

# PHARMACY (PHAR)

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## PHAR 500 - INTRODUCTION TO PROFESSIONAL DEVELOPMENT

The course introduces students to the profession, historic elements, and the process for becoming a pharmacist. Students will engage in self-reflection about the opportunities within the profession and the education and training required to obtain their desired pharmacy position. This course introduces the importance of interprofessional approaches to patient care in complex health care systems and the role of the pharmacist to assure optimal medication therapy outcomes.  
Credits: 1

## PHAR 502 - DRUGS AND SUBSTANCES OF ABUSE

This elective course will serve to introduce and examine current issues with drugs and substances of abuse, including approaches to identifying current and emerging drugs and substances of abuse, understanding the impact of drugs and substances of abuse has on patient, and management of a patient presenting to a facility with intoxication due to drugs and/or substances of abuse. The overall goal of this class will be to define the role a pharmacist can play as a provider of facts and information of drugs and substances of abuse.  
Credits: 1.5

## PHAR 505 - IMMUNIZATION CERTIFICATION

Pharmacy-Based Immunization Delivery is an innovative and interactive training program that teaches student pharmacists and pharmacists the skills necessary to become a primary source for vaccine information and administration. The program teaches the basics of immunology and focuses on practice implementation and legal/regulatory issues.  
Credits: 1.5

## PHAR 506 - FUND OF SOLID ORGAN TRANSPLANT

In the solid organ transplant setting, pharmacists have a unique role on multidisciplinary medical teams through their expertise in pharmacotherapeutics, pharmacokinetics, and drug information. This course introduces students to select disease states encountered in the solid organ transplant setting as well as current controversies regarding the clinical management of these patients. The therapeutic management of transplant patients will be discussed using case study, interactive methods and lecture formats. This elective provides an opportunity to advance solid organ transplant understanding and clinical application for students potentially interested in pursuing residency training and/or specialty training in solid organ transplant pharmacy  
Credits: 3

## PHAR 510 - BIOCHEMISTRY I

Knowledge of biochemistry is necessary to understand physiology and pathology of all cells, tissues and organ systems, as well as pharmacologic and therapeutic strategies employed in disease management. This clinically relevant biochemical knowledge base will be covered in two courses in the curriculum designated as Biochemistry I & II and are designed to produce specific educational and ability-based outcomes.  
Credits: 4

## PHAR 511 - BIOCHEMISTRY II

Knowledge of biochemistry is necessary to understand physiology and pathology of all cells, tissues and organ systems, as well as pharmacologic and therapeutic strategies employed in disease management. This clinically relevant biochemical knowledge base will be covered in two courses in the curriculum designated as Biochemistry 1 & 2 and are designed to produce specific educational and ability-based outcomes.  
Credits: 4

## PHAR 512 - CLINICAL MICROBIOLOGY & IMMUNOLOGY

Clinical microbiology and immunology is designed to train students in the principles of microbiology and introduce them to its application in pharmaceutical and clinical practice and to the understanding and management of infectious diseases. Topics in pharmaceutical and clinical microbiology will include fundamental principles of pathogenicity (specifically bacteria, fungi, viruses and parasites), antimicrobial agents, contamination and infection control, aseptic techniques and sterility requirement in pharmaceuticals production.  
Credits: 4

## PHAR 514 - PATHOPHYSIOLOGY I

This course is focused on providing the background in functional anatomy, physiology, and pathology of organ systems that will allow students to integrate knowledge necessary to formulate a therapeutic care plan, to recommend and defend the course of treatment that best addresses a patient's needs, to evaluate the effectiveness of a treatment regimen and manage medications in a manner that assures optimal therapeutic.  
Credits: 4.5

## PHAR 519 - PHARMACEUTICS I: CALCULATIONS

This course focuses on the arithmetic operations involved in ensuring that accurate doses of medications are dispensed to patients. It is aimed at developing the pharmacy students' knowledge, skills and attitudes that would engender attention to detail, precision and accuracy in every operation that they perform so as to ensure that error-free, safe and efficacious medicines are dispensed to clients at all time. The course will develop students' skills in pharmaceutical calculations applicable to practice in conventional as well as in specialized settings such as prescription filling, medication order compounding, determination of dosage regimens and estimation of patients' compliance in community, clinical & hospital practice, industrial research and development, and in manufacturing.  
Credits: 2

## PHAR 520 - PHARMACEUTICS I: DRUG DELIVERY

The course will familiarize the student with the physical and chemical principles governing pharmaceutical chemistry and dosage form development. The student will be introduced to how basic physical/chemical principles are important in the preparation, compounding of the dosage form, and disease-based or patient-centered decision making and therapeutic outcomes. The influence of physico-chemical principles on storage and administration of the various pharmaceutical dosage forms will also be covered in class.  
Credits: 4

## PHAR 521 - PHARMACEUTICS II

The course focuses on physical and chemical principles relevant to the design, formulation, manufacturing, and use of pharmaceutical products such as powders, tablets, capsules, controlled delivery systems, sterile products and biopharmaceuticals. The properties of drug substance, non-active ingredients, excipients, and potential interactions between two entities are discussed. The influence of the interactions and relevance on drug product performance, stability and patient safety is highlighted. Related clinical outcomes relevance is discussed.  
Credits: 3

**PHAR 522 - PHARMACEUTICS III**

Pharmaceutics III is a continuation of the didactic and laboratory courses in Pharmaceutics I/II: Drug Delivery. The principles and mechanisms of drug absorption, distribution, metabolism, elimination (ADME), bioavailability and bioequivalence will be covered. Influence of the concepts on decision making regarding choice of drug, switching a drug within a pharmacologic/therapeutic class to another, compliance, wellness of patients, etc. will be discussed.

Credits: 3

**PHAR 523 - PC:INTO TO COMM & ASMNT**

The course introduces the student to the professional practice of pharmaceutical care. The student will learn what knowledge and experience is necessary to provide pharmaceutical care to patients. The course will explain the criteria for a health care professional practice, the meaning of "practitioner," and what constitutes a profession. The roles of the patient, the practitioner, and selected components of society are described in the context of pharmaceutical care practice.

Credits: 3

**PHAR 524 - PC:MED ADMIN & SELF MONIT TECH**

Subsequent terms of the course sequence introduce new concepts to the student pertaining to professional practice of pharmaceutical care. The course will continue to build upon and elaborate on the criteria for a health care professional practice, the meaning of the "practitioner," and what constitutes a profession. Students will continue to accumulate knowledge and skills from these sequences (I-VI) and demonstrate them in ongoing assessments and capstone exams.

Credits: 2

**PHAR 527 - PROFESSIONAL DEVELOPMENT AND LEADERSHIP I**

This course is designed to expand and track the personal and professional growth of students. This course is part of a longitudinal series spanning 6 quarters of the didactic curriculum during the P1-P3 years. This longitudinal course is designed to enhance the attributes needed by new pharmacist practitioners (advocacy, inter-professional collaboration, cultural awareness, self-awareness, leadership, innovation and entrepreneurship, and professionalism).

Credits: 0.5

**PHAR 528 - PROFESSIONAL DEVELOPMENT AND LEADERSHIP II**

This course is designed to expand and track the personal and professional growth of students. This course is part of a longitudinal series spanning 6 quarters of the didactic curriculum during the P1-P3 years. This longitudinal course is designed to enhance the attributes needed by new pharmacist practitioners (advocacy, inter-professional collaboration, cultural awareness, self-awareness, leadership, innovation and entrepreneurship, and professionalism).

Credits: 0.5

**PHAR 529 - PROFESSIONAL DEVELOPMENT AND LEADERSHIP III**

This course is designed to expand and track the personal and professional growth of students. This course is part of a longitudinal series spanning 6 quarters of the didactic curriculum during the P1-P3 years. This longitudinal course is designed to enhance the attributes needed by new pharmacist practitioners (advocacy, inter-professional collaboration, cultural awareness, self-awareness, leadership, innovation and entrepreneurship, and professionalism).

Credits: 0.5

**PHAR 530 - PRINCIPLES OF DRUG ACTION**

This course is designed to provide background necessary to choose drugs based on their pharmacokinetic (absorption, distribution, metabolism and elimination; ADME), and pharmacodynamics (drug-receptor interactions, agonists, partial agonists, and antagonists) parameters and introduce students to pharmacology of drugs affecting the autonomic nervous system, as well as basic concepts in pharmacotherapy.

Credits: 4

**PHAR 531 - INTEGRATED SEQUENCE: IMMUNOLOGIC, RHEUMATOLOGIC, AND PULMONARY DISORDERS**

This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to infectious diseases and pulmonary disorders.

Credits: 4.5

**PHAR 532 - INTEGRATED SEQUENCE: ENDOCRINE SYSTEMS**

This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to endocrine and pulmonary diseases.

Credits: 4.5

**PHAR 533 - RESEARCH IN TRANSL ONCOLOGY**

This course is designed to provide a base level of knowledge and practical experience in research activities related to translational oncology. Students will collaborate with Professor Hart on a specific topic to address key fundamental questions in cancer biology. Students will learn proper ways to mine literature, and develop skills in critical analysis and interpretation of primary research. Students will participate in literary review on a chosen subject, analyze historic and recent literature pertaining to said subject, and write up their review of the literature and assessment of pitfalls and future directions for the particular field. Students will have the opportunity to co-author publications resulting from this collaborative effort. Projects will be presented with a focus on laboratory activities of relevance to a Doctor of Pharmacy candidate, as they will evaluate biological principles related to mechanisms of tumor progression using physiologically-relevant approaches and/or pharmacological interventions to treat cancer. Research topics will be assigned based on the interests, strengths and focus of this course's faculty director and will be designed to help the student read, understand and interpret scientific literature.

Credits: 1-3

Course Notes: Completion of term 4 with satisfactory academic progress and, instructor interview.

**PHAR 538 - CLINICAL CASE DISCUSSIONS IN DIABETES**

This course is designed to help students gain a better understanding of drug therapy for diabetes, and examine practical issues in diabetes care. Students in this class will participate in discussions of cases of real patients with diabetes. Each week, cases will focus on a different aspect of diabetes management. All students will be expected to lead at least one discussion, as well as participate in discussions each week.

Credits: 1.5

**PHAR 539 - ADVANCED PEDIATRIC PHARMACOTHERAPY**

This course is designed to provide an advanced understanding of the pathophysiology and pharmacotherapy associated with disease states commonly encountered in the pediatric population including general pediatrics, toxicology, pediatric critical care and trauma, obesity, psychiatric illness, and pharmacy-specific pediatric related issues.

Credits: 1.5

**PHAR 541 - INTRODUCTION TO MANAGED CARE PHARMACY**

This managed care pharmacy elective course will provide an overview of managed care pharmacy and an understanding of how managed care pharmacy impacts the healthcare system.

Credits: 3

**PHAR 543 - RESEARCH IN BIOTECHNOLOGY**

Pharmaceutical Biotechnology is important area of science and technology, and contributes to design and delivery of new therapeutic drugs, the development of diagnostic agents for medical tests, and the beginnings of gene therapy for correcting the medical symptoms of hereditary diseases. This course will introduce the students to various biotechnology techniques used to attenuate chronic disorders like cancer, diabetes etc. Students will be involved in working independently on a research project that involves but not limited to characterization and expression of gene delivery vectors.

Credits: 3

**PHAR 547 - CLINICAL BIostatISTICS**

This course will introduce common biostatistics encountered in medicine such as p-values, confidence intervals, standard deviations, statistical tests, etc. This course will introduce students to calculating statistics such as odds ratios, number needed to treat/harm, and other statistics along with the evaluation of those statistics. This course will utilize medical journal studies to assist students in a critical review of these statistics and how to interpret what is encountered. The course will heavily focus on biostatistics and not journal article reviews. Our focus will be on a basic understanding of statistics as they apply to the medical field. By the end of the course, the student should have a basic understanding of what they will read and review in medical journals in preparation of future IS courses as well as clinical rotations.

Credits: 3

**PHAR 550 - PHARMACY LAW**

Students will learn about the history of pharmacy laws and how these laws structure practice guidelines and impact the distribution/dispensing of drugs. Students also learn about state and local statutes concerning pharmacy practice and healthcare policies relevant to pharmacy practice. The course includes an introduction to law, the Constitution, the role of laws/regulations, judicial system and process, and administrative agencies, with emphasis on the regulation of business and pharmacy practice.

Credits: 3

**PHAR 551 - HEALTH CARE SYSTEMS**

This course will discuss the U.S. health care system and approaches to ensure medication safety. External forces affecting health care delivery, organizational structure including professionals and policy surrounding those forces will be discussed in general. Specifically, the impact these issues have on the pharmacy profession will be examined as well as the models of pharmacy practice that exist today. Students should gain further understanding of the dynamic health care market.

Credits: 3

**PHAR 552 - BIostatISTICS AND PHARMACO**

This course is designed to introduce to first year pharmacy students, the concepts and methods of biostatistics, epidemiology and studydesign. This course will help students understand the types of clinical research study designs, applied biostatistics, quality of data, applicability of research results and the ability to evaluate studies critically based upon the quality of the reported data and study designs and not solely on the opinion of the researchers.

Credits: 3

**PHAR 554 - DRUG LITERATURE EVALUATION**

This course is designed to provide pharmacy students with an overview of drug information resources, demonstrate medical information searching and retrieval skills, employ analysis and synthesis of drug information, and strengthen written and verbal communication skills. Students will learn how to critically evaluate biomedical literature and apply this knowledge to resolve issues regarding optimal medication use and medication-related adverse events.

Credits: 3

**PHAR 557 - DRUG DEVELOPMENT PROCESS**

This course will focus on the entire process of discovering, developing (including preformulation or early phase development) and testing (preclinical through clinical) a new drug substance through the various phases of its life cycle (discovery, in vitro and in vivo testing, ADME, toxicology and biodistribution, Investigational New drug (IND) submission and approval, human clinical trials and New Drug Application (NDA)). Papers will be assigned and classes would be run as seminar-type sessions with enrollees describing what each step entails and the type of information that needs to be gathered to apply for Investigational New Drug approval. This course will inform students on the purpose and design of each phase of human clinical trials. This course will focus on the entire process of discovering, developing (including preformulation or early phase development) and testing (preclinical through clinical) a new drug substance through the various phases of its life cycle (Discovery, in vitro and in vivo testing, ADME, Toxicology and Biodistribution, Investigational New drug (IND) submission and approval, Human Clinical trials and New Drug Application (NDA)). Papers will be assigned and classes would be run as seminar-type sessions with enrollees describing what each step entails and the type of information that needs to be gathered so to apply for an investigational New Drug approval. Included would be a description of the purpose and design of each Phase of human clinical trials.

Credits: 3

**PHAR 559 - PHARMACOGENOMICS**

Pharmacogenomics is increasingly becoming an important component of pharmacotherapy that relates genetic composition of an individual to drug response. The primary objective of this course is to provide students an understanding of the principles of pharmacogenomics in the context of variability in drug response and the application of genetic profile to drug development and drug treatment. Future pharmacists will be educated on the genetic basis of pharmacokinetics and pharmacodynamics i.e. drug efficacy, adverse drug reactions and drug-drug interactions. Following completion of the course, students should be able to appreciate the pharmacogenomics discipline and how it can impact the treatment outcomes in patients.

Credits: 1

**PHAR 560 - BIO DRUG DISCOVERY RES I**

Focus and emphasis will be on working with drug candidate molecules, both proteinaceous and small molecule, learning how to purify and characterize such agents, and test agents for medical, biochemical and immunological reactivities. Focus will also be placed on aspects of physicochemical properties of drug substances that must be considered in designing and developing novel drug substances that may one day enter into human clinical trials.

Credits: 3

Attributes: Lab Course

**PHAR 561 - RES IN DRUG DESIGN & SYN I**

This course is designed to introduce students to research in medicinal chemistry. A research project/problem is assigned to each student requiring specialized equipment and techniques. Students will learn to plan and conduct research, and interpret results.

Credits: 3

Attributes: Lab Course

**PHAR 564 - INDEPENDENT CLINICAL RES I**

The objective of this elective is to learn practical aspects of clinical research, to participate in key elements of clinical research (i.e. protocol composition, data collection, manuscript publication), and contribute to ongoing clinical pharmacy research at an academic medical center. Students will be expected to work independently with minimal oversight. Resources will be provided for the clinical research students to facilitate any and all research related activities.

Credits: 1.5

Attributes: Lab Course

**PHAR 566 - DIFFERENTIAL DIAGNOSTICS**

This new elective course will give pharmacy students better insight into medical decision making, diagnostic testing, and developing differential diagnoses for common hospital and clinic presentations. The course has been designed (and discussions will be led) by an Internal Medicine physician who specializes in Gastroenterology. Topics to include: work-up of chest pain, shortness of breath, abdominal pain, nausea/vomiting, rectal bleeding, hematemesis, pancreatitis, dysphagia, fever, syncope, and elevated liver enzymes. You will have an opportunity to practice critical thinking and diagnostic decision making in an interactive format. We will meet every other week (with key clinical cases being assigned as homework during the off weeks). This fun course will give you the confidence to feel comfortable in the hospital and working with physicians.

Credits: 1.5

**PHAR 567 - PHARMACEUTICAL BIOTECHNOLOGY**

Pharmaceutical Biotechnology is an increasingly important area of science and technology, and contributes to design and delivery of new therapeutic drugs, the development of diagnostic agents for medical tests, and the beginnings of gene therapy for correcting the medical symptoms of hereditary diseases. This course is designed to provide pharmacy graduate students with a basic understanding of the macromolecular drugs such as proteins and nucleic acids that have emerged as a new class of therapeutic agents due to their unique biological and pharmacological properties.

Credits: 1.5

**PHAR 569 - ADVANCED INFECTIOUS DISEASES**

This course is designed to give students a more advanced experience into infectious diseases pharmacotherapy, building upon topics learned in the IS-VII course. Students will learn approaches of antimicrobial therapy in challenging situations such as treatment of highly resistant organisms, treatment of zoonotic infections, and approaching antimicrobial stewardship from a practical approach. Furthermore, students will get practice to critically evaluate ID literature from weekly assignments as well as in their final case presentation.

Credits: 3

**PHAR 570 - PROFESSIONAL PRACTICE I**

Professional Practice I & Introductory Pharmacy Practice Experiences foundations are each an 80 hour sequence of internship activities which provides a number of experiential activities that integrate knowledge and skills you will be learning within your didactic courses. The continuum will serve as building blocks to prepare you for the advanced practice experiences. The learning activities will take you into authentic settings to develop important professional abilities.

Credits: 3

**PHAR 571 - PROFESSIONAL PRACTICE II & IPP**

Professional Practice II & Introductory Pharmacy Practice Experiences (IPPEs) foundations are each an 80 hour sequence of internship activities which provides a number of experiential activities that integrate knowledge and skills you will be learning within your didactic courses. The continuum will serve as building blocks to prepare you for the advanced practice experiences. The learning activities will take you into authentic settings to develop important professional abilities.

Credits: 3

**PHAR 572 - PROF PRACTICE III & IPPE**

Professional Practice I, II, III, IV & Introductory Pharmacy Practice Experiences (IPPEs) foundations are a 320-hour four-term sequence of internship activities which provides a number of experiential activities that integrate knowledge and skills you will be learning within your didactic courses. The continuum will serve as building blocks to prepare you for the advanced practice experiences. The learning activities will take you into authentic settings to develop important professional abilities.

Credits: 3

**PHAR 601 - PC:SELF-CARE & NON-RX THER**

Subsequent terms of the course sequence introduce new concepts to the student pertaining to professional practice of pharmaceutical care. The student will build upon previous knowledge and engage in experiences necessary to provide pharmaceutical care to patients. Students will continue to hone and accumulate knowledge and skills from topics pertaining to renal, genitourinary, and cardiovascular pharmacotherapy and demonstrate these in ongoing assessments and capstone objective structured clinical examinations.

Credits: 3

Attributes: Lab Course

**PHAR 602 - PC:STERILE PROD**

This course is fourth in the series of six pharmaceutical care lab courses. Throughout this series, lecture, lab, and active learning formats are utilized. PC Lab IV specifically addresses practical applications of topics covered in Integrated Sequence VI and VII. These topics include musculoskeletal injuries, management of hepatic drug interactions, prevention and management of ulcer, ostomy products and OTC gastrointestinal agents. Additionally, activities to reinforce knowledge of the top 150 drugs and nonprescription therapeutics are continued.

Credits: 2

**PHAR 603 - PC:APPLIED CLINICAL SKILLS**

This course is fifth in the series of six pharmaceutical care lab courses. Throughout this series, lecture, lab, and active learning formats are utilized. PC Lab V specifically addresses practical applications of topics covered in Integrated Sequence VIII and IX. These topics include psychiatric and neurologic conditions. Additionally, activities to reinforce knowledge of the top 150 drugs and nonprescription therapeutics are continued. PC Lab V also addresses concepts and skills related to sterile preparations.

Credits: 2

**PHAR 604 - PHARMACEUTICAL CARE VI: OBJECTIVE STRUCTURED CLINICAL EXPERIENCE**

This course is designed to review and assess clinical knowledge, skills, and concepts learned in previous courses throughout the curriculum in preparation for Advanced Pharmacy Practice Experience rotations. Focus will be on accessing and interpreting appropriate clinical practice guidelines, patient assessment, communication, clinical decision making and documentation of patient assessment and therapeutic recommendations. In addition, students will present an individual patient case presentation in order to apply clinical knowledge, patient assessment, presentation and communication skills related to this skill.

Credits: 3.5

**PHAR 605 - PRINCIPLES OF DRUG ACTION**

This course is designed to teach biopharmaceutical researchers about the fundamentals of drug action related to pharmacokinetics, pharmacodynamics and toxicology. A major goal of this course is to impart knowledge on the chemical and pharmacological properties related to drug action and drug development. Students will be introduced to the various targets (e.g. receptors, ion channels, enzymes) for drug development and factors that affect drug action.

Credits: 3

Course Notes: Prerequisites: PharmD Pharmacology Course

**PHAR 606 - INTRODUCTION TO PHARMACEUTICAL DOSAGE FORMS AND BIOPHARMACEUTICS**

The course focusses on physical-chemical principles governing pharmaceutical systems, dosage form design and development. Students will learn how physicochemical properties of drugs affect their formulation into dosage forms and impacted by excipient selection and processing variables, and the biopharmaceutical considerations needed for design of safe, efficacious, stable and acceptable products. Students will be introduced to drug development and approval processes which could be integrated with student's specific research projects.

Credits: 3

Course Notes: Prerequisites: Pharmaceutics

**PHAR 607 - DRUG & SUBSTANCE OF ABUSE**

This elective course will serve to introduce and examine current issues with drugs and substances of abuse, including approaches to identifying current and emerging drugs and substances of abuse, understanding the impact of drugs and substances of abuse has on patient, and management of a patient presenting to a facility with intoxication due to drugs and/or substances of abuse. The overall goal of this class will be to define the role a pharmacist can play as a provider of facts and information of drugs and substances of abuse.

Credits: 1.5

**PHAR 609 - THESIS DESIGN AND PROPOSAL**

The research course is focused on the student developing a research proposal with his advisor on a topic selected by the advisor. The research topics will range from pharmacology, pharmaceuticals, drug delivery to traditional medicine, medicinal chemistry, molecular pharmaceuticals, etc. The student will then present the proposal to research committee that will be composed by the research advisor as a final assessment of the success of the design.

Credits: 1

**PHAR 611 - CLINICAL CASE DEFENSE**

This course is designed to provide an advanced application of clinical skills through a presentation of a patient case. Students are able to display their knowledge and communicate this knowledge to faculty members and their peers. Through attendance of their peers' presentations, students will have the opportunity to compose and answer questions regarding the disease states presented. This class will help students improve their clinical knowledge, problem-solving skills, presentation skills, communication skills, and self and peer-evaluation skills.

Credits: 0.5

**PHAR 612 - RESEARCH ELECTIVE IN INFECTIOUS DISEASES**

This course is designed as an introduction into the professional medical writing and literature search and synthesis. Students will be exposed to the clinical research process from the initial idea stages, will be required to complete a literature review and write the study background, and be able to identify variables to collect and create a data collection sheet.

Credits: 1.5

**PHAR 613 - RESEARCH IN MEDICINAL CHEMISTRY**

This course is designed to provide a base level of knowledge and practical experience in laboratory activities related to medicinal chemistry experimentation. Students will be given a topic of interest and relevance to the drug discovery and development activities of Professor Olson. Students will develop and devise a testable hypothesis to answer fundamental questions and concepts. Students will learn laboratory procedures and approaches and will be taught to respect and adhere to laboratory safety and regulatory criterion. Students will gather data and analyze data to address the scientific significance of their experiments. Students will have the opportunity to co-author scientific publications on their experimental findings and accomplishments and present their work in public venues. Projects will be presented with a focus on laboratory activities of relevance to a Doctor of Pharmacy candidate. Research topics will be assigned based on the interests and strengths and focus of this course's faculty director and will be designed to help the student learn understand and interpret literature reports that relate to drugs, especially how drugs were developed, tested, and approved for human use.

Credits: 0.5-3

**PHAR 614 - COLLEGE OF PHARMACY REMEDIATION COURSE I**

College of Pharmacy Remediation Course I is a flexible credit course to be used by the College to re mediate content to ensure competence in remedial topic.

Credits: 0.5-4

**PHAR 615 - COP REMEDIATION COURSE II**

College of Pharmacy Remediation Course I is a flexible credit course to be used by the College to re mediate content to ensure competence in remedial topic.

Credits: 0.5

**PHAR 616 - TUTORING EXPERIENCE IN PHARMACEUTICAL CALCULATIONS**

The student will have opportunities to serve as a teaching assistant for PHAR 519, design educational materials, and provide approximately 15-20 hours of tutoring over the duration of the course, as necessary. Group meetings will take place weekly to discuss challenges and teaching opportunities.

Credits: 1.5

**PHAR 617 - ADVANCED INTEGRATIVE MEDICINE AND MINDFULNESS-BASED STRESS REDUCTION**

This course is a highly experiential hybrid course designed to provide students the opportunity to apply advanced knowledge of integrative medicine to common patient presentations as part of a comprehensive treatment plan. Integrative medicine interventions introduced in the course will focus heavily on appropriate use of herbals, supplements, and mindfulness interventions in the outpatient setting. Each week of the course introduces management of a new condition commonly treated with integrative approaches. Mega-cases will be utilized, meaning students will follow the same theoretical patients, and/or family members of the original patients, longitudinally throughout the duration of the course. The course will allow students to not only understand the importance of treatment of the holistic patient over time, but the role of understanding the patient's story and shared decision-making in optimal treatment. Within the course, students will actively participate in the highly evidence-based 8-week Mindfulness-Based Stress Reduction (MBSR) program as a component of the course. The goal of the MBSR program as embedded in this course is for students to understand deeply, and experience fully, the practice of mindfulness; as a result, students will be able to utilize mindfulness as an e

Credits: 3

**PHAR 620 - RESEARCH IN NEUROPHARMACOGNOSY**

This course is designed to provide students with the base knowledge and practical skills relating to conducting research in the field of neuropharmacognosy (the study of pharmacological properties of naturally-occurring drugs in relation to their effects on the Central Nervous System). Students will collaborate with faculty to develop and address a specific topic relating to either 1) potential neuropathological targets for a specific naturally-occurring compound, or 2) potential naturally-occurring therapeutics for targeting a specific neuropathological condition. Students will develop the skills necessary to conduct, analyze and present a thorough literature review of their topic, including identification of knowledge gaps and any socio-economic, practical, or legal challenges to conducting research related to their specific topic.

Credits: 1-3

**PHAR 621 - RESEARCH PROJ IN HEAL DISPAR**

Credits: 1.5-3

**PHAR 623 - IS IV:PULMONARY SYSTEMS**

This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented here and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to pulmonary disorders.

Credits: 3

**PHAR 626 - HISTORY OF PHARMACY IN AMERICA**

This course is designed to introduce the pharmacy student to the history of pharmacy. This will be accomplished by focusing upon the historical development of pharmacy in the United States. By examining the growth and professionalization of the field, its statutory regulation and its product development students will be able to apply the lessons of history to current and future practice philosophies. The history of pharmacy is an area that receives little attention in the pharmacy curriculum but its lessons and tradition are of great importance in recognizing and understanding the professionalism required of a pharmacist.

Credits: 1.5

**PHAR 627 - PROFESSIONAL DEVELOPMENT AND LEADERSHIP IV**

This course is designed to expand and track the personal and professional growth of students. This course is part of a longitudinal series spanning 6 quarters of the didactic curriculum during the P1-P3 years. This longitudinal course is designed to enhance the attributes needed by new pharmacist practitioners (advocacy, inter-professional collaboration, cultural awareness, self-awareness, leadership, innovation and entrepreneurship, and professionalism).

Credits: 0.5

**PHAR 628 - PROFESSIONAL DEVELOPMENT AND LEADERSHIP V**

This course is designed to expand and track the personal and professional growth of students. This course is part of a longitudinal series spanning 6 quarters of the didactic curriculum during the P1-P3 years. This longitudinal course is designed to enhance the attributes needed by new pharmacist practitioners (advocacy, inter-professional collaboration, cultural awareness, self-awareness, leadership, innovation and entrepreneurship, and professionalism).

Credits: 0.5

**PHAR 629 - PROFESSIONAL DEVELOPMENT AND LEADERSHIP VI**

This course is designed to expand and track the personal and professional growth of students. This course is part of a longitudinal series spanning 6 quarters of the didactic curriculum during the P1-P3 years. This longitudinal course is designed to enhance the attributes needed by new pharmacist practitioners (advocacy, inter-professional collaboration, cultural awareness, self-awareness, leadership, innovation and entrepreneurship, and professionalism).

Credits: 0.5

**PHAR 630 - INTEGRATED SEQUENCE: RENAL AND GENITOURINARY SYSTEMS**

Integrated Sequence IV: Renal and Genitourinary Systems. This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to renal and genitourinary diseases.

Credits: 4.5

**PHAR 631 - INTEGRATED SEQUENCE: CARDIOVASCULAR SYSTEMS**

Integrated Sequence V: Cardiovascular Systems. This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to cardiovascular diseases.

Credits: 5.5

**PHAR 632 - INTEGRATED SEQUENCE: GASTROINTESTINAL AND HEPATOBILIARY SYSTEMS**

This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to the gastrointestinal and hepatobiliary systems.

Credits: 4

**PHAR 633 - INTEGRATED SEQUENCE: INFECTIOUS DISEASES**

This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to the musculoskeletal and immune systems.

Credits: 5

**PHAR 634 - INTEGRATED SEQUENCE: NEUROLOGIC DISORDERS**

This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to the neurological systems.

Credits: 4.5

**PHAR 635 - INTEGRATED SEQUENCE: PSYCHIATRIC AND BEHAVIORAL CONDITIONS**

This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to the treatment of psychiatric and mood disorders, and related behavioral conditions.

Credits: 4.5

**PHAR 636 - INTEGRATED SEQUENCE: HEMATOLOGIC AND ONCOLOGIC DISORDERS**

This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to the treatment of hematologic and oncologic disorders.

Credits: 4.5

**PHAR 637 - INTEGRATED SEQUENCE: SPECIAL PATIENT POPULATIONS/ CONDITIONS**

This course is designed to provide background necessary to select optimal drug regimens based on biopharmaceutical principles and clinical considerations of the medications presented herein and introduce students to the scientific, clinical, social and economic aspects of drug use pertaining to the special patient populations including critically ill patients, geriatric patients, pediatric patients, women's health needs, patients with other illnesses that require special considerations.

Credits: 4.5

**PHAR 638 - PHARMACEUTICAL ANALYSIS**

The goal of the course is to introduce students to identification and quantitation of pharmaceuticals, including literature search and writing of laboratory reports. Lecture topics that will include identification and classical quantitation of pharmaceuticals using the following techniques – gas chromatography, high performance liquid chromatography, visible, UV, infra-red, and fluorescence spectroscopy. Bioanalytical chemistry techniques such as electrophoresis, mass spectrometry, enzyme immunoassays, nucleic acid amplification and protein sequencing will be discussed.

Credits: 3

**PHAR 640 - THERAPEUTIC DRUG MONITORING**

This course is designed to provide a broad perspective on the emerging field of pharmacogenomics and its application to alterations of drug pharmacokinetics and pharmacodynamics, therapeutic drug monitoring and applications for pharmacotherapy of various diseases, including, but not limited to, those affecting cardiovascular, endocrine, hematologic, nervous, respiratory, renal, and immune systems, and cancer.

Credits: 3

**PHAR 642 - PHARMACY PRACTICE RESEARCH IN AMBULATORY CARE**

Pharmacy practice research focuses on pharmacist care and its effect on patient outcomes. This research course will provide students with a working knowledge and hands-on experience of conducting pharmacy practice research in ambulatory care. Students in this course will be exposed to all components of research in pharmacy practice. Each week, focus will be placed on a different aspect of research – Idea generation, Literature review, Proposal development, Data collection tool development, IRB submission, Data collection, Data entry and analysis, Abstract writing and Presentation.

Credits: 1-3

**PHAR 650 - PRACTICE MANAGEMENT**

This course introduces Pharmacy students to various management roles in Pharmacy Practice with the aim of preparing healthcare leaders that will deliver safe, effective and efficient care across different settings. Students will develop a strong foundation in management sciences with application and integration of Medication Therapy Management (MTM).

Credits: 3

**PHAR 652 - HEALTH ECONOMICS & OUTCOMES**

This course is designed to introduce students to the concepts and methods of health economics and outcomes assessments and its application to pharmacy practice. This course will help students understand the concepts and methods of economic analyses and its role in clinical decision making, provide a brief review of decision modeling techniques; introduce to the concepts and importance of medication adherence, patient satisfaction, quality of life and health related quality of life in health care.

Credits: 3

**PHAR 655 - POST-GRADUATE TRAINING**

This course will educate and prepare students for postgraduate residency training. It will expose you to different postgraduate training opportunities including community pharmacy residencies, ambulatory care residencies and fellowships. It will increase knowledge, interest, and confidence among students about residency training and identify and develop the skills needed for application to these programs.

Credits: 1.5

**PHAR 657 - PUBLIC HEALTH/HEALTH POLICY**

This course presents the basic and critical issues in public health within the context of population healthcare and an in-depth discussion of the role of pharmacy professionals in promoting and protecting the health of the public. In order to address public health needs, pharmacists must understand and address the fundamental determinants of health in a population in order to provide effective health promotion, disease prevention, and quality health services. This course focuses on strategies for the identification and management of the healthcare needs of specific populations.

Credits: 3

**PHAR 670 - PRF. PRACTICE IV AND IPPE**

Professional Practice IV & Introductory Pharmacy Practice Experiences (IPPEs) are an 80 hour sequence of internship activities (total of 240 hours) which provides a number of experiential activities that integrate knowledge and skills you will be learning within your didactic courses. The continuum will serve as building blocks to prepare you for the advanced practice experiences. The learning activities will take you into authentic settings to develop important professional abilities.

Credits: 3

**PHAR 671 - INTERPROFESSIONAL PRACTICE/IPE**

The course is a continuation of professional practice experiences intended to engage students with other health professionals in order to establish a climate of mutual respect and shared values; understand the roles of other health professions; strengthen communications with other health professionals; and, foster greater teamwork between pharmacists and other health professionals. The course will be divided into blocks and consist of a seminar and other activities, including practice experiences off campus of up to 80 hours.

Credits: 2

**PHAR 680 - INTERPROFESSIONAL COLLABORATION**

Interprofessional Collaboration Seminar (one-hour weekly) and the Interprofessional Collaboration simulation experiences together provide a foundational sequence of didactic and experiential activities that will enable the student to become an integral member of an interdisciplinary health care team. This course is designed to allow students to apply the facts, information and concepts gained in didactic coursework to professional practice through an interprofessional practical experience (IPE) under the supervision of a healthcare professional within a health care setting. The IPE seminars and simulations encompass experiences and activities to enhance communication with patients, prescribers, and other health care professionals and to deliver interprofessional care with positive patient outcomes.

Credits: 1

**PHAR 695 - INDEPENDENT STUDY**

This course will expose a pharmacy student to research designs and application in social and behavioral, or clinical pharmacy. The student will work with a course instructor on a project that will provide hands-on experience with research methods, data collection, analysis and reporting. The student will be provided with tools and any resources necessary to conduct such research.

Credits: 1.5

**PHAR 710 - GLOBAL HEALTH PHARM PRACT**

According to the World Health Organization, global health is defined as the health of populations in a global context, transcending the perspective and concerns of individual nations. The purpose of this course is to educate students on the five main components of global health: 1. Foreign Policy; 2. National Security; 3. Humanitarian Efforts; 4. Economic Advancement; and 5. Public Health. Furthermore, the students will learn about pharmacy practice in the developed and developing nations, workforce professional development, and innovative practice models to better meet patients' needs globally.

Credits: 1.5

**PHAR 711 - PHARM DILEM:INTERAL MED**

This course is designed to provide an opportunity to evaluate, design, and defend a patient-specific pharmacotherapeutic treatment plan for a hospitalized patient case over an extended timeline to show disease progression. Students will work individually and in groups to utilize and communicate their knowledge of clinical guidelines and primary literature via oral presentation and written report of their selected treatment plans after assessing a patient chart. This course will improve clinical knowledge, problem-solving, presentation, and writing skills.

Credits: 1.5

**PHAR 712 - ADVANCED PHARMACEUTICAL CALCULATIONS IN DOSAGE FORM**

This course is designed to cover calculations pertaining to dosage form design that is not covered in the PharmD. curriculum. In addition, the student will have the opportunity to serve as a tutor for PHAR 519 students and design educational materials. Group meetings will take place weekly to discuss challenges and teaching opportunities.

Credits: 1.5

**PHAR 713 - MANAGED CARE AND HEALTH INSURANCE**

This course will present an overview of design, function and management of managed care plans. It will introduce students to the concepts pertaining to private and public health insurance/benefit plans, PBMs and different pharmacy practice models and reimbursement issues. This course will offer real world experiences by having outside experts working in managed care delivering the course material.

Credits: 1.5

**PHAR 714 - MEDICINE OR MENACE- PSYCHEDELIC DRUGS**

This course is designed to introduce students to the historic, social, recreational and therapeutic aspects of psychedelic drugs. Through lecture, video and recommended readings, students will gain an understanding of how psychoactive compounds have been utilized by various cultures over time and how alterations in the legal status of these drugs impact those groups as well as society in general. Additionally, students will be introduced to and asked to evaluate current research involving the potential therapeutic uses of psychoactive compounds. This course combines lecture with significant student participation in discussion sessions facilitated by faculty.

Credits: 3



**PHAR 715 - IMPULSIVITY, MORAL JUDGEMENTS, HARM AVERSION, FAIRNESS, & RECIPROCITY: INTRODUCTION TO NEUROSCIENCE**

This course is designed to introduce students to behavioral neuroscience, a rapidly growing area for new drug development. It will focus on neuronal mechanisms underlying behaviors associated with neurological and behavioral disorders. It complements discussions of various aspects of central nervous system in the core curriculum, particularly those in PHAR 634: Neurological disorders, and PHAR 635: Psychiatric and behavioral disorders, and expands these discussions to include behaviors. It is also designed to stimulate students to seek advanced studies of the CNS with a focus on behavioral neuroscience. Current pharmacy curriculum lacks sufficient depth in behavioral neuroscience and an additional expectation is that this course partially addresses this deficiency.

Credits: 3

**PHAR 716 - CARDIOVASCULAR DISEASE RISK MANAGEMENT CERTIFICATE**

Pharmacy-Based Cardiovascular Disease Risk Management is an innovative training program that teaches student pharmacists the skills necessary to successfully assess risk, promote cardiovascular disease prevention, and encourage patient adherence to therapy. The course emphasizes chronic cardiovascular disease prevention and management by building on knowledge and skills gained in prior coursework. The course is heavily based on self-study materials, in-class lectures, active learning through patient cases, and formal assessments in the form of quizzes, a final exam, and a practical assessment of skills.

Credits: 2

**PHAR 720 - PHARMAC DILEM INTER MEDIC**

This course is designed to provide an opportunity to evaluate, design, and defend a patient-specific pharmacotherapeutic treatment plan for a hospitalized patient case over an extended timeline to show disease progression. Students will work individually and in groups to utilize and communicate their knowledge of clinical guidelines and primary literature via oral presentation and written report of their selected treatment plans after assessing a patient chart. This course will improve clinical knowledge, problem-solving, presentation, and writing skills.

Credits: 1.5

**PHAR 721 - SELECTED TOPICS IN EPIDEMIOLOGY**

This course is designed to introduce students to the selected topics in epidemiology. Students in this course will gain understanding about the fundamental tools that are used to measure morbidity and mortality in epidemiology. This course will also focus on describing strengths and weaknesses of screening tests and help them understand when a screening program is appropriate for diagnosis in population. Students will also learn ways of expressing prognosis using survival as a measure and learn about ethical and professional issues related to the field of epidemiology.

Credits: 1.5

**PHAR 750 - HEALTH OUTCOMES RESEARCH**

This elective course is designed to offer students hands on research experience in the area of health outcomes research. Students will work closely with the instructor(s) in developing a new research proposal or work on an ongoing research project. Students' will be presented with the opportunities of applying the concepts and principles of pharmaceconomics and health outcomes that they learned in their didactic coursework (PHAR 652) and gaining research skills in this area.

Credits: 1-3

**PHAR 751 - RESEARCH IN PUBLIC HEALTH**

In this course students will learn how to improve public health among the underserved population. Specifically, students will identify a health problem, assess patients' needs, examine potential solutions, select the best framework to address the problem, implement a health initiative program, and assess the outcomes. Ultimately, students will learn how to be effective members of the interdisciplinary team to enhance public health.

Credits: 1-3

**PHAR 754 - NUCLEAR PHARMACY**

This course will expose the student to topics in nuclear pharmacy and nuclear medicine. During the course the student will be provided with the fundamentals that nuclear pharmacists encounter while meeting the NRC criteria to handle radiopharmaceuticals.

Credits: 1

**PHAR 757 - PRINCIPLES OF PALLIATIVE CARE**

This elective will provide students with an understanding of the pharmacist's role in pain control, palliative, and end-of-life care.

Credits: 3

**PHAR 758 - CLIN. CASES IN ANTITHROMBOTIC**

This course will provide students with a working knowledge of basic and advanced pharmacotherapeutic problems related to antithrombotic and antiplatelet therapy. Students in this class will participate in discussions of cases of real patients on antithrombotic or antiplatelet agents.

Each week, cases will focus on a different aspect of antithrombotic/antiplatelet management. All students will be expected to lead at least one discussion, as well as actively participate in weekly discussions.

Credits: 1.5

**PHAR 765 - VETERINARY PHARMACY**

Veterinary Pharmacy provides a foundation for a pharmacist interested in providing care to nonhuman patients. It focuses on the care of dogs and cats, but concepts can be applied to other species. Veterinary pharmacy references, legal aspects of dispensing, and unique physiologic and pharmacokinetic differences among species will be highlighted. Prevention and management of common disease states will be addressed. Other topics include drug administration, zoonotic infections, dog bite prevention, immunizations, triage, wound care, and appropriate use of OTCs. Class periods will feature a combination of lecture, student research, and skills. Pets will be present in several class sessions.

Credits: 3

**PHAR 770 - ADVANCED PATIENT CARE - COMMUNITY**

Students will apply the facts, information and concepts gained in didactic coursework to professional practice through practical experience under the supervision of a licensed pharmacist in a community pharmacy setting. The Community Pharmacy Practice rotation encompasses medication dispensing and control, communicating with patients, prescribers, and other health care professionals and understanding the basic principles of managing workflow to deliver positive patient outcomes. Community pharmacists are the most visible and available to the public. This rotation develops student competence to provide pharmaceutical care in the community setting and extends students' image of community pharmacy practice beyond traditional dispensing. This experience contributes to the integration of clinical knowledge and skills with the basics of communication, medication dispensing and control.

Credits: 8

**PHAR 771 - ADVANCED PATIENT CARE - HOSPITAL**

Students will apply the facts, information and concepts gained in didactic coursework to professional practice through practical experience under the supervision of a licensed pharmacist in a hospital pharmacy setting. The hospital rotation help students integrate knowledge and theoretical concepts across the curriculum in an environment that encourages and requires interactions between students, preceptors and patients. Our goal is to enable students to safely and accurately perform the activities associated with the receipt, preparation and dispensing of medication orders, perform required drug control activities, support the mission of the pharmacy department and activities that maintain productive relationships with other departments in the hospital.

Credits: 8

**PHAR 772 - ADVANCED PATIENT CARE-AMBULATORY CARE**

Students will apply the facts, information and concepts gained in didactic coursework to professional practice through practical experience under the supervision of a licensed pharmacist in an ambulatory care setting. The ambulatory care rotations rotation helps students integrate knowledge and theoretical concepts across the curriculum in an environment that encourages and requires interactions between students, preceptors and patients. Our goal is to enable students to provide safe, effective and cost-efficient disease state management by assuring the safe, accurate preparation and dispensing of medications, developing patient-specific pharmacotherapy plans and optimizing patients' outcomes. Students should gain experience in treating common disease states in the ambulatory care environment, including but not limited to endocrine disorders, cardiovascular diseases, commonly occurring outpatient infectious diseases, respiratory diseases by taking patient histories, developing patient-specific recommendations, providing counseling, monitoring patient outcomes and consulting with other healthcare providers.

Credits: 8

**PHAR 773 - ADVANCED PATIENT CARE-ACUTE CARE MEDICINE**

Students will apply the facts, information, and concepts gained in didactic coursework to professional practice through practical experience under the supervision of a licensed pharmacist in a hospital setting. The adult internal medicine advanced practice rotation requires students to integrate knowledge and theoretical concepts across the curriculum in an environment that requires appropriate interactions between students, preceptors, other healthcare professionals, and patients. The goal is to enable students to recommend and provide safe, effective, and cost-efficient patient care by developing evidence-based, patient-specific pharmacotherapy plans that optimize patient outcomes and have the support of the other healthcare practitioners involved. Students should gain experience in treating common disease states in the adult internal medicine population, including but not limited to endocrine disorders, cardiovascular diseases, infectious diseases, respiratory diseases, and renal/liver dysfunction.

Credits: 8

**PHAR 774 - APPE ELECTIVE ROTATION I**

Special Populations electives (APPEs) provide students the opportunity to study a pharmacy practice specialty area in a more in-depth manner. These experiences encompass a variety of practice areas and settings. Examples of these electives include but are not limited to medicine sub-specialties such as infectious diseases, oncology, neurology, specialty infusion and cardiology. Other opportunities include emergency department practice, critical care, drug information, and surgery. The student will develop an understanding of the signs and symptoms, pathophysiology, complications, and pharmacotherapy of the diseases encountered in special populations practice settings. Using this knowledge, the student will develop and sharpen clinical skills to provide desired medication management outcomes for patients. These electives require that the student function in a team with a broad range of other healthcare professionals.

Credits: 8

**PHAR 775 - APPE ELECTIVE ROTATION II**

The student will develop an understanding of the role of the pharmacist, and gain knowledge and skills to manage resources and daily operations applicable to the specific elective rotation site. The preceptor will provide student site-specific objectives on the first day of the APPE.

Credits: 8

**PHAR 777 - DOCTOR OF PHARMACY SEMINAR**

This course is designed to evaluate the general practice knowledge of students about to graduate pharmacy school, assess students' competence prior to practicing as a licensed pharmacist, and prepare students to succeed on board examination.

Credits: 1