SCHOOL OF PHARMACY
DOCTOR OF PHARMACY PROGRAM

(The pharmacy curriculum is subject to change without notice.) Electives offered by the Program in Health Care Ethics, Humanities and Law are listed under Preventive Medicine in the School of Medicine and Graduate School sections. These courses are offered on an interdisciplinary basis; students in all UCHSC schools are encouraged to participate.

FALL SEMESTER

**PHRD 3000 Introduction to Pharmacy Practice and Education** 2.0 cr.
Catherine Jarvis, Pharm.D., Beverly Brunson, MPA
Prerequisites - P1 status.
This course will use a combination of large group didactic discussion, small group problem-based learning, self-learning and outside activities. The focus of the course is to provide students the opportunity to learn basic skills needed for success in the professional pharmacy curriculum and in their academic careers.

**PHRD 3100 Professional Skills Development I** 3.0 cr.
Susan Paulsen, Pharm.D., Connie Valdez, Pharm.D.
Prerequisites – PHRD 3000, P1 status.
This one-semester course is the first in a five-semester longitudinal course sequence intended to develop a broad range of skills necessary for current and future pharmacy practice. It is designed to parallel the didactic portion of the curriculum, integrating and applying essential knowledge, skills and attitudes required for a successful professional career. It is formatted to prepare students for more complex patient case scenarios presented in Comprehensive Patient Care (in semester 6). Uniquely this course lends continuity and cohesiveness to the entire curriculum. Each year, as students assemble their pharmacy knowledge base, the professional skills course affords students the opportunity to integrate information within a given semester and from semester-to-semester. Additionally, students will be expected to practice and refine a variety of skills through collaborative and individual activities. As the course builds over three years of the curriculum, students will be able to observe and document their own progression towards achievement of professional academic and personal goals.

**PHRD 3200 Professional Career Development** 1.0 cr.
Heather Ulrich, Pharm.D.
Prerequisites – PHRD 3000, P1 status.
The goal of this course is to introduce students to selected opportunities and current issues related to professional careers in pharmacy. This course will therefore consist of a series of presentations by faculty and guest lecturers highlighting the multifaceted scope of contemporary pharmacy practice. These presentations will address practice and career opportunities as well as issues and challenges related to the profession. These presentations will provide students with a basic, early perspective on various career options and alternative practice settings.

**PHRD 3300 Experiential Practice I** 1.0 cr.
Christopher J. Turner, B. Pharm., Ph.D., Catherine Jarvis, Pharm.D.
Prerequisites – PHRD 3000, P1 status.
These two sequential (Fall P1, Spring P1) Pass/Fail format introductory pharmacy practice experience (IPPE) courses are comprised of traditional introductory and didactic classes, multiple periods of experiential training, and writing and other assignments. The primary purpose of these courses is to introduce students to the general and professional Center for the Advancement of Pharmacy Education (CAPE) competencies required to practice pharmacy and to allow students to begin to apply those competencies in caring for patients in diverse settings.

**PHRD 3400 Principles of Drug Information** 1.0 cr.
Hilda Bi, Pharm.D.
Prerequisites – PHRD 3000, P1 status.
This course is designed to introduce concepts and skills required to locate and evaluate drug literature and to respond to drug information requests in an efficient manner. Course content will include the structure of biomedical literature; an explanation of the hierarchy of medical literature and the process of systematic searching for drug information. Basic evaluation skills of medical literature; and an understanding of the pharmacist’s role and responsibilities as a provider of drug information. Professional skills will be strengthened during hands-on experiences with common drug references, by performing searches on computerized databases, and by applying the knowledge gained throughout the course to answering drug information.

**PHRD 3410 Health Care Economics** 1.0 cr.
Marianne McCollum, Ph.D.
Prerequisites – PHRD 3000, P1 status.
Knowledge of key concepts of health care economics is essential for successful career development. The purpose of this course is to introduce students to these concepts, and to provide the background necessary for future courses concerning the structure and financing of health care.

**PHRD 3500 Pharmacy Law** 2.0 cr.
David Hill, Ed.D.
Prerequisites – PHRD 3000, P1 status.
Legal and ethical issues in pharmacy practice are presented in this course in both lecture and discussion group formats. The course begins with an introduction to law, including the Constitution, the role of laws and regulations, the judicial system and process, and administrative agencies, with emphasis on regulation of business in general and pharmacy practice in particular.
PHRD 3550 Health Care Ethics  
1.3 cr.
David Hill, Ed.D. Prerequisites – PHRD 3000, P1 status.
A course designed to provide students with foundational knowledge and skills in responsible professional behavior that will enable them to competently reflect upon, address and resolve the ethical and social/cultural issues that students will confront during their training and professional practice. This course will teach rudimentary knowledge and skills in ethical theory and reasoning, professional ethics, and interprofessional approaches to health care decision making and will explore the goals of health care and the experience of illness. Through small group activities, students will have opportunities to foster communication skills, critical reasoning, and reflective deliberation within the moral and ethical dimensions of health care.

PHRD 3600 Science Foundations I: Chemistry and Pharmaceutics  
3.0 cr.
Tom Anchordoquy Ph.D. Prerequisites – PHRD 3000, P1 status.
The main goal of this course is to relate general principles of chemistry and energetics (thermodynamics and kinetics) to drug stability and bioavailability, pharmacologic action, and interactions with biological macromolecules.

PHRD 3610 Science Foundations II: Biochemistry and Cell Function  
4.0 cr.
David Bain, Ph.D. Prerequisites – PHRD 3600, P1 status.
The goals of this course are to build a strong knowledge base in biochemistry and cell biology and link biochemical principles to cellular function, describe how various diseases and errors in metabolism relate to biochemical defects in the cell, examine how selected drug-biomolecule interactions result in altered cellular metabolism, and recognize the processes that regulate cell communication and homeostasis. At the completion of this course, students should have a strong knowledge base regarding these concepts and should be able to apply them to more advanced topics in pharmacy practice.

PHRD 4100 Professional Skills Development III  
3.0 cr.
David Thompson, Ph.D., Susan Paulsen, Pharm. D. Prerequisites – PHRD 3150, P2 status.
This one-semester course is the third in a five-semester longitudinal course sequence intended to develop a broad range of skills necessary for current and future pharmacy practice. It is designed to parallel the didactic portion of the curriculum, integrating and applying essential knowledge, skills and attitudes required for a successful professional career. It is formatted to prepare students for more complex patient case scenarios presented in Comprehensive Patient Care (in semester 6). Uniquely, this course lends continuity and cohesiveness to the entire curriculum. Each year as students assemble their pharmacy knowledge base, the professional skills course affords students the opportunity to integrate the information within a given semester and from semester-to-semester. Additionally, students will be expected to practice and refine a variety of skills through collaborative and individual activities. Since this course builds over three years of the curriculum, students are able to observe and document their own progression towards achievement of professional, academic, and personal goals.

PHRD 4200 Instructional Methods I  
1.0 cr.
Carol Balmer, Pharm.D., P2 status.
This course focuses on development of essential components of pharmacy-related teaching skills, including preparation of learning objectives, outlines, visual aids, and multiple choice questions, and will review presentation skills. During the fall semester, students develop brief teaching presentations, with formative feedback from peers and the course director. The presentations that are developed during the fall semester are given to audiences consisting of approximately 40 students and one or more faculty assessors during the spring semester.

PHRD 4300 Experiential Practice III  
2.0 cr.
Christopher Turner, Ph.D., Samuel Ellis, Pharm.D. (PHRD 4300), Prerequisites – PHRD 3350, P2 status.
The first of the three sequential (Fall P2, Spring P2, Fall P3) 2-credit hour Pass/Fail format introductory pharmacy practice experience (IPPE) courses are comprised of introductory classes, multiple periods of experiential training in a variety of practice settings, presentations by external speakers, writing and self-learning assignments, and exams. These courses build on previous IPPE courses to further develop students’ understanding of the general and professional CAPE competencies required to practice pharmacy and to enhance students’ skill in the application of these competencies in caring for patients. The courses emphasize the CAPE competencies “Thinking”, “Communication” and “Provide pharmaceutical care”. Students will be required to care for patients through non-prescription medication, health-promotion, and immunization and other disease-prevention activities in community pharmacies, and through hospital-based programs.

PHRD 4400 Pharmacy and Health Care III: Evidence-based Practice  
2.0 cr.
Rob Valuck, Ph.D. Prerequisites: PHRD 3450, P2 status.
This course is designed to introduce students to the quantitative methods most commonly used in applied clinical research and prepare them to interpret the results, and evaluate the appropriateness of statistical analyses used in pharmacotherapy research studies. Content addressed includes the following areas: an overview of study designs in medical research, measurement, descriptive statistics and measures of risk, inferential statistics, hypothesis testing, and the use of common statistical techniques. More advanced methods (e.g., survival analysis, multivariate analysis, and meta-analysis) are introduced at a very basic level.
PHRD 4600 Clinical Science Foundations 3.0 cr.
David Thompson, Ph.D. Prerequisites – PHRD 3650, P2 status.
This course provides students with a more detailed understanding of selected topics that bridge the gap between basic and clinical sciences. This course is divided into two distinct sections: (i) Biopharmaceutics and Pharmacokinetics, which focuses on the application of basic principles of these disciplines to the clinical use of pharmacological agents with the object of optimizing drug therapy, and (ii) Toxicology, which provides a basis for understanding the mechanisms of toxicity common to a broad range of diseases. Together, these sections will provide students with (a) foundation for the rational application of drug therapy in a variety of disease states.

PHRD 4700 Integrated Organ Systems III: F/E, A/B, Renal 2.0 cr.
Sheryl Vondracek, Pharm.D. Prerequisites – PHRD 3750, PHRD 3760, P2 status.
This course is intended to provide the student with an understanding of (i) the functioning of the renal system in health and disease, (ii) the means by which drugs alter kidney function and kidney function alters drug disposition, (iii) the importance of drug chemical structure on pharmacological and therapeutic actions, (iv) the therapeutic applications of drugs that modify kidney function, and (v) management of complications in patients with kidney disease. Controversial issues, recent advances in pharmacotherapy, and patient-specific management will be emphasized. The course is designed to augments Professional Skills Development and provide foundational knowledge for future core courses and clinical rotations.

PHRD 4710 Integrated Organ Systems IV: Cardiovascular 3.0 cr.
Joseph Saseen, Pharm.D. Prerequisites – PHRD 4700, P2 status.
Cardiovascular disease is consistently the leading cause of death in America. This course is intended to provide the student with an understanding of (i) the functioning of the cardiovascular system, (ii) the means by which drugs alter cardiovascular function, (iii) the importance of cardiovascular pharmacology, (iv) prevention and management strategies for cardiovascular conditions, including pharmacotherapy and non-drug measures, (v) assessing cardiovascular diseases and drug therapy, and (vi) developing complete patient specific pharmacotherapy plans that include specific recommendations, clear and accurate rationale for recommendations, monitoring, and patient education. Emphasis in this class will be placed on preventive cardiology (e.g., pharmacotherapy strategies that reduce cardiovascular risk), particularly cardiovascular diseases that are commonly (found) in routine pharmacy practice (e.g., hypertension, dyslipidemia, smoking). Standards of care, controversial issues, recent advances in pharmacotherapy, and patient-specific management will be emphasized. The course is designed to augment Professional Skills Development and provide foundational knowledge for future core courses and clinical rotations.

PHRD 4720 Integrated Organ Systems V: Cardiopulmonary 4.0 cr.
Robert Page, Pharm.D. Prerequisites – PHRD 4710, P2 status.
Cardiovascular and pulmonary diseases remain in the top four of the major killers in the United States. However, these complex areas of medicine also encompass disease states where pharmacist interventions are critical and make a major impact on patient outcomes. This course is intended to build upon the principles taught within IOS 3 & 4. Specifically, the course will provide the student with an understanding of (i) the coagulation pathways, cardiac electrophysiology, and respiratory pathophysiology, (ii) the means by which drugs alter cardiac and respiratory function, (iii) the importance of cardiovascular and respiratory pharmacology, (iv) prevention and management strategies for cardiovascular and respiratory conditions, including pharmacotherapy and non-drug measures, (v) assessing cardiovascular and respiratory diseases and drug therapy, and (vi) developing complete patient specific pharmacotherapy plans that include specific recommendations, clear and accurate rationale for recommendations, monitoring, and patient education. Emphasis in this class will be placed on not just the chronic but acute management of cardiovascular and respiratory diseases, particularly found in the inpatient setting. Standards of care, controversial issues, recent advances in pharmacotherapy, and patient-specific management will be emphasized. The course is designed to augment Professional Skills Development and provide foundational knowledge for future core courses and clinical rotations.

PHRD 5100 Professional Skills V 3.0 cr.
Connie Valdez, Pharm.D., Brian Hemstreet, Pharm.D. Prerequisites – PHRD 4150, P3 status.
This one-semester course is the fifth in a five-semester longitudinal course sequence intended to develop a broad range of skills necessary for current and future pharmacy practice. It is designed to parallel the didactic portion of the curriculum, integrating and applying essential knowledge, skills and attitudes required for a successful professional career. It is formatted to prepare students for more complex patient case scenarios presented in Comprehensive Patient Care (in semester 6). Uniquely, this course lends continuity and cohesiveness to the entire curriculum. Each year, as students assemble their pharmacy knowledge base, the Professional Skills course affords students the opportunity to integrate information within a given semester and from semester-to-semester. Additionally, students will be expected to practice and refine a variety of skills through collaborative and individual activities. As this course builds over three years of the curriculum, students will be able to observe and document their own progression towards achievement of professional, academic and personal goals.

PHRD 5200 Seminar on Pharmacy Issues V 1.0 cr.
Mark Ruscin, Pharm.D., Jacci Bainbridge, Pharm.D. Prerequisites – PHRD 4250, P3 status.
This one credit hour course will provide the Pharm.D. student the opportunity to participate in a formal, weekly seminar series as a speaker, self-evaluator, active member of the audience, and session coordinator.
PHRD 5300 Experiential Practice V  2.0 cr.
Chris Turner, Ph.D. Prerequisites – PHRD 4250, P3 status.
The third of the sequential (Fall P2, Spring P2, Fall P3) 2-credit hour Pass/Fail format introductory pharmacy practice experience (IPPE) courses are comprised of introductory classes, multiple periods of experiential training in a variety of practice settings, presentations by external speakers, writing and self-learning assignments, and exams. These courses build on previous IPPE courses to further develop students’ understanding of the general and professional CAPE competencies required to practice pharmacy and to enhance students’ skill in the application of these competencies in caring for patients. The courses emphasize the CAPE competencies “Thinking”, “Communication”, and “Provide pharmaceutical care”. Students will be required to care for patients through non-prescription medication, health-promotion, and immunization and other disease-prevention activities in community pharmacies, and through hospital-based programs. Continuation of previous semesters – community site based health promotion and disease prevention with added emphasis on TOC products (dermatologic, otic, ophthalmic, anal/rectal and diabetes care products), patient counseling, immunizations (in planning phase, optional/voluntary) and institutional site programs.

PHRD 5400 Pharmacy and Health Care VI – Population Based Practice  2.0 cr.
Patrick Sullivan, Ph.D. Prerequisites – PHRD 4450, P3 status.
This course will introduce the concepts of pharmacoeconomics in a manner that will build upon the student’s previous exposure to evidence-based pharmacy practice, health economics and the health care system.

PHRD 5700 Integrated Organ Systems IX – Endocrine, Rheum., Ophthalmology  4.0 cr.
Laura Hansen, Pharm.D. Prerequisites – PHRD 4750, PHRD 4760, PHRD 4770, P3 status.
This course is divided into four sections based on organ system (i.e. 1-endocrine (diabetes); 2-ophthalmology, otics, and dermatology; 3-endocrine (hormones and women’s health); and 4-osteoporosis, corticosteroids, and genitourinary). This course is intended to provide the student with an understanding of the endocrine, skin, ocular, otic, and genitourinary systems as they relate to (i) their role in overall health and disease; (ii) the importance of appropriate drug chemical structure, pharmaceutics, and pharmacology for medication actions; and (iii) the pharmacotherapeutic applications used to effectively treat them. Controversial issues, recent advances in pharmacotherapy, and patient-specific management will be emphasized. The course is designed to augment Professional Skills Development and provide foundational knowledge for future core courses and clinical rotations.

PHRD 5710 Integrated Organ Systems X – Infectious Diseases  4.0 cr.
Jacci Bainbridge, Pharm.D. Prerequisites – PHRD 4750, PHRD 4760, PHRD 4770, P3 status.
This course is intended to provide the student with an understanding of (i) the functioning of the immune system in health and disease, (ii) the role of pathogens in causing infections, and (iii) the therapeutic applications of antimicrobial agents in combating infections. Emphasis in this class will be placed on rational selection of appropriate antibiotic therapy and the appropriate monitoring of patients for drug efficacy and safety.

PHRD 5720 Integrated Organ Systems XI – Infectious Diseases  3.0 cr.
Brian Hemstreet, Pharm.D. Prerequisites – PHRD 5710, P3 status.
Continuation of the 5710 second part of the semester. This course is intended to provide the student with an understanding of (i) the biology of human pathogens, (ii) the role and mechanisms of various pathogens in causing infections, (iii) the functioning of the immune system in health and disease, and (iv) the therapeutic applications of antimicrobial agents in combating infections. Emphasis in this course will be placed on disease pathophysiology, rational selection of appropriate antimicrobial drug therapy, appropriate monitoring of patients for drug efficacy and safety, and drug interactions. This course complements and expands on information presented in Integrated Organ Systems X. While the previous course dealt chiefly with antibacterial agents and bacterial infections this course deals with fungal, parasitic, viral, and other opportunistic infections and their management. The course is designed to augment Professional Skills Development and provide foundational knowledge for future core courses and clinical rotations.

PHRD 5800 Pharmacokinetics and Toxicokinetics  2.0 cr.
Daniel Gustafson, Ph.D., Pharm.D., Prerequisites – P3 status.
This course will be taught as both didactic lecture and through the primary literature that will be discussed with student participation. The following topics will be covered: Introduction to PK and ADME, Linear Models, Complicated Linear Models, Linear Multiple Dose, Non-compartmental and System Analysis, Physiologically-based Pharmacokinetics, Urinary Excretion and Hepatic Elimination, Absorption Analysis and Bioavailability.

PHRD 6700 PharmD Clerkship  6.0 cr.
Christopher Turner, Ph.D.
## PHRD 3650 Principles of Drug Action  4.5 cr.
Marc Fariss, Ph.D. Prerequisites – PHRD 3600; PHRD 3610
- Building upon Science Foundations from last semester, this course aims to introduce the student to basic pharmacodynamic and pharmacokinetic determinants of drug action, drug interactions, and the genetic basis for inter-individual differences in response to drug efficacy and toxicity. In addition, comprehensive aspects of medicinal chemistry will be covered for a number of therapeutic categories of drug agents.

## PHRD 3750 Integrated Organ Systems I: Physiology  4.0 cr.
David Thompson, Ph.D. Prerequisites – PHRD 3610 Concepts of human physiology including nerve and muscle function, neuroanatomy, cardiovascular, renal and GI system.
- IOS1 introduces students to human physiology through a systematic study of the nervous, motor, cardiovascular, renal, endocrine and gastrointestinal systems. A dominant theme of this course is emphasis on the mechanisms involved in homeostasis and how various organ systems interact to maintain homeostasis. Integration of information in this course will enable the student to comprehend normal physiological function and the impact of disease processes or drug treatment on tissue and organ function. Accordingly, an overall objective of this course is to provide a foundation for IOS courses that discuss pathophysiological conditions and the actions of the therapeutic agents used to treat them.

## PHRD 3760 Integrated Organ Systems II: Autonomics & Autacoids  3.0 cr.
David Thompson, Ph.D. Prerequisite – PHRD 3750
- The autonomic nervous system (ANS), autacoids and inflammatory mechanisms represent important regulators of homeostasis under physiological and pathophysiological conditions. Consequently, they impact many organ systems in the body. This class is intended to provide the student with an understanding of (i) the physiology and pathophysiology of the autonomic nervous system, the nervous somatic system and autacoids, (ii) the importance of drug chemical structure on pharmacological and therapeutic actions, and (iii) the therapeutic applications of drugs which influence or mimic these systems.
This second year course will build on the first year experiential program to further develop understanding of the professional and general competencies required to practice pharmacy and to increase the skill level of students in the application of these competencies in pharmacy practice. In addition, it will introduce students to hospital pharmacy practice. Similar to the first year experiential program, the course will stress active learning and will require students to contribute to the achievements of their practice sites through health education and patient care. In contrast to the modular format of the first year experiential program, PHRD 4350 will require students to undertake a cohort of activities on a week-to-week basis throughout the semester.

PHRD 4400 Pharmacy and Health Care IV: Literature Evaluation and Advanced Drug Information 2.0 cr.
Hilda Bi, Pharm.D. Prerequisites – PHRD 4400, P2 status.
This course is designed to introduce a variety of drug information related activities that pharmacists participate in during clinical practice in various settings. In addition, this course will build on previous drug information skills to advance competency in knowledge and evaluation of primary literature. Course content will include reviews of the following drug information related activities: FDA approval process and investigational drugs, the role of the Institutional Review Board, formulary management, medication use evaluation, medication safety, adverse drug reaction monitoring and literature evaluation.

PHRD 4760 Integrated Organ Systems VII: GI, Nutrition 2.0 cr.
Rob MacLaren, Pharm.D. Prerequisites – PHRD 4750, P2 status.
This course is intended to provide the student with an understanding of (i) the functioning of nutrition and the gastrointestinal system in health and disease, (ii) the means by which drugs alter gastrointestinal function and gastrointestinal function alters drug disposition, (iii) the importance of drug chemical structure on pharmacological and therapeutic actions, and (iv) the therapeutic applications of nutrition and drugs that modify gastrointestinal function. Controversial issues, recent advances in pharmacotherapy, and patient-specific management will be emphasized. The course is designed to augment Professional Skills Development and provide foundational knowledge for future core courses and clinical rotations.
**PHRD 4770 Integrated Organ Systems VIII: Central Nervous System**  
4.0 cr.  
Jacci Bainbridge, Pharm.D.  
Prerequisites – PHRD 4750, 4760, P2 status.  
This class is intended to provide the student with an understanding of (I) the functioning of the central nervous system (CNS) in health and disease, (ii) the means by which drugs alter CNS function, (iii) the importance of drug chemical structure on pharmacological and therapeutic actions, and (iv) the therapeutic applications of drugs which modify CNS function. Emphasis in this class will be placed on CNS conditions that are amenable to drug therapy.

**PHRD 5250 Seminar on Pharmacy Issues**  
1.0 cr  
Jacci Bainbridge, Pharm.D., Mark Ruscin, Pharm.D., Samuel Ellis, Pharm.D., Prerequisites – P3 status.  
Continuation of PHRD 5200.  
This one credit hour course will provide the Pharm.D. student the opportunity to participate in a formal, weekly seminar series as a speaker, self-evaluator, active member of the audience, and session coordinator.

**PHRD 5350 Experiential Practice VI**  
2.0 cr.  
Chris Turner, Ph.D.  
Prerequisites – PHRD 5300, P3 status.  
This 2 credit hour course will comprise one period for course introduction and 20 hours (normally 10 x 2 hour periods) of experiential training at a non-pharmacy patient care site. Students will be assigned a non-pharmacist preceptor at their practice site. Additional time will be used in class to facilitate the P3 and P4 match process and orientation. An optional pharmaceutical industry site visit (Sandoz, Broomfield) is offered.  
The course will emphasize communication skills with non-pharmacist health care practitioners, primarily nurses and physicians. In addition, it will provide insight into the challenges faces by non-pharmacist health care practitioners in their patient care activities. PHRD 5350 will stress active learning and will require students to contribute to patient care at their practice sites.  
Each preceptor will involve their student in activities to help them care for their patients. Each preceptor will decide the nature of those activities and, accordingly, activities will vary from site to site. Examples of activities suggested to the preceptors by the school include:  
- Patient care activities, e.g.,  
  - accompany prescribers during patient care activities  
  - discuss pharmacotherapy with prescribers  
  - physical assessment activities (e.g., blood pressure measurements)  
  - educate patients about their disease states  
- Quality assurance activities, e.g.,  
  - chart review to track prescribing patterns (e.g., beta-blockers post MI)  
  - chart review to track therapeutic outcomes (e.g., HgA1c values)  
- Interview patients to establish/update Rx, OTC, herbal and health product profiles  
- Review profiles to establish drug/drug, drug/food and drug/laboratory test interactions  
- Formulary projects (e.g., drug cost comparison tables)  
- Other activities required by the preceptor

**PHRD 5650 Comprehensive Patient Care I**  
9.0 cr.  
Joseph Saseen, Pharm.D., Sheryl Vondracek, Pharm.D., Sunny Linnebur, Pharm.D.  
Comprehensive Patient Care is a Pass/Fail capstone course designed to lend continuity and cohesiveness to the entire curriculum, through integration and application of essential knowledge, skills and attitudes required for a successful professional career. In this course students will continue to develop a broad range of skills necessary for current and future pharmacy practice. Additionally, students will be expected to practice and refine a variety of skills through collaborative and individual activities. This course will be presented using longitudinal patient cases that evolve over a period of several days, short cases that are focuses on a more limited period of time, and completion of skills and/or activities relevant to pharmacy practice. These activities have been designed to reflect P4 rotations. Successful completion of CPC is considered a prerequisite for P4 Advanced Pharmacy Practice experiences.

**PHRD 5850 Geriatric Pharmacy Elective**  
2.0 cr.  
Mark Ruscin, Pharm.D., Sunny Linnebur, Pharm.D. Prerequisite – P3 status.  
This course is intended to provide the student with an advanced understanding of pharmacotherapy in older adults as well as common medical, psychological, and social issues encountered when caring for older adults. It is also intended to provide students an introduction to interdisciplinary care and opportunities to further develop problem solving and communication skills.

**PHRD 5855 Independent Study Elective**  
2.0 cr.  
Susan Paulsen, Pharm.D. Prerequisite – P3 status.

**PHRD 5860 Alternative and Complementary Therapies**  
2.0 cr.  
Susan Paulsen, Pharm.D. Prerequisite – P3 status.  
This two credit, one-semester course is designed to develop a broad knowledge base in the field of complimentary and alternative medicine. This lecture and interactive course will cover herbal/nutritional supplement products, vitamins and minerals used to treat common disease states and conditions. Students will be required to review one patient chart and make recommendations and answer two clinical questions related to the topics discussed in class. In addition, students will prepare and participate in one community-based activity for direct patient conversations regarding their medications and nutritional supplements.
PHRD 5865 Research Elective  var. cr.
Kathleen Stringer, Pharm.D. Crosslisted Courses: PHPR 4650, PHSC 4650
The student is expected to conduct clinical and/or laboratory-based research with a regular, full-time member of the School of Pharmacy faculty. For the purposes of this course, research is defined as a hypothesis driven investigation conducted in a clinical or laboratory setting that seeks to answer specific scientific questions. Investigations restricted to literature research do not meet this definition. Under the guidance of the faculty member, the student will learn how to use the research literature, propose specific hypotheses, design and conduct experimental protocols and analyze experimental data.

PHRD 5870 Pediatric Pharmacy Practice  2.0 cr.
Catherine Jarvis, Pharm.D. Prerequisite – P3 status.
This course will be offered to students interested in developing and fostering their knowledge and assessment of childhood diseases and pharmacotherapy. Clinical pharmacy specialists and staff from the Children's Hospital of Denver will teach this course. This course is intended to provide students with a more advanced understanding of both common and uncommon disease states in acutely and chronically ill children. An emphasis on pharmacotherapy as well as common medical, psychological, and social issues encountered when caring for pediatric patients will be discussed.

PHRD 5875 Pharmacy Management Elective  2.0 cr.
David Hill, Ed.D., Prerequisites – P3 status.
An introduction to the principles, skills, and issues important to the successful management of a pharmacy enterprise. While the course is largely concerned with application to community pharmacy, relevant comparisons will be made for the hospital pharmacy setting. Particular attention will be given to key business relationships, business planning, market analysis, forms of ownership, service offerings, competitive strategies, operational issues such as promotion and marketing, customer service, financial, inventory and human resource management, drug plan and reimbursement challenges; management of specialized practices; and professional advocacy to support pharmacy entrepreneurship.

PHRD 5880 Substance Abuse  2.0 cr.
David Thompson, Ph.D. Prerequisite – P3 status.
This course aims to provide the student with a database concerning the basic pharmacology, toxicology, treatment and biopsychosocial aspects of substance abuse and addiction. In addition, it will prepare the student to provide the public with substance abuse prevention education and to understand the procedures and resources for the identification, intervention and rehabilitation of those, including colleagues, with substance abuse and chemical dependence.

PHRD 5895 Medical Spanish  2.0 cr.
Connie Valdez, Pharm.D. Prerequisite – P3 status.
This Beginning Medical Spanish course, tailored for pharmacy students, is designed to allow students to become comfortable with conversational Spanish and medical vocabulary in various pharmaceutical contexts. Language learning is both academic and experiential. You will need to memorize new vocabulary, think about how it pulls together to form a complete thought, and PRACTICE! Therefore, each class session will include a combination of review, new learning, and lots of practice! The best way to approach it is to be relaxed and not care about making mistakes with the language. So be ready to relax, experiment, and LEARN SPANISH!

PHRD 6100 Drug Information Portfolio  2.0 cr.
Tonya Criner, Pharm.D. Prerequisite – P4 status.
This experiential drug information component of the curriculum is conducted through a longitudinal approach during the clerkship year. Each student will be responsible to develop a portfolio documenting his/her drug information-related activities while on various rotations. The goals of the Drug Information Portfolio are to 1) develop skills in the retrieval, evaluation, and provision of clinically-relevant drug information, 2) develop verbal and written communication skills, and 3) develop professional interpersonal skills.

PHRD 6700 PharmD Clerkship  6.0 cr.
Christopher Turner, Ph.D. Prerequisite – P4 status. The following course is offered to students in all schools and programs:

SUMMER SEMESTER

PHSC 3030 Introduction to Pharmaceutical Sciences  6.0 cr.
B. Brunson and T. Anchordoquy, Ph.D. Prerequisites - Instructor approval.
A comprehensive course that consists of Biochemistry, Physiology, Pharmaceutics, and preceptor experience. The course is designed to integrate learning skills, problem solving and critical thinking skills with course content and to offer students a preview into the diverse options available in pharmacy practice.

PHRD 6700 PharmD Clerkship  6.0 cr.
Christopher Turner, Ph.D. Prerequisite – P4 status.
PRDO 5010 Immunology  3.0 cr.
Faculty. Restrictions: Restricted to students in the Nontraditional Doctor of Pharmacy Program.
This course includes basic concepts of immunology, immunopathology, immunopharmacology and immunotherapy. It addresses the pathogenesis of diseases associated with the immune system such as hypersensitivity disorders, HIV/AIDS, autoimmune and rheumatic diseases, graft-versus-host disease and transplantation immunology, infectious diseases, and the role of the immune system in oncology. It also addresses the effects and outcomes of drugs and drug therapy and their impact on the immune system. Clinical applications of immunology, such as hypersensitivity reactions, allergic rhinitis, graft versus host disease, and biologic treatments of cancer are included. This course is recommended prior to Advanced Disease State Management III [Infectious Diseases and Pediatric Disorders] and Advanced Disease State Management IV [Oncology and Rheumatology Disorders, PRDO 5340], but is not a prerequisite.

PRDO 5320 Advanced Disease State Mgmt I: Gastrointestinal Disorders, Nutrition & Critical Care  4.0 cr.
Faculty. Prerequisite: PRDO 5700. Restrictions: Restricted to students in the Nontraditional Doctor of Pharmacy Program.
Note: Offered as a two semester course spanning two semesters on alternate years.
This course combines the elements of pathophysiology, advanced pharmacotherapeutics management, basic physical assessment skills, and professional skills development for patients with common gastrointestinal and nutritional disorders, and for critical care. The course incorporates the principles of applied and active learning using a combination of lecture and interactive formats. Major gastrointestinal disorders include pancreatitis, inflammatory bowel disease; diarrhea and constipation; alcoholic liver disease; acute liver failure; peptic ulcer disease and gastric esophageal reflux disease; and hepatitis. Major nutritional topic areas include nutritional assessment; parenteral and enteral nutritional support; nutrition in special populations, and nutritional supplements. Critical care topics include antibiotic use in the ICU; hypertensive crisis; shock; and sedation; neuromuscular blockade; and stress-induced mucosal bleeding.

PRDO 5330 Advanced Disease State Mgmt, Block III: Infections, Pediatrics & Toxicology  4.0 cr.
Faculty. Prerequisite: PRDO 5700. Restrictions: Restricted to students in the Nontraditional Doctor of Pharmacy Program. Note: Offered as a two semester course spanning two semesters on alternate years.
This course combines the elements of pathophysiology, advanced pharmacotherapeutics management, basic physical assessment skills, and professional skills development for infectious diseases and pediatrics disorders. The course incorporates the principles of applied and active learning using a combination of lecture and interactive formats. The infectious disease module includes basic microbiology; clinical use of antibiotics; management of viral, fungal, mycobacterial, and protozoal infections; infections of the upper and lower respiratory tracts; urinary tract, CNS, skin and soft tissues; common childhood infectious diseases; bone and joint infections; HIV/AIDS; sexually transmitted diseases; and immunizations. The pediatrics section addresses approach to the pediatric patient; normal growth and development; problem-solving in pediatric patients; and a body-system approach to management of common pediatric disorders.

PRDO 5350 Advanced Disease State Management V: Psychiatry, Neurology, and Geriatrics  4.0 cr.
Faculty. Prerequisite: PRDO 5700. Course Restrictions: Restricted to students in the Nontraditional Doctor of Pharmacy Program. Note: Offered as a two semester course spanning two semesters on alternate years.
This course combines the elements of pathophysiology, advanced pharmacotherapeutics management, basic physical assessment skills, and professional skills development for neurologic, psychiatric, and geriatric disorders. The course incorporates the principles of applied and active learning using a combination of lecture and interactive formats. Major topics in neurology include seizure disorders; multiple sclerosis; headache; chronic pain; Parkinson's disease; traumatic brain injury; and coma. Psychiatry addresses major affective disorders; anxiety; sleep disorders; schizophrenia; attention deficit disorders; substance abuse and a brief toxicology section addressing general principles of poison control, use of antidotes and management of common overdoses. The major topics in geriatrics are physiologic changes with aging; Alzheimer’s disease and other dementias; incontinence and BPH.
PRDO 5700 Clinical Skills Foundations  2.0 cr.
Faculty. Prerequisite: For all Advanced Disease State Management Courses. Course Restrictions: Restricted to students in the Nontraditional PharmD. program.

This course combines three important areas that together form an appropriate foundation for the Advanced Disease State Management courses. The first component provides orientation to the professional skills development sections of the Advanced Disease State Management courses. It focuses on developing an organized approach to drug-related problems, and includes experience in case presentations using the S.O.A.P. format, medication histories, problem-solving techniques, assessment of drug-related problems, and discussion of risk, responsibilities, and liabilities of clinical pharmacy practice.

The second component is an 8-week segment on Pharmacokinetics and Pharmacodynamics. It is taught with a combination of lectures, readings, and problem-based exercises. It includes a review of basic applied pharmacokinetics principles and individualization of drug dosing. The main focus of the course is to address issues of pharmacodynamics, physiologic determinants of drug disposition, protein binding, drug disposition in liver disease, and the use of assays in applied pharmacokinetics.

The third component focuses on pathophysiology, pharmacotherapeutics, and professional skill development for Fluids and Electrolytes and Acid Base disorders. This emphasizes management of disorders of sodium, chloride, potassium, calcium, and phosphate balance, as well as metabolic and respiratory acidosis and alkalosis. This segment is 4 weeks long.

**SPRING SEMESTER**

PRDO 5240 Evidenced-Based Pharmacy Practice  3.0 cr.
D. Casdorph. Prerequisites: PRDO 5460 & PRDO 5560. Course Restrictions: Restricted to students in the Nontraditional Doctor of Pharmacy Program.

This course introduces the pharmacist to the concepts and analytical foundation underlying evidence-based pharmacy practice. Course content will focus on: concepts of evidence-based practice; fundamentals of research including measurement, reliability, validity, and ethical concerns; an overview of the FDA drug approval process; clinical research designs; data analysis and presentation; the structure and evaluation of clinical research proposals and reports; and pharmacoconomics. Upon completion of the course, the student will be able to critically evaluate the medical literature for use in clinical and/or administrative decision-making.

PRDO 5310 Advanced Disease State Management I: Cardiovascular and Renal Disorders  3.5 cr.
Faculty. Prerequisite: PRDO 5700. Course Restrictions: Restricted to students in the Nontraditional PharmD. program.
Note: Offered as a two semester course spanning two semesters on alternate years.

This course combines the elements of pathophysiology, advanced pharmacotherapeutics management, basic physical assessment skills, and professional skills development for patients with common cardiovascular and renal disorders. The course incorporates the principles of applied and active learning using a combination of lecture and interactive formats. Major cardiovascular disorders include hypertension, dysrhythmias, lipid disorders, congestive heart failure, myocardial infarction, and acute coronary syndrome. Major renal topics include acute and chronic renal failure, dialysis of drugs, drug disposition in renal failure, and drug-induced renal disease.

PRDO 5340 Advanced Disease State Mgmt IV: Oncology, Rheumatology & Immunologic Disorders  4.0 cr.
Faculty. Prerequisites: PRDO 5700; PRDO 5010 recommended. Course Restrictions: Restricted to students in the Nontraditional Doctor of Pharmacy Program. Note: Offered as a two semester course spanning two semesters on alternate years.

This course combines the elements of pathophysiology, advanced pharmacotherapeutics management, basic physical assessment skills, and professional skills development for oncology and rheumatology disorders. The course incorporates the principles of applied and active learning using a combination of lecture and interactive formats. Major topics in oncology include clinical use of antineoplastics; common solid tumors such as breast, lung, colon and prostate cancers, leukemias and lymphomas; pain and palliative care; nausea and vomiting management; stem cell transplantation; preventing chemotherapy errors; pediatric oncology; and alternative cancer therapies. Rheumatologic topics include assessment of rheumatology patients; rheumatoid and osteo arthritis; osteoporosis; and gout and hyperuricemia.

PRDO 5360 Advanced Disease State Management VI: Endocrinology, Hematology, and Pulmonary Disorders  4.0 cr.
Faculty. Prerequisite: PRDO 5700. Restrictions: Restricted to students in the Nontraditional PharmD. program. Note: Offered as a two semester course spanning two semesters on alternate years.

This course combines the elements of pathophysiology, advanced pharmacotherapeutics management, basic physical assessment skills, and professional skills development for endocrinology, hematology, and pulmonary disorders. The course incorporates the principles of applied and active learning using a combination of lecture and interactive formats. Major topics in endocrinology include diabetes and its complications; metabolic syndrome; osteoporosis; obesity; hormone replacement therapy; contraception and infertility; and thyroid and adrenal disorders. The hematology section addresses anemias; and coagulation disorders; and acute and chronic anticoagulation. Major pulmonary topics are acute and chronic asthma; COPD; cystic fibrosis; and pulmonary function testing.
PRDO 5700 Clinical Skills Foundations  2.0 cr.
Faculty. Prerequisite: For all Advanced Disease State Management Courses. Course Restrictions – Restricted to students in the Nontraditional PharmD. program.
This course combines three important areas that together form an appropriate foundation for the Advanced Disease State Management courses. The first component provides orientation to the professional skills development sections of the Advanced Disease State Management courses. It focuses on developing an organized approach to drug-related problems, and includes experience in case presentations using the S.O.A.P. format, medication histories, problem-solving techniques, assessment of drug-related problems, and discussion of risk, responsibilities, and liabilities of clinical pharmacy practice.

The second component is an 8-week segment on Pharmacokinetics and Pharmacodynamics. It is taught with a combination of lectures, readings, and problem-based exercises. It includes a review of basic applied pharmacokinetics principles and individualization of drug dosing. The main focus of the course is to address issues of pharmacodynamics, physiologic determinants of drug disposition, protein binding, drug disposition in liver disease, and the use of assays in applied pharmacokinetics.

The third component focuses on pathophysiology, pharmacotherapeutics, and professional skill development for Fluids and Electrolytes and Acid Base disorders. This emphasizes management of disorders of sodium, chloride, potassium, calcium, and phosphate balance, as well as metabolic and respiratory acidosis and alkalosis. This segment is 4 weeks long.

SUMMER SEMESTER

PRDO 5460 Advanced Drug Literature Evaluation and Clinical Applications  1.5 cr.
Faculty. Prerequisites: PRDO 5240, PRDO 5560 & PRDO 6300. Course Restrictions: Restricted to students in the Nontraditional Doctor of Pharmacy Program.

This course will strengthen the skills necessary to allow practicing pharmacists to provide accurate, unbiased, and relevant drug information. The pharmacist will develop approaches to problem solving methods, communication skills, and advanced techniques in literature retrieval, evaluation, and application. The format includes lectures, discussions, and activities. It will focus on the following competencies: determining drug information needs, collecting patient and request-specific data, identifying potential drug information resources, establishing and utilizing search strategies, applying advanced techniques for evaluating literature, utilizing drug literature in clinical situations, developing a framework of a drug information response, formulating recommendations, and providing responses to drug information requests.

PRDO 5560 Instructional Methods with Seminars in Pharmaceutical Care  2.0 cr.
Will be offered summer, fall, and spring terms.
Faculty. Prerequisites: PRDO 5240, PRDO 5460 and at least 2 ADSM Courses. Course Restrictions - Restricted to students in the Nontraditional Doctor of Pharmacy Program.

This course is designed to provide the pharmacist with basic skills in lecture development and presentation. It will include instructional methods theory, such as levels of learning, and design of learning objectives and assessment tools. Presentation skills for addressing health care professional audiences and small group teaching will be addressed. In the seminar component of the course, pharmacists will prepare brief teaching presentations on pharmacy practice or pharmacotherapeutics topics. Presentations include PowerPoint slides. One short presentation is recorded online; the other is a CE-style presentation delivered to a small audience of colleagues, and videotaped. Presentations will be critiqued and self-assessed for content and presentation skills as a tool for development of teaching skills. Pharmacists will be asked to develop constructive feedback for selected presentations.