



Pharm D Course Descriptions 2015-2016

The core curriculum is delivered in 8 semesters and covers a series of courses based within the following sub disciplines: (i) biomedical sciences (ii) the pharmaceutical sciences, (iii) the social & behavioral & administrative sciences, (iv) clinical sciences, and (v) integrated sciences.

Biomedical Sciences

PHAR 621 Cell and Molecular Biology and Biochemistry (5 cr)

The Cellular and Molecular Biology and Biochemistry course is designed to provide the pharmacy students with a fundamental understanding of current concepts of cellular and molecular biology, and human biochemistry. Students are provided an overview of eukaryotic carbohydrate, lipid and protein metabolism, cellular signal transduction, biomedical aspects of human nutrition, genetic regulation, the molecular basis of inherited genetic diseases and acquired diseases like cancer, principles of commonly used biotechnologies, drug targets screening, and biopharmaceutical products generation. Prerequisites Courses: None

PHAR 622 Pathophysiology and Pharmacology I: The Nervous System (6 cr)

This course introduces the basic mechanisms of pathophysiology and pharmacology, and then integrates these disciplines through the study of the etiology, pathogenesis, clinical manifestations, treatment and prevention of major neurologic, psychiatric, and neuroendocrine diseases/disorders. Following an introduction to normal tissue types and adaptive responses, the course will cover basic etiological and pathophysiological mechanisms, including cell, tissue and organ system responses to stress and injury. Mechanisms of injury will be reviewed, including chemical and physical insults, accumulations, hypoxia/ischemia, teratogens, genetic mutations, infections, immunologic injury, and aging. The central and peripheral nervous systems (CNS & PNS), including the autonomic system, are reviewed, including receptors, ligands, autonomic and peripheral nervous systems, neuroanatomy, histology, neurophysiology, synaptic plasticity, and neuroendocrinology. Prerequisites Courses: PHAR 621, 631

PHAR 724 Pathophysiology and Pharmacology II: Cardiovascular, Diabetes, Thyroid (6 cr)

This course describes and evaluates underlying pathogenesis of major cardiovascular disorders and the cardiovascular pharmacology. Upon completion of this course, students gain an understanding of major cardiovascular disease states, drug targets based on understanding the pathophysiology, the mechanism of action and adverse effects of drugs used to treat cardiovascular disorders. Selected topics include hypertension, dyslipidemia, thrombosis, arrhythmia, ischemic heart diseases, heart failure, venous thromboembolism, peripheral arterial diseases, valvular disease and cardiovascular shocks. In addition, this course describes the pathophysiology of two of the endocrine glands, thyroid and pancreas. Students gain an understanding of underlying pathogenesis of hypothyroidism, hyperthyroidism and Diabetes Mellitus, and mechanism of action and adverse effects of pharmacological classes and agents to treat these endocrine disorders. Prerequisites Courses: PHAR 621, 622, 631, 633

PHAR 725 Pathophysiology and Pharmacology III: Pulmonary/ Renal/GI/GU (5 cr)

In this course, students will learn to identify drug targets based upon an understanding of the pathophysiology of major diseases of the respiratory, renal, gastrointestinal, genitourinary, and endocrine systems. Students will learn to recognize the major disorders of these systems, the mechanism of action and adverse effects of pharmacological classes of drugs used in the treatment of these disorders. In addition, students will learn the alternative pharmacological agents for patients who exhibit significant adverse effects to existing pharmacological therapy of these disorders. Prerequisite Courses: 621, 622, 724

PHAR 827 Immunology (4 cr)

The course will initially focus on an overview of innate and adaptive immunity as well as basic principles of cellular (T and B lymphocyte) immunology. A special emphasis will then be placed on integrating the underlying pathophysiological and applicable pharmacological mechanisms, which can be used in the intervention and management of immunological-based diseases. These disease states include: Th2-mediated diseases (e.g., Allergy), as well as Th1 and Th17 driven autoimmune diseases (e.g., Rheumatoid Arthritis, Psoriasis, Crohn's Disease, Systemic Lupus Erythematosus, and Multiple Sclerosis). Other topics covered in the course include organ transplantation, vaccination for disease, immunodeficiency and AIDS, as well as interactions between the immune system and cancer. Students are provided with an overview of immunity, cells and proteins of the immune system, along with their specific roles and interactions in human disease. Students will gain an understanding of specific disease state management through the interpretation of basic scientific findings, application of pharmacologic principles, relevant clinical reports/data and evidence-based clinical guidelines. These principles will be emphasized in reading assignments, assigned applications, and in-class discussion. Team-based and evidence-based patient case discussion, as well as patient pharmacological treatment plan recitation will be applied throughout the course. Prerequisite Courses: 621, 622, 631, 724, 725.

Pharmaceutical Sciences

PHAR 631 Medicinal Chemistry & Physical Pharmacy (5 cr)

The course consists of four components: 1) Fundamentals of Medicinal Chemistry – which introduces the concepts required to understand the principles of Medicinal Chemistry, including drug structure-relationships, prediction of the physico-chemical properties of a drug, basic knowledge of the major pathways of drug metabolism and factors that can contribute to drug-drug interactions. 2) The students will be able to predict the solubility, metabolism and pharmacological activity/potency of drugs classes based on the contribution of their functional groups to their structures. 3) The course is designed to provide students with a fundamental understanding of drug assay and the application of chemical and physico-chemical methods of analysis to pharmaceutical substances. 4) The course provides students with a fundamental knowledge of the active constituents of natural medicines with emphasis on the top selling medicinal herbs. Prerequisites Course: None

PHAR 632 Biopharmaceutics, Drug Delivery and Calculations (5 cr)

This course is designed to give students an appreciation of the formulation, manufacture, and testing of dosage forms as well as an understanding of the interactions between complex drug delivery systems and biological systems. The course covers all the basic dosage forms and drug delivery systems as well as the routes of administration, absorption, and bioavailability. The course

will also cover pharmaceutical calculations and gives an overview of drug quality control and regulation. Prerequisites Course: None

PHAR 633 Basic and Clinical Pharmacokinetics (5 cr)

This course focuses on understanding and applying pharmacokinetic principles for optimizing drug dosage. It is divided into three modules; descriptive, quantitative, and clinical pharmacokinetics. Descriptive pharmacokinetics provides a basic introduction to the key pharmacokinetic principles. This module enables the student to conceptualize principles such as drug bioavailability, distribution, clearance, and excretion. Concepts of drug absorption, metabolism, protein binding, and pharmacokinetic drug interactions will be discussed as well. Quantitative pharmacokinetics covers the mathematical aspects, including the calculation of pharmacokinetic parameters following drug administration and compartment modeling. The third module, clinical pharmacokinetics, covers the process of using pharmacokinetic principles to optimize individual drug therapy in individuals and in patients with altered physiology. Prerequisite Courses: PHAR 632

Social/Behavioral/Administrative Sciences

PHAR 634 Biostatistics and Pharmacoepidemiology (3 cr)

This course is designed to introduce major concepts in biostatistics and pharmacoepidemiology, two topics that are closely intertwined. Students will develop the ability to interpret and critically evaluate medical literature and to identify findings that have implications for their practice. Emphasis will be placed on an examination of how observational study designs draw upon epidemiologic techniques to address drug effectiveness, safety, outcome assessment and regulatory decision making. Students will also acquire skills in applying statistical analysis concepts learned throughout this course with the use of common computer software. Prerequisite Courses: None

PHAR 712 Professional Communications (2 cr)

The course is designed to teach student pharmacists the skills and techniques necessary to have productive communication encounters with patients and healthcare professionals using verbal and non-verbal abilities. Utilizing techniques that evolve around oral and written communication, the students will begin to develop the skills necessary to conduct effective patient interviewing/counseling encounters, initiate problem solving & conflict management techniques, and expand their awareness regarding cultural competence and health literacy. Prerequisites Course: None

PHAR 811 Pharmacy and the Health Care System (3 cr)

This course will introduce the major healthcare stakeholder groups (patients, providers, payers, and policymakers), and elucidate the manner by which their interests and interactions over the last 100 years have shaped the current US healthcare financing and delivery system, and sets the stage for health care reform intervention. Students will learn how to use this information as a framework to identify existing and future healthcare needs, and develop potential pharmacist-driven solutions and implementation strategies. Prerequisites Course: PHAR 634, 661, 712, 743

PHAR 813 Pharmacy Law and Ethics (3 cr)

This course is designed to prepare student pharmacists to evaluate through critical thinking and problem solving skills and techniques necessary to identify, analyze, and evaluate the legal and ethical issues pertaining to the practice of pharmacy. Upon completion, a student will have an understanding of requirements for preparing and dispensing medications in a manner compliant

with pharmacy rules/regulations and laws, as well as preparing and maintaining records that respect a patient's privacy interests and comply with the law, along with an appreciation for a pharmacist's duty to avoid harm while practicing the profession within the allocation of health resources, patient autonomy, and interactions with other healthcare providers.

Prerequisite Courses: PHAR 661 and IPPEs

PHAR 815 Pharmacy Management and Economic Principles (3 cr)

The objective of this course is to provide an opportunity to the pharmacy students to learn important management, organizational, accounting, entrepreneurial, and marketing skills that are useful for pharmacy practice. To provide optimum care and services as a healthcare professional, pharmacists should understand the basic principles of managerial, organizational, and financial management. On a day-to-day basis pharmacists have to deal with people, change, structural demands, and organizational behavior. Therefore, more emphasis will be given to planning, organization, motivation, control, and marketing as they relate to community and health-system pharmacy management. This course will also provide a basic introduction of pharmacoeconomic principles and its application to improve patient outcomes. Course material will provide the students with an understanding of the methods to choose a cost-effective drug therapy for patient populations in order to achieve quality clinical, economic and humanistic outcomes. A combination of classroom mini-lectures, class discussion, required readings, and in-class learning assignments will be used to facilitate the student's understanding of important concepts related to pharmacy management and pharmacoeconomics. Prerequisite Courses: PHAR 811

Clinical Sciences

PHAR 641 Self Care I (4 cr)

Self-Care I is the first clinical course that exposes the student to the appropriateness of patient interviewing, physical assessment and product selection of over-the-counter (OTC) medications. This course is interactive and designed to introduce a systematic approach for evaluating a patient's self-care needs. Students will be expected to understand how and why obtaining a comprehensive patient history and potentially conducting a physical exam are necessary to objectively recommend appropriate over-the-counter medications that are safe and effective. Students will begin to appreciate the role of a pharmacist and how educating and empowering patients is a cornerstone in community pharmacy practice. Prerequisite Courses: None

PHAR 642 Self Care II (3 cr)

Self-Care II is the second integrated clinical course that exposes the student to the appropriateness of patient interviewing, physical assessment and product selection of over-the-counter (OTC) medications and complementary alternative medication (CAM) therapy. This course is interactive and designed to continue the systematic approach for evaluating a patient's self-care needs. Students will continue utilizing their skills to take a comprehensive patient history and conduct a proper physical exam, if necessary, for appropriately recommending over-the-counter medications that are safe and effective. Prerequisite Courses: PHAR 641

PHAR 743 Drug Literature Evaluation & Drug Information (3 cr)

This course will provide a systematic approach to drug information and literature evaluation to formulate and implement appropriate drug therapy decisions. This includes effective searching, retrieval, evaluation and dissemination of electronic and print resources. Students will utilize skills learned in this course to effectively communicate and tailor drug information at the appropriate

level for providers, other health professionals, caregivers, patients and the public. Additionally, this course will provide introductory knowledge on the state-of-the-art in pharmacy informatics and decision support systems needed to implement patient-centered care. Students will be able to define basic terminology used in health informatics and describe the health benefits and current constraints in using information and communication technology in health care. Prerequisite Courses: PHAR 634

Integrated Sciences

PHAR 757 Pharmacotherapy I: Clinical Foundations & Clinical Neuroscience (Neurologic and Psychiatric Disorders) (8 cr)

The course will focus on clinical foundations and integration of the pathophysiological and pharmacological mechanisms and the pharmacotherapeutic interventions used in the management of disorders that are specific to or have a high prevalence in psychiatry or neurology. Prerequisite Courses: 621, 622, 631, 632, 633, 634, 641, 642, 661

PHAR 752 Pharmacotherapy II: CV/Diabetes/ Pulmonary (8 cr)

This course focuses on the development of highly skilled clinical pharmacists. Students are taught to integrate knowledge of therapeutic interventions with the pathophysiological and pharmacological mechanisms and patient specific data to optimally management cardiovascular, pulmonary, and endocrine disorders. Students will gain understanding of disease state management through the interpretation of case reports, laboratory findings, application of pharmacologic principles and evidence based guidelines. These principles will be emphasized in reading assignments, through individual and team in-class applications, and classroom discussion utilizing the Team-Based Learning pedagogy. This learning pedagogy will be supplemented by additional active learning utilizing tools including the Objective Structured Clinical Exams (OSCE), Journal Club, Simulation, SOAP Notes and Care Plans. Updates in the primary literature and practice recommendations will also be examined. Students will learn to demonstrate clinical skills relevant to providing patient care in simulated learning activities. Evidence based patient case discussion and patient therapeutic treatment plan recitation will be applied throughout the course. Students will also be expected to demonstrate the professional skills, attitudes, and values necessary to enter a clinical service. Prerequisite Courses: 633, 724, 743, 757

PHAR 853 Pharmacotherapy III: Renal/Gastrointestinal /Hematology/Oncology (8 cr)

This course has four distinct blocks of pharmacotherapy: renal, gastrointestinal, hematologic, and This course covers several topics of pharmacotherapy: renal, nutrition, gastrointestinal disorders, hepatic, hematology, and oncology as well as some ethical issues surrounding patient care. The student will need to integrate physiologic, pathophysiologic, pharmacologic, pharmacodynamic, pharmacokinetic, laboratory monitoring, and pharmacotherapeutic principles to assess and/or formulate disease specific pharmacotherapy care plans. The course will focus on optimizing drug therapy through the design, recommendation, implementation, monitoring, and modification of individualized pharmacotherapeutic plans using updated pharmacologic principles, clinical recommendations, and evidence based guidelines. Prerequisite Courses: 634, 725, 743, 752

PHAR 856 Pharmacotherapy IV: Microbiology and Infectious Diseases (8 cr)

This course will cover the pathophysiology and treatment of bacterial, viral, and fungal infections, as well as the principles of antimicrobial regimen selection and antimicrobial prophylaxis. By the end of this course the student should be able to: identify the principles of the practice of infectious diseases, identify the impact of the use of antimicrobial agents on the population, describe basic

properties of common pathogenic microorganisms, list pharmacological properties of selected antimicrobial agents, identify likely pathogens responsible for a particular infectious disease process, select first line and alternative antimicrobial agents for selected disease states, and identify appropriate actions to monitor for efficacy and toxicity. To accomplish these goals, the student will be required to comprehend common microbiologic laboratory tests used to identify microorganisms. The student will be expected to know the mechanisms of action, dosing regimens, antimicrobial spectrum, mechanisms of bacterial resistance, common adverse reactions, and pharmacokinetics/pharmacodynamic properties of antimicrobial agents discussed in course materials. Additional topics related to men's health will also be covered, objectives for which include the ability to select appropriate treatment of patients with erectile dysfunction, benign prostatic hyperplasia, urinary incontinence, and hormonal imbalances. Prerequisite Courses: 631,633, 743, 827

PHAR 853 Integrated Skills Laboratory (2 cr)

The Integrated Skills Laboratory teaches students the fundamentals of the roles and responsibilities of the pharmacist in a variety of practice settings. Throughout the semester, students will be exposed to simulations in community, hospital, and ambulatory care environments and developing skills in prescription processing, order entry and evaluation, and disease state management. Students will also be exposed to patient case scenarios and tasked to assess, evaluate, and prioritize patient problems and provide appropriate treatment recommendations. This longitudinal course will build on skills developed in previous courses such as Intro to Pharmacy Practice and Integrated Sciences to optimize performance in Advanced Pharmacy Practice Experiences (APPE). Prerequisite Courses: All year 1 & year 2 courses; 811, 827, 853, 861

Introductory Courses

PHAR 661 Introduction to Pharmacy Practice (2 cr)

This course is designed to prepare students for their first community Introductory to Pharmacy Practice Experience (IPPE) as well as provide an overview of pharmacy practice. This course will introduce the students to the practical aspects of pharmacy practice including basic pharmacy dispensing and contemporary pharmacy issues as well as allow them to complete many certificate programs as required by their experiential practice experiences. Additionally, students will be expanding on their introductory knowledge of commonly dispensed prescription medications (Top 200) and review their pharmacy calculations skills. Students will visit a local pharmacy wholesaler to better understand the pharmacy supply chain. Prerequisites Course: None

IPPEs (PHAR 761, 762, 861, & 862) (2 cr each)

The Introductory Pharmacy Practice Experiences (IPPE I-IV) will be based in community, hospital and a variety of specialty sites. Each IPPE will consist of a minimum of 75 hours per semester and may include, but not be limited to, the following supervised activities:

- processing and dispensing new and refill medication orders
- conducting patient interviews to obtain pertinent patient information
- creating patient profiles
- responding to drug information inquiries
- interacting with other health care professionals

- participating in public health educational programs
- interpreting and evaluating patient information
- triaging and assessing the need for patient referral
- identifying patient-specific factors that affect health and pharmacotherapy
- assessing patient health literacy and compliance
- performing calculations required to compound, dispense, and administer medications
- providing point-of-care and patient-centered services
- conducting physical assessments
- preparing and compounding extemporaneous preparations
- communicating with patients and health care providers
- interacting with pharmacy technicians in the delivery of pharmacy services
- documenting interventions in patient records
- billing third parties for pharmacy services

Advanced Pharmacy Practice Experiences (PHAR 971 – 976) (6 cr each)

The required Advanced Pharmacy Practice Experiences (APPE I-VI) will be based in community pharmacy, institutional pharmacy, acute care general medicine, and ambulatory care settings. Elective APPE's will be offered in oncology, critical care, long-term care pharmacy, and other specialized pharmacy care settings. Each APPE is 240 hours (40 hours/week for 6 weeks) in duration and may include, but not be limited to, the following activities:

- all of the above IPPE activities
- identifying and reporting medication errors and adverse drug reactions
- managing the drug regimen through monitoring and assessing patient information
- providing pharmacist-delivered patient care
- providing patient education
- educating the public and health care professionals on the treatment of medical conditions, wellness, dietary supplements, durable medical equipment, and medical and drug devices
- retrieving, evaluating, managing, and using clinical and scientific publications in the decision-making process
- accessing, evaluating, and applying information to promote optimal health care
- ensuring continuity of pharmaceutical care among health care settings
- participating in discussions and assignments regarding compliance with accreditation, legal, regulatory/legislative, and safety requirement, the drug approval process, and health care policy matters that affect pharmacy
- working with the technology used in pharmacy practice
- managing systems for storage, preparation, dispensing, and safety of medications and help supervise technical personnel involved in such processes
- performing prospective and retrospective outcomes analyses to support formulary recommendations and therapeutic guideline development
- creating a business plan to support a patient care service administering medications where practical and legal