Elective Long Term Care Rotation 6 s.h.
Practice in consulting and providing services to varied long-term patient care environments. Requirements: P4 standing.

PHAR:9412 Elective Managed Care Rotation 6 s.h.
Practice experience in providing pharmaceutical care or pharmacy-related services in a managed care organization. Requirements: P4 standing.

PHAR:9413 Acute Care Medicine Rotation 6 s.h.
Clinical experience applying therapeutic skills for the pharmacotherapeutic management of patients on general medicine or specialty inpatient areas. Requirements: P4 standing.

PHAR:9415 Elective: Pediatrics Rotation 6 s.h.
Clinical experience in drug therapy management of general and specialty pediatric patients. Requirements: P4 standing.
PHAR:9416 Elective: Pharmacy Rotation 6 s.h.
Selected practice experiences in various pharmacy practice settings. Requirements: P4 standing.

PHAR:9417 Elective Psychiatry Rotation 6 s.h.
Clinical experience in the rational use of drugs in psychiatric disorders. Requirements: P4 standing.

PHAR:9418 Elective Research Rotation 6 s.h.
Practice experience in basic pharmaceutical or clinical research; proposal, study design, data collection and analysis, presentation of results. Requirements: P4 standing.

PHAR:9419 Elective: Surgery Rotation 6 s.h.
Clinical experience in drug therapy management on a surgery unit. Requirements: P4 standing.

PHAR:9420 Elective Pharmacy Practice Underserved Population Rotation 6 s.h.
Opportunity to learn the best practices for pharmaceutical management; approaches to enhance access to and appropriate use of medicines in underserved and resource-limited environments. Requirements: P4 standing.

PHAR:9421 Elective Community Management Rotation 6 s.h.
Practice exposure to community pharmacy operations and management at the store, district, or corporate level. Requirements: P4 standing.

PHAR:9422 Elective: Compounding/Complimentary Alternative Medicine Rotation 6 s.h.
Clinical work in a community setting with focus on team approach; experience developing extemporaneous compounds to optimize patient care and/or integrating traditional and nontraditional medicine. Requirements: P4 standing.

PHAR:9423 Elective: Critical Care Medicine Rotation 6 s.h.
Practice experience providing pharmaceutical services to intensive care unit patients. Requirements: P4 standing.

PHAR:9424 Elective Emergency Medicine Rotation 6 s.h.
Clinical experience providing pharmaceutical care for patients treated in the emergency department. Requirements: P4 standing.

PHAR:9425 Elective Hospital Management Rotation 6 s.h.
Practice experience in hospital pharmacy operations and management. Requirements: P4 standing.

PHAR:9426 Elective Infectious Disease Rotation 6 s.h.
Clinical experience providing pharmaotherapeutic management of patients receiving antimicrobial medications. Requirements: P4 standing.

PHAR:9427 Elective Medication Use Evaluation Rotation 6 s.h.
Practical experience in drug use evaluation to improve patient outcomes. Requirements: P4 standing.

PHAR:9428 Elective Pharmacy Industry Rotation 6 s.h.
Practice experience in an area of the pharmaceutical or related industries. Requirements: P4 standing.

PHAR:9429 Elective: Pharmacy Regulatory Rotation 6 s.h.
Practice experience with a pharmacy regulatory body. Requirements: P4 standing.

PHAR:9430 Elective: Professional Association Rotation 6 s.h.
Practice experience in professional association management environment at the state or national level. Requirements: P4 standing.

PHAR:9431 Elective: Veterinary Pharmacy Rotation 6 s.h.
Practice experience in managing drug therapy for animals. Requirements: P4 standing.

PHAR:9432 Elective: Advanced Community Pharmacy Rotation 6 s.h.
Community pharmacy experience emphasizing patient-centered care. Requirements: P4 standing.

PHAR:9433 Elective Academic Rotation 6 s.h.
Practice experience delivering pharmacy education with a College of Pharmacy faculty member. Requirements: P4 standing.

PHAR:9434 Elective International Pharmacy Non-Patient Care Rotation 6 s.h.
Practice experiences in pharmacy practice outside the United States with a focus on research, health care policy, and/or pharmacy education. Requirements: P4 standing.

PHAR:9435 Administrative Bye Rotation 6 s.h.

PHAR:9436 Transitions of Care Rotation 6 s.h.
Practice experience consulting and providing services to patients transitioning through different patient care environments.

PHAR:9437 Elective Informatics Rotation 6 s.h.
Practice experience in informatics in health care setting.

PHAR:9438 Elective International Pharmacy Patient Care Rotation 6 s.h.
Practice experiences in pharmacy practice outside the United States with a patient care focus.