

SCHOOL OF PHARMACY

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Dean:

Russell B. Melchert

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Maqual Graham

Associate Dean for Student Affairs:

Steven C. Stoner

Associate Dean for UMKC School of Pharmacy at MU:

Erica Ottis

Associate Dean for UMKC School of Pharmacy at MSU:

Paul O. Gubbins

History

Originally organized in 1885 as the Pharmaceutical Department of the University of Kansas City, the school was reorganized and reincorporated in 1898 as the Kansas City College of Pharmacy and Natural Science. In 1943, this forerunner of the present school joined the University of Kansas City as its third professional school.

When the University of Kansas City was incorporated into the University of Missouri System in 1963, the School of Pharmacy became the only state-supported pharmacy school in Missouri. In October 2010, the school commemorated 125 years of excellence in pharmaceutical education, research and service.

The School of Pharmacy is a member of the American Association of Colleges of Pharmacy (AACP). The doctor of pharmacy program is accredited by the Accreditation Council for Pharmacy Education (ACPE). Information about ACPE can be found at <https://www.acpe-accredit.org/>.

Degrees Offered

The School of Pharmacy offers the advanced professional degree of doctor of pharmacy. In addition, the School of Pharmacy participates in the School of Graduate Studies Interdisciplinary Ph.D. program with emphasis areas in pharmaceutical sciences and pharmacology and toxicology.

The UMKC School of Pharmacy currently has three Pharm.D. program sites: the UMKC campus site (Kansas City), the UMKC School of Pharmacy at the University of Missouri (Columbia) site, and the UMKC School of Pharmacy at Missouri State University (Springfield). The Pharm.D. program is a single program with multiple locations. All students at each site are enrolled through UMKC and graduate from UMKC. The required curriculum is the same for all students enrolled in the UMKC Pharm.D. program. The same program policies and procedures apply to all students in the Pharm.D. program, regardless of program site.

Students interested in or that are currently pursuing Interdisciplinary Ph.D. programs of study should consult the School of Graduate Studies section of this catalog for degree requirements and other academic regulations applicable to the degree program.

Advising Systems

Student Support - Academic and Faculty Advising

Upon entry into the doctor of pharmacy program, each student is assigned a faculty advisor who serves as a mentor throughout the program. If students are experiencing difficulties, whether academic or personal, or if seeking more in-depth information about the curriculum or career paths, they should seek counsel from their faculty advisor. It is important that students keep in contact with their faculty advisor throughout the program as they will monitor their progress and success.

Academic advisors in the Pharmacy Office of Student Affairs also work closely with students in the pharmacy assurance program, pre-pharmacy program and current pharmacy students to provide assistance during the application and admission process, ensuring proper admission requirements and matriculation procedures and timelines are met. After entry, academic advisors assist students through subsequent enrollment and progression requirements and through final graduation completion. Academic advisors act as liaisons to various campus services and departments of the campus community and can link students with resources to address any academic or personal issues. Professional staff in the Office of Student Affairs also serve as advisors to individual classes and to the Pre-Pharmacy Society in addition to assisting pharmacy student organization and class officers.

Both the professional academic and faculty advisors are familiar with sources of assistance and will help students seek the best solutions to their issues and concerns. Building a strong relationship with both advisors is strongly encouraged. Students that encounter academic difficulty during the program should meet with their advisors for guidance and for help in smooth transitions.

The School of Pharmacy offers a variety of services to assist students in support of the academic experience. For more information visit: <https://pharmacy.umkc.edu/current-students/advising-and-resources.html>

Libraries

The University Libraries provide the full spectrum of information services to support study and research in pharmacy. For additional information, consult the University Libraries section of this catalog.

Student Affairs

The School of Pharmacy offers a variety of services to assist students in support of their academic experience.

Student services, which are available not only through the School of Pharmacy but throughout the University, are outlined in the Division of Student Affairs section of this catalog.

Student Involvement

Student Government

The student body annually elects an Executive Council for student pharmacists. The name of this primary council is Pharmacy Student Council (PSC). This body supports individual pharmacy students, student organizations, and the student body at the Kansas City, Columbia, and Springfield locations. The PSC is dedicated to representing the views, ideas, and concerns of the student body. This council consists of a president, administrative vice president, executive vice president, student government association senators, student activity fee committee representative and student council liaisons from each pharmacy campus location.

Student Organizations

The UMKC School of Pharmacy hosts a number of very active pharmacy student organizations. The following organizations are recognized by the UMKC Office of Student Involvement. UMKC students routinely win local, regional and national awards for their outstanding community service activities, leadership efforts, and commitment to patient care. General descriptions of each organization can be found under the Pharmacy Student Organizations section of the Pharmacy School website at: <https://pharmacy.umkc.edu/current-students/student-organizations.html>.

- Academy of Managed Care Pharmacy (AMCP)
- American Association of Pharmaceutical Scientists (AAPS)
- American Pharmacists Association Academy of Student Pharmacists (APhA-ASP)
- Black Student Pharmacists Organization (BSPO)
- American Association of Psychiatric Pharmacists (AAPP)
- Industry Pharmacists Organization (IPhO)
- Kappa Epsilon (KE)
- Kappa Psi (KY)
- National Community Oncology Dispensing Association (NCODA)
- National Community Pharmacists Association (NCPA)
- Pharmaceutical Sciences Graduate Student Association (PSGSA)
- Pharmacy Student Council (PSC)
- Phi Lambda Sigma Leadership Society (PLS)

- Pre-Pharmacy Society (PPS)
- Public Health Organization (PHO)
- Rho Chi Honor Society (RC)
- Student College of Clinical Pharmacy (SCCP)
- Student Society of Health-System Pharmacists (SSHP)
- Student National Pharmaceutical Association (SNPhA)

State Licensure Requirements

Students planning to practice the profession of pharmacy are required to satisfy the licensure requirements of the state in which they intend to practice. Licensure requirements vary, therefore, information concerning these requirements should be obtained by contacting the board of pharmacy of the state concerned.

Students accepted and enrolled in the doctor of pharmacy curriculum are required to obtain a valid Intern Pharmacist License issued by the Missouri Board of Pharmacy in order to fully participate in and continue through the curriculum. In addition, enrolled students must also obtain intern pharmacist professional liability insurance and keep insurance current through the duration of the program. The Missouri Intern Pharmacist License and professional liability insurance must remain current and valid through the last Advanced Pharmacy Practice Experience. Successful completion of all portions of the curriculum, both credit and non-credit requirements, are necessary for a student to meet graduation requirements and accrue sufficient internship hours toward pharmacist licensure eligibility.

All UMKC Pharm.D. students must read and adhere to the UMKC School of Pharmacy Student Intern Pharmacist License and Intern Liability Policy (<https://pharmacy.umkc.edu/docs/intern-license-liability-policy.pdf>) as posted on the School of Pharmacy website.

The state of Missouri requires that an applicant for pharmacist licensure be 21 years of age, a graduate of an ACPE accredited school of pharmacy approved by the state's board of pharmacy and have on file with the board proof of obtaining a minimum number of internship hours in a retail/community or hospital pharmacy practice setting under the supervision of a registered pharmacist/preceptor. Refer to the Missouri Board of Pharmacy and the National Association of Boards of Pharmacy websites for the most up-to-date information as requirements can change at any time.

Career Applications

Doctor of Pharmacy Careers

A number of graduates choose to practice in community and hospital pharmacy practice settings, but a wide variety of career possibilities in the pharmacy profession are available. Pharmacists have a great spectrum of practice environments to choose from in which their professional skills can be applied. Career information can be found through any of the national pharmacy professional associations. For information about these opportunities, see <https://pharmacy.umkc.edu/careers/index.html> (<https://pharmacy.umkc.edu/careers/>)

The doctor of pharmacy program also provides an appropriate academic base for students wishing to enter graduate study in the pharmaceutical sciences, pharmacology, toxicology, chemistry, biology, business, and/or public health. Others have gone on to pursue degrees in medicine, dentistry, or law.

Postgraduate training in the form of a residency and/or fellowship is recommended for all doctor of pharmacy graduates seeking advanced career opportunities in industry or academia.

- Academic Regulations and Requirements
- Doctor of Pharmacy (<http://catalog.umkc.edu/colleges-schools/pharmacy-home-page/doctor-of-pharmacy/>)
- Pharmacy (PHARM 7000) Courses (<http://catalog.umkc.edu/course-offerings/graduate/pharm/>)
- Doctor of Philosophy
 - Interdisciplinary Ph.D. in Pharmaceutical Sciences and Pharmacology (<http://catalog.umkc.edu/colleges-schools/pharmacy-home-page/interdisciplinary-phd-degree-requirements-pharmaceutical-sciences-pharmacology/>) and Toxicology
- Graduate Pharmacy (PHARM 5000) Courses (<http://catalog.umkc.edu/course-offerings/graduate/pharm/>)

Faculty

Mostafa Z. Badr; professor emeritus of pharmacology and pharmaceutical sciences; B.S., M.S. (Cairo University, Egypt); Ph.D. (University of Louisville).

Kylie Barnes; clinical professor of pharmacy practice and administration; PharmD (St. Louis College of Pharmacy).

Hari K. Bhat; professor of pharmacology and pharmaceutical sciences; B.Sc., M.Sc. (University of Kashmir, India); Ph.D. (University of Texas Medical Branch at Galveston).

Brandi L. Bowers; clinical assistant professor of pharmacy practice and administration; Pharm.D. (University of Arkansas for Medical Sciences).

Wayne M. Brown; associate professor emeritus of pharmacy practice and administration; B.S. (Medical College of South Carolina); M.S., Ph.D. (University of Mississippi).

Angela Brownfield; clinical professor of pharmacy practice and administration and director, experiential learning; Pharm.D. (St. Louis College of Pharmacy).

Austin Campbell; clinical assistant professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Kun Cheng^{2,3}; professor of pharmacology and pharmaceutical sciences, Sperry Family Fund Endowed Chair, and Curators' Distinguished Professor; B.S., M.S. (China Pharmaceutical University, China); M.S. (National University of Singapore, Singapore); Ph.D. (University of Tennessee).

Lisa Cillessen; clinical associate professor of pharmacy practice and administration; Pharm.D. (Ohio State University).

Sarah R. Cox; clinical associate professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Christene M. DeGracia; clinical assistant professor of pharmacy practice and administration; B.S. (University of Texas at Dallas); Pharm.D. (University of Houston).

Glenn H. Eberhart; professor emeritus of pharmacology and pharmaceutical sciences; B.S. (University of Denver); M.S., Ph.D. (University of California).

Elizabeth Englin; clinical associate professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Seenae Eum; teaching assistant professor of pharmacology and pharmaceutical sciences; B.S., M.S. (Seoul National University, South Korea); Pharm.D. (University of Minnesota).

Simon H. Friedman^{2,3}; professor of pharmacology and pharmaceutical sciences; B.S. (Massachusetts Institute of Technology); Ph.D. (University of California, San Francisco).

Maqual Graham; associate dean academic affairs, and professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Paul Gubbins; associate dean, professor of pharmacy practice and administration and vice chair, Division of Pharmacy Practice and Administration; PharmD (University of Illinois at Chicago College of Pharmacy).

William G. Gutheil^{2,3}; professor of pharmacology and pharmaceutical sciences; B.S. (California Polytechnic State University); Ph.D. (University of Southern California).

Kendall Guthrie; clinical associate professor of pharmacy practice and administration and director, co-curriculum; Pharm.D. (University of Missouri-Kansas City).

Jeremy P. Hampton; clinical associate professor of pharmacy practice and administration; B.S. (Rockhurst University); Pharm.D. (University of Missouri-Kansas City).

Karen L. Hardinger; clinical professor of pharmacy practice and administration and director, assessment; Pharm.D. (University of Kansas).

Kathryn Holt; clinical associate professor of pharmacy practice and administration; Pharm.D. (Medical University of South Carolina).

Orisa J. Igwe^{2,3}; professor of pharmacology and pharmaceutical sciences; B.S. (Northeast Louisiana University); M.S. (University of Kentucky); Ph.D. (University of Cincinnati).

Thomas P. Johnston; professor emeritus of pharmacology and pharmaceutical sciences; B.S., Ph.D. (University of Minnesota).

Maureen E. Knell; clinical professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Chi H. Lee^{2,3}; professor of pharmacology and pharmaceutical sciences; B.S. (Seoul National University, South Korea); M.S. (University of Washington); Ph.D. (Rutgers University).

Cameron C. Lindsey; professor of pharmacy practice and administration and chair, Division of Pharmacy Practice and Administration; Pharm.D. (University of Missouri-Kansas City).

Yifei Liu^{2,3}; associate professor of pharmacy practice and administration; B.S. (West China University of Medical Sciences, China); M.S., Ph.D. (University of Iowa).

Heather Lyons-Burney; clinical associate professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Patricia A. Marken; professor emeritus of pharmacy practice and administration; B.S. (Dalhousie University, Canada); Pharm.D. (Medical University of South Carolina).

Cydney E. McQueen; clinical professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Tatum Mead; clinical associate professor of pharmacy practice and administration; B.A. (University of Northern Iowa); Pharm.D. (University of Iowa).

Russell B. Melchert^{2,3}; dean, and professor of pharmacology and pharmaceutical sciences; B.S., Ph.D. (University of Oklahoma Health Sciences Center).

Srikumaran K. Melethil; professor emeritus of pharmacology and pharmaceutical sciences; B.Pharm., M.Pharm. (Andhra University, India); Ph.D. (State University of New York at Buffalo).

Nicole M. Moreno; assistant clinical professor of pharmacy practice and administration; Pharm.D. (Texas Tech University Health Sciences Center).

Mridul Mukherji^{2,3}; associate professor of pharmacology and pharmaceutical sciences; B.S. (University of Allahabad, India); M.S. (University of Calicut, India); Ph.D. (University of Oxford, United Kingdom).

Leigh Anne Nelson; professor of pharmacy practice and administration; B.S., Pharm.D. (University of Missouri-Kansas City).

Sarah M. Oprinovich; clinical associate professor of pharmacy practice and administration; Pharm.D. (Purdue University).

Erica Ottis; associate dean, clinical professor of pharmacy practice and administration and vice chair, Division of Pharmacy Practice and Administration; Pharm.D. (St. Louis College of Pharmacy).

Mark Patterson; associate professor of pharmacy practice and administration; B.A. (Bowdoin College); M.P.H. (Yale University); Ph.D. (University of North Carolina-Chapel Hill School of Pharmacy).

Robert W. Piepho; dean emeritus and professor emeritus of pharmacology and pharmaceutical sciences; B.S. (University of Illinois); Ph.D. (Loyola University).

Jordan M. Rowe; clinical assistant professor of pharmacy practice and administration; Pharm.D. (University of Arkansas for Medical Sciences).

Valerie L. Ruehter; assistant dean, experiential learning, and clinical professor of pharmacy practice and administration; B.S., Pharm.D. (University of Missouri-Kansas City).

Dominick Salvatore; clinical associate professor of pharmacy practice and administration; Pharm.D. (St. Louis College of Pharmacy).

Jennifer A. Santee; clinical associate professor of pharmacy practice and administration; Pharm.D. (University of Iowa).

Mark T. Sawkin; clinical professor of pharmacy practice and administration; B.S., Pharm.D. (Wayne State University).

Stephanie Schauner; clinical associate professor of pharmacy practice and administration and assistant director, experiential learning; Pharm.D. (University of Missouri-Kansas City).

Peter S. Silverstein²; teaching associate professor of pharmacology and pharmaceutical sciences; B.A. (Duke University); MA (Lehman College of City University of New York); Ph.D. (Auburn University).

Andrew Smith; clinical professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Roger W. Sommi, Jr.; professor emeritus of pharmacy practice and administration; B.S. (University of Wisconsin-Madison); Pharm.D. (University of Utah).

Morgan Sperry; clinical associate professor of pharmacy practice and administration and director, UMKC Drug Information Center; Pharm.D. (Creighton University).

Amanda M. Stahnke; clinical associate professor of pharmacy practice and administration; BA (Westminster College); Pharm.D. (Southern Illinois University).

Carly Steuber; clinical assistant professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Taylor Steuber; clinical associate professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Steven C. Stoner; associate dean student affairs, and clinical professor of pharmacy practice and administration; Pharm.D. (University of Nebraska).

Diana Tamer; clinical associate professor of pharmacy practice and administration; B.S. (American University of Beirut); Pharm.D. (Lebanese American University).

Jianping Wang^{2,3}; associate professor of pharmacology and pharmaceutical sciences; M.D., M.S. (Second Military Medical University); Ph.D. (Louisiana State University of Health Sciences Center).

Eric Wombwell; clinical professor of pharmacy practice and administration; Pharm.D. (University of Missouri-Kansas City).

Gerald J. Wyckoff^{2,3}; professor of biological sciences, pharmacology and pharmaceutical sciences and chair, Division of Pharmacology and Pharmaceutical Sciences; B.S. (Cornell University); Ph.D. (University of Chicago).

Bi-Botti C. Youan^{2,3}; professor of pharmacology and pharmaceutical sciences; Pharm.D. (University of Cote, Abidjan); MBA (United Business Institutes, Belgium); M.Sc., Ph.D. (Catholic University of Louvain, Belgium).

David M. Yourtee; professor emeritus of pharmacology and pharmaceutical sciences; B.S. (University of Missouri-Columbia); Ph.D. (University of Missouri-Kansas City).

Xiangming Zha^{2,3}; associate professor of pharmacology and pharmaceutical sciences; B.S. (Shanghai Jiao Tong University, Shanghai); M.S. (Shanghai Brain Research Institute, Chinese Academy of Sciences, Shanghai); Ph.D. (University of Iowa).

¹ Associate or Adjunct Graduate Faculty

² Members of UMKC Graduate Faculty

³ Members of UMKC Doctoral Faculty

⁴ Located at UM-St. Louis campus

Courses

PHARM 5507 Basic Pharmacology Credits: 3

Basic pharmacological concepts and important classes of pharmacologic agents.

Prerequisites: BIOLOGY 218, LS-PHYS 217.

PHARM 5508 Medicinal Chemistry of Drug Classes Credits: 3

This course will focus on major drug classes, both natural and synthetic, with emphasis on their chemical properties, their mode of action, their structure-activity relationships, and their metabolic fate. Structure-activity relationships and the influence of organic functional groups on physicochemical properties of drugs and their pharmacological activities will be emphasized. Drug metabolism will also be covered, with a focus on organic functional group transformations.

PHARM 5509 Toxicology Credits: 3

Principles of general toxicology and toxicology of industrial and household chemicals, agricultural agents, social poisons, and selected therapeutic agents.

PHARM 5519 Pharmacology I Credits: 2

Basic pharmacological principles of drug absorption, distribution, metabolism and elimination; concept of drug-receptor interactions; dose-response relationships and mechanism of action; and signaling mechanisms.

Prerequisites: Successful completion of prior professional program coursework or course coordinator's permission.

PHARM 5520 Pharmacology II Credits: 4

Principles of and advances in chemotherapy; biology, mechanism of action; clinical applications and adverse effects of various drug groups.

Prerequisites: Successful completion of prior professional program coursework or course coordinator's permission.

PHARM 5521 Advanced Organic Medicinal Chemistry Credits: 3

The focus of this course is an examination of the physical-chemical basis of drug action, particularly focusing on the formation of drug-target complexes. This includes the mathematical description of this binding, as well as an advanced description of the physical forces responsible for binding. In addition we will examine the energetic and entropic factors that contribute to complex stability, examining real world examples when possible.

PHARM 5527 Analytical Methods Credits: 3

A detailed study of the methods used to detect, identify, and quantitate drugs, small molecules, enzymes, proteins, and biological molecules. The statistical foundation, core concepts, and practical implementation of analytical methods are areas of emphasis. State-of-the-art instrumentation and recent technological developments are also presented, including biotechnology based methods such as proteomics methods and quantitative PCR.

PHARM 5530 Pharmacology III Credits: 4

Mechanism of action; therapeutic uses; and adverse effects of drugs affecting different organ systems.

Prerequisites: Successful completion of prior professional program coursework or course coordinator's permission.

PHARM 5531 Physical Pharmacy Equilibria Credits: 3

Advanced principles of aqueous solutions, acid-base equilibria, solubility and complexation. Mathematical solutions and state-of-the-art research applications.

Prerequisites: B.S. in pharmacy.

PHARM 5533 Advanced Pharmacokinetics and Biopharmaceutics Credits: 3

This course involves the study of the rates at which drug absorption, distribution, metabolism, and excretion occur in the body following medication administration. The student will be expected to kinetically model a given physiological process associated with the disposition of a drug in any tissue, write a series of equations, and then solve those equations to produce a final set of equations that can be used to predict the concentrations of drug in the biological matrix of interest. Knowledge of derivation of equations is expected, along with real-world application of resulting equations.

Prerequisites: PHARM 7303 and MATH 345 (both with a grade of B or better).

PHARM 5550 Stability of Pharmaceuticals Credits: 3

The course provides instruction in the processes responsible for instability of pharmaceuticals. Course content includes, but is not limited to, instability due to light, oxygen, and metal ions; the effect of temperature on the rate of drug decomposition; the effect of dielectric constant and ionic strength on degradation; and physical and chemical instability of newer polypeptide drugs. In addition, practical strategies to prevent instability of the active compound and excipients used in pharmaceutical formulations is provided.

Prerequisites: MATH 210, PHARM 7202, PHARM 7203.

PHARM 5555 Religion, Culture and Health Credits: 3

This course addresses the impact of religious beliefs on the culture practices of contemporary society, and aims at examining the relationship between these beliefs, modern sciences and health.

PHARM 5560 Discussions in Pharmacology Credit: 1

Discussions in Pharmacology (also called Pharmacology Journal Club), is a graduate course. It is designed to provide graduate student the opportunity to read, interpret and present literature to fellow peers, post-docs and faculty. The Journal Club presentations promote active and lively discussion and exchange of ideas. The class is a mandatory requirement for all graduate students in the Division of Pharmacology Toxicology.

Prerequisites: B.S. (or equivalent) in biology, chemistry, pharmacy or related biomedical sciences.

PHARM 5580A Seminar in Pharmaceutical Sciences Credit: 1

Enrollment and participation required of all graduate students in the School of Pharmacy during each semester of graduate study.

PHARM 5580C Seminar in Pharmacology/Toxicology Credit: 1

Enrollment and participation required of all graduate students in the School of Pharmacy during each semester of graduate study.

PHARM 5588 Biotechnology Credits: 3

In this graduate course, the principle theories, techniques and strategies to conduct experiments using common biotechnology/molecular biology techniques will be discussed. The course material has been designed to provide up to date information on techniques in biotechnology. Knowledge on these basic biotechnology/molecular biology techniques will be useful in diverse fields like biochemistry and pharmaceutical sciences to work with nucleic acid and proteins (or equivalent) in biology, chemistry, pharmacy or related discipline.

PHARM 5590A Special Topics Pharmacy Credits: 1-3**PHARM 5599A Research And Thesis Pharmacy Credits: 1-9****PHARM 5599C Research And Thesis Pharmacology Credits: 1-9****PHARM 5605 Fundamentals of Pharmaceutical Sciences Credits: 3**

This is an entry-level graduate course for all incoming graduate students who select Pharmaceutical Sciences either as the primary discipline or co-discipline. The course will teach the fundamentals of the Pharmaceutical Science discipline. The fundamentals include drug discovery, drug absorption and metabolism, formulation development, physical pharmacy, pharmaceutics, drug delivery, molecular biology, cell biology, medicinal chemistry, and pharmacokinetics.

PHARM 5615 Methods In Pharmacology And Toxicology Credits: 3

Exposure to some of the techniques employed in research in pharmacology and toxicology. There are eight one-hour introductory lectures for the course, followed by six hours of laboratory per week.

PHARM 5630 Cytochrome P450: Drug Metabolism, Bioavailability, Interactions and Toxicity Credits: 3

This course is designed to provide students up-to-date scientific facts on drug metabolism, bioavailability interactions, and toxicity (DMBIT) in perspective of cytochrome P450 (CYP) and the factors that affect DMBIT. The course will also include prospects of CYP applications for various purposes in reference to drug metabolism. The course will include lectures, lab experience, and student seminar/report.

Prerequisites: B.S. (or equivalent) in chemistry, biology, pharmacy, or related subject.

PHARM 5631 Pharmaceutical Formulations I Credits: 3

Advanced theory and practice of Pharmaceutical formulations, including classical and current research. This course will introduce the principles of biomaterial based drug delivery systems and unify knowledge from the fields of biology, materials science, and pharmaceuticals.

Prerequisites: B.S. in Pharmacy.

PHARM 5632 Novel Drug Delivery Systems Credits: 3

The course offers up-to-date information about drug transport mechanisms and drug absorption processes across various absorptive membranes ie., buccal, nasal, dermal, corneal, pulmonary, and oral mucosae. The course material has been designed to provide current ideas and thinking about gene delivery, drug targeting to tumor cells and lipid and carrier mediated drug delivery. It provides unique information about cell culture models as a predictor of drug delivery as well as physical chemistry of surfaces in various microparticulates and lipid emulsion systems.

PHARM 5633 Receptor Pharmacology and Signal Transduction Credits: 3

Molecular characterization of drug receptors involving quantitative description of functional studies with agonists and antagonists and binding of ligands to receptors; the molecular structure of receptors and the signaling systems that couple receptors to their pharmacologic functions.

Prerequisites: LS-BIOC 370, PHARM 5519, PHARM 5520, PHARM 5530.

PHARM 5634 Protein and Nucleic Acid Drug Delivery Credits: 3

In the graduate course, the principle theories, techniques and strategies in developing protein and nucleic acid drugs will be discussed. The course material has been designed to provide up to date information in protein and nuclear acid drug delivery. It offers unique information on how to combine knowledge of chemistry, molecular biology and pharmaceutical sciences to achieve successful therapeutic application of protein and nucleic acid.

Prerequisites: B.S. in bioengineering, biology, chemistry, pharmacology, or pharmacy.

PHARM 5640 Biochemical and Molecular Toxicology Credits: 3

This course will provide students with a comprehensive mechanistic understanding of various molecular events that lead to and/or are associated with chemically/environmentally induced degenerative of proliferative diseases. The course will include lectures student presentations of recent advances in biochemical and molecular toxicology and student report on a topic of interest as it pertains to the subject being taught. The title of the report has to be approved by the course coordinator.

Prerequisites: B.S. (or equivalent) in biochemistry, biology, chemistry, or molecular biology.

PHARM 5645 Cancer Biotechnology I Credits: 3

This course is designed to provide a basic understanding of tumor progression, molecular events and signaling mechanisms underlying tumor formation. Epidemiological approaches, etiology, and current methods of detection and diagnosis of cancer will be discussed. Current pharmacological management strategies of cancer and future therapeutic interventions will also be reviewed.

Prerequisites: BIOLOGY 202 (or equivalent).

PHARM 5690BB Special Topics Toxicology Credits: 1-3**PHARM 5690C Special Topics Pharmacology Credits: 1-3****PHARM 5690PCII Special Topics Pharmacy Credits: 1-3**
Special Topics Pharmacy**PHARM 5699 Research and Dissertation Credits: 1-16**

Available for Doctorate program with the following emphasis areas: (A) Pharmacy, (B) Pharmaceutical Chemistry, (C) Pharmacology, (AA) Pharmacy Administration, and (BB) Toxicology.

PHARM 5699A Research And Dissertation - Pharmacy Credits: 1-16**PHARM 5699B Research And Dissertation Pharmaceutical Chemistry Credits: 1-16****PHARM 5699BB Research And Dissertation Toxicology Credits: 1-16****PHARM 5699C Research And Dissertation Pharmacology Credits: 1-16****PHARM 5899 Required Graduate Enrollment Credit: 1****PHARM 7100A Introductory Topics in Pharmacy I Credit: 1**

These courses include presentations and discussions on the profession of pharmacy including: the roles and responsibilities of the pharmacist, educational requirements to obtain the degree, career opportunities, student life, legal and ethical issues, and study skills development.

PHARM 7101 Introduction to the Professional Degree Program and Pharmacy Practice Credits: 2

This course introduces students to the profession of pharmacy by communicating drug names, defining drug-related problems and discussing professional responsibilities and roles of a pharmacist. Students will examine and reflect on personal knowledge, skills, abilities, beliefs, biases, motivation, and emotions that could enhance or limit personal and professional growth following completion of various self-assessments. This course also assists students to assume responsibility for their own learning. One 2-hour class session is held per week.

Prerequisites: Admission to the Pharm.D. Program.

PHARM 7110 Professional Skills II: Pharmacy Calculations Credits: 2

This course provides instruction in performing and applying the necessary calculations involved in pharmacy practice and the dispensing, manufacturing and preparation of dosage forms. Topics covered include but are not limited to: fundamentals of pharmaceutical calculations, exponents, ratios, percentages, proportions and fractions); International System of Units; pharmaceutical measurements; interpretations of medication orders and prescriptions; density, specific gravity and specific volume; patient specific parameters involved in dosing (surface area, weight and age); isotonicity and buffer solutions; milliequivalents, millimoles and milliosmoles; dilution, concentration and allegation; and reduction/enlargement of formulas. Students must have an understanding of mathematical principles to include algebra and calculus.

Prerequisites: MATH 210.

PHARM 7151 Introduction to Pharmacy Law Credit: 1

This course will examine the federal laws that pertain to the practice of pharmacy.

PHARM 7199 Pharmacy Grand Rounds Credits: 0.25

The School of Pharmacy offers Grand Rounds seminars for the student body regarding timely and important topics and issues facing the profession of the School.

PHARM 7202 Pharmaceutics I Credits: 3

Overall, in this course, the principles of chemistry, physics and mathematics are applied to the pharmaceutical sciences. Elements of mathematics, states of matter, acid-base chemistry, solubility, partitioning, isotonicity, interfacial phenomena, rheology, reaction kinetics, incompatibilities, and stabilization of pharmaceutical formulations and dispersed systems will be considered.

Prerequisites: PHARM 7110.

PHARM 7203 Pharmaceutics II Credits: 3

Discussion of pharmaceutical processes, equipment and material used in drug delivery systems and the preparation and evaluation of various drug delivery systems and formulations.

Prerequisites: PHARM 7202.

PHARM 7203L Pharmaceutics II Lab Credit: 1

In this lab course, students will perform hands-on pharmaceutical processes, use manufacturing equipment, and prepare formulations in which selected dosage forms are manufactured and evaluated. This is a professional elective option for Pharm.D. students.

Prerequisites: PHARM 7202.

Co-requisites: PHARM 7203.

PHARM 7223 Rural Health and Agricultural Medicine Credits: 2

Intended to introduce inter-professional health professions students to agricultural health and rural medicine in order to prepare them to serve rural populations. Provided in collaboration with the Great Plains Center for Agricultural Health Safety, this course will provide a solid foundation in prevention strategies for safety and health in production agriculture. Students will recognize relevant demographic, socioeconomic and social determinants of health. Participants will be equipped with resources and tools that can support them in their future service to rural communities and emphasize the importance of interdisciplinary collaboration among health professions in order to reduce risks and optimize health.

Prerequisites: Students must be enrolled in health professions coursework.

PHARM 7224 Introduction to Cannabis Medicine Credit: 1

The course will serve as an introduction to the endogenous cannabinoid system and explore the clinical potential and the clinical, social, and legal problems associated with medicinal use of cannabis and cannabinoid medicines.

PHARM 7228 Introduction to Veterinary Pharmacy Credits: 2

This course will introduce the student pharmacist to the unique challenges and aspects of veterinary medicine including regulatory issues, general overview of anatomy/physiology, as well as proper interactions with and the training of veterinarians.

PHARM 7231 Drug Development and Pharmaceutical Career Opportunities Credits: 2

An introduction to the drug development industry and the process by which a new drug is brought to market. Students will use knowledge gained in previous coursework to deepen their understanding of how the biopharma and pharmaceutical industry functions. There will be an overview of discovery, preclinical, clinical, regulatory, drug safety, marketing, and medical affairs functions within the pharmaceutical industry. Opportunities that exist for Doctor of Pharmacy graduates to develop careers in these areas will also be discussed.

Prerequisites: PHARM 7101.

PHARM 7233 U.S. Health Care System and Marketing Credits: 3

U.S. Health Care System and Marketing is a required course for the Doctor of Pharmacy degree program at The University of Missouri -Kansas City School of Pharmacy. It consists of two modules: U.S. Health Care System and Medication Safety (Module I) , and Health Care Marketing (Module 2). The learning objectives of the course are to (1) characterize components of the U.S. health care system at the macro level, including public health programs; (2) discuss medication errors and management within the U.S. health care system; (3) manage patients' health care needs using technological resources to optimize safety and efficacy of medication use systems; and (4) analyze the marketing process for health care projects and services, including business ethics in marketing activities. This course provides the context and builds the knowledge base for future required courses in economic, social, and administrative sciences.

PHARM 7244 Introduction to Drugs of Abuse Credits: 2

As a health professional in training, it is important to know the mental and behavioral effects of abusing both prescription and illicit substances. This knowledge will help the health professional to be more understanding of their patients who may be suffering with a substance abuse problem. Introduction to Drugs of Abuse will focus on both the physical and psychological effects of substances such as hallucinogens, amphetamines, alcohol, and nicotine among others. The course will also be discussing important topics such as behavioral modification, the controversies of treatment, and the role of the pharmacist in the treatment of substance abuse. A substantial focus will also be placed on patient experiences and the psycho-social aspects of substance abuse.

Prerequisites: BIOLOGY 218, BIOLOGY 218L.

Co-requisites: LS-PHYS 399, LS-PHYS 400.

PHARM 7245 Top Drugs I Credit: 1

This 1.0 hour course is designed as an introduction to up to 300 of the most commonly prescribed medications. This course will provide students with the opportunity to learn basic drug knowledge including brand (trade) and generic names, controlled substance schedule, therapeutic class, common dosage forms, FDA approved indications and common off-label uses, dosing, mechanism of action, pharmacokinetics, drug interactions, contraindications/precautions and medication safety considerations, adverse effects, drug monitoring, patient counseling, and clinical pearls.

Prerequisites: Successful completion of the P1 year in the Pharm.D. Program

PHARM 7266 Medical & Medication Error Evaluation & Management Credit: 1

A course designed to discuss the current body of evidence with respect to medical quality, medication errors, and strategies used to improve quality minimize error rates. At the completion of the course, the student should be able to (1) review and synthesize evidence within the literature; (2) describe the policy framework designed to improve health care quality; (3) describe characteristics and factors that enable encourage providers to improve the quality of care; (4) describe common causes of medication errors; (5) differentiate strategies to prevent errors; (6) correlate medication errors and specific disease states.

PHARM 7275 The Pharmacists' Role in Global Health Credits: 2

This course is designed to introduce students to the global context of public health. "Global Health" is defined as the application of principles of public health to health issues and challenges that transcend geopolitical boundaries, and to the complex array of global and local forces that affect these health issues.

PHARM 7277 Zoonotic Illnesses Credit: 1

A zoonotic illness is a disease that can be transmitted from animals to humans – over 60% of all human infections are zoonotic. The purpose of this course is to increase student knowledge relative to infectious diseases caused by zoonotic transmission/pathogens. Topic discussion will include background evolution of the disease, diagnostic considerations, management, monitoring and reporting of the infectious diseases to the local health department. This course will serve to reinforce the principles of infectious diseases pharmacotherapy and further expose students to diseases encountered in rural Missouri (i.e. tick bites, farm animals). Classes are didactic in nature.

Prerequisites: Microbiology course from any accredited college or university.

PHARM 7289 Introduction to Complementary and Alternative Medicine Credit: 1

An elective course designed to introduce a variety of the most common complementary and alternative medicine (CAM) modalities. Each modality will be defined and explained and any clinical evidence for or against will be discussed. An important emphasis will be on how patient use of these therapies may affect their needs for medication therapy management and counseling. For example, patients who see a naturopathic physician may be more likely to use herbal therapies that may interact with their prescription medications.

Prerequisites: Good standing in the P2 Doctor of Pharmacy year; P1 students may enroll with instructor approval.

PHARM 7303 Pharmacokinetics and Biopharmaceutics Credits: 3

This course involves the study of the rates at which drug absorption, distribution, metabolism, and excretion occur in the body following medication administration. The student will be taught to calculate pharmacokinetic parameters, and then utilize those values to optimize pharmacotherapy in his/her patient. So as to promote inter-professional healthcare dialogue, this course will demonstrate how to make informed recommendations associated with both drug administration and monitoring to medical and nursing healthcare providers. Recommendations include, but are not limited to, suggesting changes in the dose, dosing frequency, infusion rate, steady-state plasma drug concentrations, 'peak' and 'trough' plasma drug concentrations, drug/drug interactions, drug/food interactions, and dosing adjustment in the context of diminished kidney or liver function.

PHARM 7307 Advanced Pathophysiology Credits: 3

Advanced pathophysiology I is the study of the alterations of normal physiological functioning in cellular, tissue, organ, and organ systems. These alterations form the basis for understanding a variety of pathophysiological conditions and the manifestations and impact of abnormal physiological functioning on patients across the life span. Advanced pathophysiology I deals with both generalized disease processes and major organ system dysfunction. Students will have the opportunity to identify clinical signs and symptoms for various disease states and associate those symptoms with pathophysiological changes. The focus of this course is not on the pharmacologic management of disease, though medication management categories may be briefly introduced as it relates to mechanism of action and the physiologic abnormality contributing to the disease state.

Prerequisites: LS-BIOC 370, LS-PHYS 400.

Co-requisites: PHARM 7362, PHARM 7245.

PHARM 7308 Advanced Pathophysiology II Credits: 3

Advanced pathophysiology II is the study of the alterations of normal physiological functioning in cellular, tissue, organ, and organ systems. These alterations form the basis for understanding a variety of pathophysiological conditions and the manifestations and impact of abnormal physiological functioning on patients across the life span. Advanced pathophysiology II deals with both generalized disease processes and major organ system dysfunction. Students will have the opportunity to identify clinical signs and symptoms for various disease states and associate those symptoms with pathophysiological changes.

Prerequisites: PHARM 7307.

Co-requisites: PHARM 7363, PHARM 7345.

PHARM 7309 Pharmacy and Pharmaceutical Sciences Innovations: Nuts & Bolts Credit: 1

This class is intended to broaden the reach of entrepreneurship into the UMKC PharmD program as well as the Pharmaceutical Sciences and Pharmacology Ph.D. Disciplines. Students will work in teams structured across academic levels to create a pitch, which they deliver as part of the course. The course will run in a “flipped” manner where didactic material will be pre-recorded, and then the class will have time for work and discussion.

Prerequisites: PharmD students and graduate level students in Pharmaceutical Sciences or with instructor permission. Open to students outside of Pharmacy but within the Health Sciences District.

PHARM 7310 Academic Service Learning I Credit: 1

Academic Service Learning is a professional elective course where students are assigned to either an area clinic in Kansas City or the MedZou program in Columbia. A minimum of 30 contact hours must be completed during the assigned semester. Health education will be the primary focus.

PHARM 7311 Pharmacy in the 21st Century Technology Credits: 2

This course allows students to develop the skills to evaluate and use Health Care Information Technology (HCIT) in contemporary pharmacy practice. The elective course is offered in the winter semester only.

Prerequisites: Third year status or higher in the Pharm. D. program.

PHARM 7313 Career Planning Credit: 1

This course enables students to engage in the study of career opportunities in the areas of industry, hospital/clinic practice, retail and managed care settings. Pharmacy opportunities are explored through lecture and discussion, guest speakers in the various areas and student exploration with business contacts and research. Topics include understanding career opportunities, achieving one's professional goals, compensation packages and negotiations, and designing a path to accomplish career objectives.

PHARM 7316 Introduction to Pharmaceutical Policy Analysis Credits: 2

This course addresses multiple key influential pharmaceutical policy areas shaping pharmacy practice, and will teach critical thinking skills required to measure both federal and state level policy impact in patient safety and access to medications.

Prerequisites: PHARM 7151, PHARM 7325.

PHARM 7317 Drug Induced Diseases Credits: 2

Drug-induced disease is an unintended effect if a drug that results in mortality or morbidity with symptoms sufficient to prompt a patient to seek medical attention and/or require hospitalization. This course will aid students in the identification, management, and prevention of drug-induced diseases.

Prerequisites: PHARM 5519, PHARM 7307.

PHARM 7318 Introduction to Critical Care Medicine Credits: 2

Critical Care is a multidisciplinary healthcare specialty that cares for patients with acute, life-threatening illness or injury. The management of these patients requires advanced knowledge in various disease states, pathophysiological changes as a result of the illness or injury, as well as the pharmacologic agents used in their treatment. The course will serve as an introduction to Critical Care medicine and will allow students to gain exposure to all that encompasses caring for the critically ill. It will not only focus on specific disease states, but also delve into the negative outcomes associated with such illnesses and provide an introduction to both medical and pharmacologic management of them. The course is not meant to provide students with a comprehensive review but rather provide a glimpse into the specialty of Critical Care Medicine.

Prerequisites: Successful completion of all pharmacy didactic and experiential courses through semester four.

PHARM 7324 Medication Management in Transitions of Care Credit: 1

Transitions of care is an important aspect of patient care in all pharmacy practice settings. The pharmacist plays a crucial role in medication management during the transitions of care process. The purpose of this course is to increase student knowledge and skills relative to the pharmacist's role in transitions of care. Students will learn strategies to effectively develop and implement pharmacy-led transitions of care services in various healthcare settings.

Prerequisites: PHARM 7414. PHARM 7414L.

PHARM 7325 Patient Assessment and Professional Communication Credits: 2

In this course, students will continue developing necessary skills to provide patient-centered care. Students will be introduced to health informatics and an electronic medical record. Students will be taught the four components of a SOAP note, a method of documentation used by healthcare providers. Students will learn how to physically assess patients and document findings in SOAP format in a patient's record. Students will also learn how to effectively communicate with other healthcare professionals and document the interactions.

Prerequisites: PHARM 7101, PHARM 7414.

Co-requisites: PHARM 7325L.

PHARM 7325L Applied Skills Lab: Patient Assessment and Professional Communication Credits: 0.5

This applied skills lab is associated with the Patient Assessment and Professional Communication course. Learning activities are designed to complement didactic instruction while allowing students to apply knowledge in a simulated environment. Students are expected to perform physical assessments on each other while under supervision and document patient information accurately and periodically within the electronic medical record system. Student achievement of core abilities will be assessed through an Objective Structured Clinical Examination. One 2-hour lab session is held every other week or weekly but no more than 10 sessions per semester.

Prerequisites: PHARM 7101, PHARM 7414.

Co-requisites: PHARM 7325.

PHARM 7326 Evidence Based Medicine Credits: 4

Pharmacists, if they are to assume the role of "medication expert," must learn how to evaluate the reliability of information relevant to healthcare options and choices. A pharmacist then can develop a clinical recommendation with justifications based on this evidence. Students will be taught a rigorous 5-Step systematic methodology assisting them with integrating this process into multidisciplinary healthcare decision-making for improved patient care.

Prerequisites: PHARM 7325, PHARM 7405.

Co-requisites: PHARM 7420.

PHARM 7328 Aerospace and Space Toxicology Credits: 2

This course introduces students to the unique toxicologic and microbiologic considerations of aeronautics (the science of flight through the atmosphere), and astronautics (the science of spaceflight).

PHARM 7331 Sterile Compounded Preparations Credit: 1

In 7331, students will gain knowledge necessary to prepare sterile compounds including review of environmental requirements, proper aseptic technique, and dose calculations as well as legal and regulatory issues.

Prerequisites: Successful completion of all prior professional Pharm.D. program coursework through semester three and OSHA Bloodborne Pathogen Safety Training.

Co-requisites: PHARM 7331L.

PHARM 7331L Applied Skills Lab: Sterile Compounded Preparations Credits: 0.5

The learning activities in 7331L are designed to complement didactic instruction and allow students to apply knowledge in a simulated environment. In 7331L, students will also demonstrate proper aseptic technique skills to compound and label, sterile preparations for safe and effective use.

Prerequisites: Successful completion of all prior professional program coursework through semester three and OSHA Bloodborne Pathogen Safety Training.

Co-requisites: PHARM 7331.

PHARM 7334 Pharmacy Based Immunization Delivery Credits: 0.5

Pharmacy-based Immunization Delivery is an interactive training program that teaches student 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, administration technique and legal/regulatory issues.

Prerequisites: Must be enrolled in the Pharm.D. program.

PHARM 7339 Advanced Community Pharmacy: Emphasis on Entrepreneurship Credits: 2

Business Plan and Entrepreneurship in Community Pharmacy course is designed to provide an opportunity for students enrolled in the School of Pharmacy to further explore business plan development and entrepreneurship in the community pharmacy setting. Upon course completion, the student will be able to understand and complete the necessary components of a full business plan and proposal that involves innovation and creativity in pharmacy practice. Students are expected to participate in a team approach to delegate all aspects of the business plan, as well as participate in classroom activities and discussions of innovative practice.

Prerequisites: PHARM 7101, PHARM 7151, PHARM 7233, PHARM 7414, PHARM 7414L, PHARM 7465.

PHARM 7341 Medicinal Chemistry I Credits: 3

This course is the study of medicinally active substances, both natural and synthetic, which describes their chemical properties, their mode of action, their structure-activity relationships and their metabolic rate. Starting with their origin, it is shown how drugs in a series are developed by chemical modification, quantitative structure activity relationships and receptor theory. The chemical properties of a drug are described and explained. The mode of action of the drug is explained on a biochemical basis whenever possible. Once a drug has had its medicinal effect, it is excreted or metabolized. Reasons for excretion or metabolism are explained.

Prerequisites: CHEM 322R.

PHARM 7344 Medicinal Chemistry II Credits: 3

This course is a continuation of PHARM 7341. This course will focus on major drug classes, both natural and synthetic, including their chemical properties, their mode of action, their structure-activity relationships and their metabolic fate. Structure-activity relationships and the influence of organic functional groups on physicochemical properties of drugs and their pharmacological activities will be emphasized. Drug metabolism will also be covered, with a focus on organic functional group transformations.

Prerequisites: PHARM 7341.

PHARM 7345 Top Drugs II Credit: 1

This 1.0 hour course is designed as an introduction to up to 300 of the most commonly prescribed medications. This course will provide students with the opportunity to learn basic drug knowledge including brand (trade) and generic names, controlled substance schedule, therapeutic class, common dosage forms, FDA approved indications and common off-label uses, dosing, mechanism of action, pharmacokinetics, drug interactions, contraindications/precautions and medication safety considerations, adverse effects, drug monitoring, patient counseling, and clinical pearls.

Prerequisites: Successful completion of the P1 year in the Pharm.D. Program and PHARM 7245.

PHARM 7353 Investigative Toxicology Credits: 2

The science of investigative toxicology is an emerging science that plays a central role in forensic toxicology and pathology regarding conditions of and for exposure of many different kinds of environmental, biological, chemical, or physical agents. Investigative toxicology may include criminal or civil legal matters. The duties of an investigative toxicologist include the qualitative and quantitative analysis of drugs or poisons in biological systems and other physical evidence collected at the scene of the investigation. This also includes the interpretation of the exposure scene evidence and findings in regard to the physiologic and behavioral effect of those exposed to the detected/suspected chemical(s) at time of exposure. The complete investigation of the cause or causes of sudden or chronic chemical exposure and its potential aftermath is an important civic responsibility. The use of toxicologic information in investigation assessment requires careful field and laboratory analysis, evaluation of data.

PHARM 7361 Pharmacology I Credits: 2

Basic pharmacological principles of drug absorption, distribution, metabolism and elimination; concept of drug-receptor interactions; dose-response relationships and mechanism of action; and signaling mechanisms.

Prerequisites: Successful completion of prior professional program coursework or course coordinator's permission.

PHARM 7362 Pharmacology II Credits: 4

Principles of and advances in chemotherapy; biology, mechanism of action; clinical applications and adverse effects of various drug groups.

Prerequisites: Successful completion of prior professional program coursework or course coordinator's permission.

PHARM 7363 Pharmacology III Credits: 4

Mechanism of action; therapeutic uses; and adverse effects of drugs affecting different organ systems.

Prerequisites: Successful completion of prior professional program coursework or course coordinator's permission.

PHARM 7364 Concepts of Epidemiology and Statistics In-Research Credits: 3

This course introduces students to study design, principles, concepts, and application of epidemiological and statistical methods in research. First part of the course will cover understanding the epidemiological principle, measuring the occurrence of disease, measures of disease association, and types of study designs, interpretation and evaluation of epidemiologic research. Second part will provide hands-on experience for students on developing skills to analyze research data using appropriate statistical methods by means of statistical software to calculate the measures of disease association. This course will help students to evaluate health care studies with respect to study design, statistical analysis, interpretation, and evidences of association. During this course students will develop an epidemiologic study proposal. Students will learn to analyze and interpret the output of these analyses using the Statistical Package for the Social Science (SPSS).

Prerequisites: STAT 436.

PHARM 7366 Oncology and Hematology Pharmacotherapy Credits: 3

This course provides disease-oriented and pharmacy-oriented insight into the pathophysiology, diagnosis, and rational drug treatment of malignancy. The pharmacist's role in selecting drug products, individualizing dosages, supportive care, and monitoring patients is emphasized, with additional emphasis on safety and handling.

Prerequisites: PHARM 7361, PHARM 7420.

PHARM 7369 Advanced Psychiatry Credits: 2

This course aims to expand student pharmacist knowledge in regards to psychiatric pharmacy practice. Students will develop skills in patient assessment, treatment plan development, and professional communication. Course content and projects are aimed at expanding the students' understanding of a wide range of psychiatric disorders and developing their ability to discuss and analyze these disorders and their implications for patients and society as a whole.

Prerequisites: Successful completion of all pharmacy coursework through semester five.

Co-requisites: PHARM 7485P, PHARM 7485L.

PHARM 7377 Principles of Nutrition Support Credits: 2

Clinical nutrition, a multidisciplinary field, has become an important practice area for the hospital pharmacist. Its growth has been the result of an awareness of the high incidence of malnutrition among hospitalized patients and its effects on morbidity and mortality. Nutrition support is an important therapy provided to patients in the acute care, homecare and long term care settings. This course will introduce the student to the fundamentals of nutrition support and prepare him/her for future involvement in this important practice area.

PHARM 7378 Introduction to Community Pharmacy Practice Credits: 3

This course is a required Introductory Pharmacy Practice Experience (IPPE) in which students will spend three weeks during the summer after their first year providing patient-centered care in a community pharmacy practice setting. The experience will emphasize application of knowledge gained in didactic coursework at the student's level in the curriculum. This IPPE provides a blend of activities that focus on both the delivery of care to patients as well as the dispensing of medications. The Introductory Pharmacy Practice Experiences seek to establish a solid practice foundation on which students will continually build as they progress through the Doctor of Pharmacy curriculum.

Prerequisites: Successful completion of all professional program coursework through semester two. Proof of current pharmacy non-credit requirements and immunization documentation.

PHARM 7379 Introduction to Health Systems Pharmacy Practice Credits: 3

This course is a required Introductory Pharmacy Practice Experience (IPPE) in which Pharm.D. students will spend three weeks during the summer after their second year providing patient-centered care in a health systems pharmacy practice setting. The experience will emphasize application of knowledge gained in didactic coursework at the student's level in the curriculum. Activities focus on understanding the medication use system and delivering care to patients in a hospital setting. The Introductory Pharmacy Practice Experiences seek to establish a solid practice foundation on which students will continually build as they progress through the Doctor of Pharmacy curriculum.

Prerequisites: Successful completion of all professional program coursework through semester four. Proof of current pharmacy non-credit requirements and immunization documentation.

PHARM 7389 Pharmacogenomics and Precision Medicine Credits: 2

This course provides fundamentals of recent advances in pharmacogenomics and the application of pharmacogenomics to the delivery of precision medicine. Concepts covered include genetics, genomics, precision medicine (AKA personalized medicine), variation, computational aspects of pharmacogenomics, drug binding and differences in drug binding on patient outcomes, and barriers to precision medicine delivery.

Prerequisites: PHARM 7303.

PHARM 7397 Home Health Care Credits: 2

Anything a patient does in the home concerning their healthcare is considered Home Health Care. All aspects of Home Health Care are covered in this class. Diabetic Ostomy products care, Durable Medical Equipment (Wheelchair, cane, crutches, etc.), home Renal Dialysis, Wound Care, Respiratory Therapy, IV accesses, Home Infusion Therapy, Hospice Care, and Enteral Nutrition are presented and discussed. Reimbursement issues are not discussed due to constantly changing regulations. This is a "hands-on" class with participation in, for example, ostomy fitting, crutches fitting, enteral nutrition taste testing, and a tour of a Home Infusion Pharmacy.

Prerequisites: PHARM 7362, PHARM 7405.

Co-requisites: PHARM 7420.

PHARM 7398 Comprehensive Diabetes Management Credits: 4

The purpose of the course is to provide the student with a multidisciplinary foundation in the principles of diabetes management. The student will develop his-her knowledge and ability to assess, manage, educate and monitor patients with diabetes. The faculty are comprised of a multidisciplinary team of experts for the online lectures. The in-class discussion will be led by a faculty member who specializes in diabetes management.

Prerequisites: PHARM 7303.

PHARM 7399 Required Enrollment Credit: 1

Required enrollment for international students in pharmacy training sites.

PHARM 7405 Pharmacotherapy I: Emphasis on Self-Care and Nonprescription Medications Credits: 4

Pharmacotherapy I integrates the fundamentals of pathophysiology and pharmacology to help develop the student's ability to provide patient-centered care. Upon course completion, students will be able to assess and provide pharmaceutical care for patients with illnesses commonly encountered in community pharmacy practice utilizing the QuEST/SCHOLAR MACS process to assess a patient's condition systematically and completely, as well as following the Pharmacist Patient Care Process (PPCP). Students are expected to identify medical and medication-related problems, recommend nonprescription drug therapy, prescription drug therapy when appropriate, and monitor for safe and effective drug use. Students are also expected to provide accurate medication counseling. In general, three hours per week are devoted for traditional didactic, classroom based instruction, teaching and learning and two hours for case recitation.

Prerequisites: Successful completion of all required courses in the Pharm.D. program through Semester 3.

Co-requisites: PHARM 7405L.

PHARM 7405L Applied Skills Lab Pharmacotherapy I: Emphasis on Self-Care and Nonprescription Medications Credits: 0.5

Students enrolled in this applied pharmacotherapy lab will gain skills necessary to provide care for patients with illnesses commonly encountered in community practice. Learning activities are designed to complement didactic instruction while allowing students to apply knowledge in a simulated environment. Students will be afforded opportunities to provide patient-centered care utilizing the QuEST/SCHOLAR MACS process. Student achievement of core abilities will be assessed through an Objective Structured Clinical Examination.

Prerequisites: Successful completion of all required Pharm.D. courses through Semester 3.

Co-requisites: PHARM 7405.

PHARM 7406P IPPE: General Medicine I Credits: 2

This course is a required Introductory Pharmacy Practice Experience (IPPE) which provides a continuum of patient care activities throughout the third professional year. The student will spend one academic year (Fall and Spring Semesters) in a patient care setting with a minimum of 90 contact hours (45 contact hours each semester). The Pharmacist's Patient Care Process will be emphasized in the care of patients with commonly seen illnesses. Students are expected to become involved in the provision of direct patient care collaborating with other healthcare professionals and improving rational drug therapy in a practice environment. Students will take part in rounds, conferences, consultations and other activities as determined by the supervising faculty. General Medicine I practice site time allows maximum time and opportunity to engage IPPE students in patient care activities; interactions with patients, caregivers, and other health care professionals; and to apply their patient care knowledge and skills in authentic practice settings.

Prerequisites: Successful completion of all required Pharm.D. coursework up to Semester 5 including the Community and Health Systems Pharmacy Practice experiences, as well as all non-credit requirements as outlined by the Office of Experiential Programs.

Co-requisites: Fall - Pharmacotherapy II; Spring: Pharmacotherapy III.

PHARM 7407P APPE Patient Care Selective Credits: 4

The student will spend one month actively participating in the delivery of direct patient care in an interprofessional practice setting where there are ongoing clinical pharmacy services. Students will take part in rounds, conferences, consultations and other activities as directed by the faculty preceptor. Faculty preceptors may add site-specific objectives as indicated.

Prerequisites: Successful completion of all pharmacy non-credit requirements and all didactic and experiential pharmacy coursework through semester six.

PHARM 7409P APPE Health Systems Credits: 4

The student will spend one month assigned to a health system site. Emphasis of study will be on the pharmacy systems of hospital/health systems, medication safety and quality, and professional practice. Clinical applications will be maintained throughout the rotation. Students will take part in department activities to enhance understanding of the integration of all aspects of patient-centered care within the department and other services in the facility/health system. Faculty preceptors may add site-specific objectives as indicated.

Prerequisites: Successful completion of all pharmacy non-credit requirements and all didactic and experiential pharmacy coursework through semester six.

PHARM 7410P APPE Ambulatory Patient Care Credits: 4

The student will spend one month actively participating in the delivery of direct patient care in an interprofessional ambulatory patient care practice setting where there is an ongoing program of clinical pharmacy services. Students will take part in rounds, conferences, consultations and other activities as directed by the faculty preceptor. Faculty preceptors may add site-specific objectives as indicated.

Prerequisites: Successful completion of all pharmacy non-credit requirements and all didactic and experiential coursework through semester six.

PHARM 7412P APPE Advanced Community Pharmacy Credits: 4

The student will spend one month in a progressive community pharmacy setting. Emphasis of study will be on the clinical aspects of providing comprehensive patient care services to diverse patient populations in a community practice. Patient-centered care activities will be emphasized throughout the rotation. Students will take part in all aspects of patient care within the practice. Faculty preceptors may add site-specific objectives as indicated.

Prerequisites: Successful completion of all pharmacy non-credit requirements and all didactic and experiential pharmacy coursework through semester six.

PHARM 7414 Patient-Centered Care and Ethical Practice Credits: 2

Students will understand the concept as well as the pharmacist's role in providing patient-centered care. Students will learn how to build relationships through consideration of the patient's personal values, preferences and beliefs. Students will learn how to effectively communicate with patients to obtain health and medication histories and to counsel for medication adherence. Drug knowledge for the most commonly prescribed medications will be learned, assessed and applied throughout this course and the associated applied skills lab (7414L). One 2-hour class session is held per week.

Prerequisites: PHARM 7101.

Co-requisites: PHARM 7414L.

PHARM 7414L Applied Skills Lab: Patient-Centered Care and Ethical Practice Credits: 0.5

This applied skills lab is associated with Patient-Centered Care and Ethical Practice course. Learning activities are designed to complement didactic instruction while allowing students to apply knowledge to patient care in a structured lab environment. Student achievement of core abilities will be assessed through completion of assigned activities and an Objective Structured Clinical Examination (OSCE). One 2-hour lab session is held on designated weeks as outlined in the course schedule.

Prerequisites: PHARM 7101.

Co-requisites: PHARM 7414.

PHARM 7418P APPE Elective I Credits: 4

Elective experiences give students the opportunity to mature professionally, secure the breadth and depth of experiences needed to achieve curricular outcomes, and explore various sectors of practice. Students may repeat required rotations as electives if space is available or may approach a preceptor to tailor an elective experience to develop an area of interest. Faculty preceptors may add site-specific objectives as indicated. Electives may include a maximum of two experiences without a patient care focus.

Prerequisites: Successful completion of all pharmacy required non-credit requirements and all didactic and experiential pharmacy coursework through semester six.

PHARM 7419P APPE Acute Patient Care Credits: 4

The student will spend one month actively participating in the delivery of direct patient care in an interprofessional acute practice setting where there are ongoing clinical pharmacy services. Students will take part in rounds, conferences, consultations and other activities as directed by the faculty preceptor. Faculty preceptors may add site-specific objectives as indicated.

Prerequisites: Successful completion of all pharmacy non-credit requirements and all didactic and experiential pharmacy coursework through semester six.

PHARM 7420 Pharmacotherapy II Credits: 7

Pharmacotherapy II is designed to develop the student's ability to assess patients and provide pharmaceutical care. The course focuses on developing and applying problem-solving strategies for complex illnesses commonly encountered in pharmacy practice. Students are expected to identify medical and medication-related problems, recommend drug therapy and monitor for safe and effective drug use. Students are also expected to provide medication counseling. Throughout the semester, students are expected to retrieve and utilize relevant patient data from an electronic medical record system to make patient care decisions. Six hours of large group and two hours of small group discussions occur weekly.

Prerequisites: Successful completion of all 2nd professional year required courses in the Pharm.D. Curriculum.

Co-requisites: PHARM 7420L, PHARM 7406P.

PHARM 7420L Pharmacotherapy II Applied Skills Lab Credits: 0.5

Students enrolled in this applied pharmacotherapy lab will gain skills necessary to provide care for patients with illnesses commonly encountered in pharmacy practice. Learning activities are designed to complement didactic instruction while allowing students to apply knowledge in a simulated environment. Students will be afforded opportunities to apply the Pharmacists Patient Care Process thereby assessing and therapeutically managing patients. Student achievement of core abilities will be assessed through an Objective Structured Clinical Examination (OSCE).

Prerequisites: PHARM 7307, PHARM 7308, PHARM 7325, PHARM 7325L, PHARM 7362, PHARM 7363, PHARM 7405, PHARM 7405L.

Co-requisites: PHARM 7420, PHARM 7406P.

PHARM 7420P APPE Elective II Credits: 4

Elective experiences give students the opportunity to mature professionally, secure the breadth and depth of experiences needed to achieve curricular outcomes, and explore various sectors of practice. Students may repeat required rotations as electives if space is available or may approach a preceptor to tailor an elective experience to develop an area of interest. Faculty preceptors may add site-specific objectives as indicated. Electives may include a maximum of two experiences without a patient care focus.

Prerequisites: Successful completion of all pharmacy non-credit requirements and all didactic and experiential pharmacy coursework through semester six.

PHARM 7421P APPE Elective III Credits: 4

Elective experiences give students the opportunity to mature professionally, secure the breadth and depth of experiences needed to achieve curricular outcomes, and explore various sectors of practice. Students may repeat required rotations as electives if space is available or may approach a preceptor to tailor an elective experience to develop an area of interest. Faculty preceptors may add site-specific objectives as indicated. Electives may include a maximum of two experiences without a patient care focus.

Prerequisites: Successful completion of all pharmacy non-credit requirements and all didactic and experiential pharmacy coursework through semester six.

PHARM 7422P APPE Elective IV Credits: 4

Elective experiences give students the opportunity to mature professionally, secure the breadth and depth of experiences needed to achieve curricular outcomes, and explore various sectors of practice. Students may repeat required rotations as electives if space is available or may approach a preceptor to tailor an elective experience to develop an area of interest. Faculty preceptors may add site-specific objectives as indicated. Electives may include a maximum of two experiences without a patient care focus.

Prerequisites: Successful completion of all pharmacy non-credit requirements and all didactic and experiential pharmacy coursework through semester six.

PHARM 7424 Introduction To Dietary Supplement Therapeutics Credits: 2

This course is intended to provide students with an awareness of important issues about dietary supplements to consider when providing pharmaceutical care to patients. Students will become familiar with regulations for dietary supplements, learn communication skills specific to discussing supplement use with patients, and the skills to retrieve and interpret reliable information to be able to make decisions about new or unfamiliar supplements.

Prerequisites: PHARM 7361.

PHARM 7427 Hospital Pharmacy Credits: 2

This course in Hospital Pharmacy is designed to expose students to the daily operation of a typical hospital pharmacy, integration of informatics and automation, and understanding of historical concepts in hospital pharmacy management. The course consists of one, two-hour lecture per week. The course will be delivered via traditional didactic lecture format and interactive group discussions.

PHARM 7434 Non-Sterile Compounded Preparations Credit: 1

In the Pharmacy Preparations: Compounding Course, students will gain knowledge and skills necessary to compound extemporaneous non-sterile preparations. The course will cover regulations governing pharmaceutical compounding in Missouri, ethical considerations applicable to compounds, various dosage forms including advantages and disadvantages of each, techniques used in preparing compounds, and the counseling information to be included for each type of dosage form covered in the course. Students will utilize their knowledge of pharmaceutical calculations in the preparation of the formulations such as calculating doses and ingredient quantities.

Prerequisites: PHARM 7110.

Co-requisites: PHARM 7434L.

PHARM 7434L Applied Skills Lab: Non-Sterile Compounded Preparations Credit: 1

Students enrolled in this compounding lab will apply knowledge gained in the associated course necessary to compound extemporaneous non-sterile preparations. Students are expected to accurately prepare, dispense, and label a variety of the most commonly prescribed extemporaneous formulations, including liquid, solid, semi-solid, and topical preparations.

Prerequisites: PHARM 7110.

Co-requisites: PHARM 7434.

PHARM 7439 Pediatric Pharmacotherapy Credits: 3

Pediatric Pharmacotherapy provides disease-oriented and pharmacy-oriented insight into the pathophysiology, diagnosis, and rational drug treatment of diseases primarily encountered in the pediatric population. The pharmacist's role in selecting drug products, individualizing dosages, and monitoring patients is emphasized.

Prerequisites: PHARM 7361, PHARM 7362, PHARM 7420.

PHARM 7451 Pharmacy Law Credit: 1

State laws impacting pharmacy practice.

Prerequisites: PHARM 7151.

PHARM 7463 Basic and Clinical Toxicology Credits: 2

Fundamentals of toxicology, including discussion of the general classes of poisonous substances, their physiological effects, and methods of treatment.

Prerequisites: Successful completion of prior professional program coursework or course coordinator's permission.

PHARM 7465 Health Economics and Medicine Credits: 3

This course introduces major economic dimensions of healthcare system and public health practices. Covers concepts necessary to understand provider and consumer behavior, health care market structure, government involvement in health care, reimbursement strategy, determinants of health, distribution channels for biopharmaceuticals, pharmacovigilance, economic evaluation of healthcare services, and comparative-effectiveness research.

Prerequisites: PHARM 7233.

PHARM 7466 Pharmacy Practice Leadership, Management, and Innovation Credits: 3

Pharmacy Practice Leadership, Management, and Innovation is a required course for the Doctor of Pharmacy degree program. The goals of the course are to teach basic leadership and management principles and apply them to pharmacy practice in a variety of situations and settings. Leadership principles are related to broad personal and organizational missions and visions. Management principles are related to operational details of managing human resources, inventory, and finances. In order to achieve these goals, this course will review specific topics, including but not limited to, leadership and professional development, entrepreneurship, operations management, application of reimbursement mechanisms, pay-for-performance, and innovative pharmacist services. Pharmacists need to understand these principles and applications as a means of providing optimum care for patients, especially when pharmacists emerge as important contributors to the future of the U.S. health care system.

Prerequisites: PHARM 7465.

PHARM 7467 Religion, Culture and Health Credits: 3

This course addresses the impact of religious beliefs, education, and cultural practices on health and healthcare issues pertinent to various segments of our society.

PHARM 7468P APPE Elective V Credits: 4

Elective experiences give students the opportunity to mature professionally, secure the breadth and depth of experiences needed to achieve curricular outcomes, and explore various areas of pharmacy practice. Students may repeat required rotations as electives, if space is available, or may approach a preceptor to tailor an elective experience to develop an area of interest. Preceptors may add site-specific objectives, as indicated. Electives may include a maximum of two experiences without a patient care focus.

Prerequisites: Successful completion of all pharmacy non-credit requirements and all didactic and experiential pharmacy coursework through semester six.

PHARM 7484P Pharmacy Seminar Credit: 1

Pharm. D. Student Seminar course is designed to provide students with examples and reasoning behind the fundamentals of seminar preparation and delivery and opportunity to utilize their knowledge by presenting a seminar. This experience will be achieved through identification of a topic, development and presentation of a seminar. The student is expected to complete two 40-minute seminars over two semesters.

Prerequisites: PHARM 7485P.

PHARM 7485L Applied Skills Lab: Pharmacotherapy III Credits: 0.5

Students enrolled in this applied pharmacotherapy lab will gain skills necessary to provide care for patients with illnesses commonly encountered in pharmacy practice. Learning activities are designed to complement didactic instruction while allowing students to apply knowledge in a simulated environment. Students will be afforded opportunities to provide pharmacy services apply the Pharmacists' Patient Care Process thereby assessing and therapeutically managing patients. Student achievement of core abilities will be assessed through an Objective Structured Clinical Examination (OSCE).

Prerequisites: PHARM 7307, PHARM 7325, PHARM 7325L, PHARM 7362, PHARM 7363, PHARM 7308, PHARM 7405, PHARM 7405L, PHARM 7420, PHARM 7420L.

Co-requisites: PHARM 7485P, PHARM 7406P.

PHARM 7485P Pharmacotherapy III Credits: 7

Pharmacotherapy III is designed to develop the student's ability to assess patients and provide pharmaceutical care. The course focuses on developing and applying problem-solving strategies for complex illnesses commonly encountered in pharmacy practice. Students are expected to identify medical and medication-related problems, recommend drug therapy and monitor for safe and effective drug use.

Prerequisites: PHARM 7280, PHARM 7307, PHARM 7325, PHARM 7361, PHARM 7362, PHARM 7405, PHARM 7414, PHARM 7420, PHARM 7420L.

Co-requisites: PHARM 7485L, PHARM 7406P.

PHARM 7489AB Introduction to Nuclear Pharmacy & Nuclear Medicine Credits: 2

Nuclear pharmacy employs the safe and effective use of radiopharmaceuticals and other drugs with the purpose of improving patient health. The purpose of this course is to educate students regarding the diagnostic and therapeutic roles of radiopharmaceuticals in healthcare and teach the proper procedures and techniques that go into safely compounding and handling these products. Students will visit Cardinal Health Nuclear Pharmacy where they will be able to demonstrate the techniques they have learned. Students will attend four two-hour lectures and have the opportunity to witness the utilization of a radiopharmaceutical during a diagnostic scan at Truman Medical Center.

PHARM 7489CC Special Topics-Pharmacy Credits: 1-5

A course designed to deal with a topic which is not available in the regular course offerings. Topics, instructors and prerequisites to be listed in the term bulletin. Elective.

PHARM 7489CE Special Topics in Pharmacy Credits: 1-5

A course designed to deal with a topic which is not available in the regular course offerings. Topics, instructors and prerequisites to be listed in the term bulletin. Elective.

PHARM 7489E Special Topics In Pharmacy Credits: 1-5

A course designed to deal with a topic which is not available in the regular course offerings. Topic, instructors and prerequisites to be listed in the term bulletin. Elective.

A course designed to deal with a topic which is not available in the regular course offerings. Topics, instructors and prerequisites to be listed in the term bulletin. Elective.

PHARM 7489EP Special Topics Pharmacy Credits: 1-5

PHARM 7489EPA Social Topics in Pharmacy Credits: 1-5

PHARM 7489FD Special Topics in Pharmacy Credits: 1-5

PHARM 7489HN Special Topics in Pharmacy Credits: 1-5

PHARM 7489M Special Topics In Pharmacy Credits: 1-5

PHARM 7489ME Special Topics Pharmacy Credits: 1-5

PHARM 7489MG Special Topics in Pharmacy Credits: 1-5

PHARM 7489MN Special Topics in Pharmacy Credits: 1-5

PHARM 7489MU Special Topics in Pharmacy Credits: 1-5

PHARM 7489N Special Topics In Pharmacy Credits: 1-5

PHARM 7489NS Special Topics in Pharmacy Credits: 1-5

PHARM 74890 Special Topics In Pharmacy Credits: 1-5

PHARM 74890TC Special Topics in Pharmacy Credits: 1-5

PHARM 7489PE Special Topics in Pharmacy Credits: 1-5

PHARM 7489PH Special Topics Pharmacy Credits: 1-5

PHARM 7489PT Special Topics In Pharmacy Credits: 1-5

PHARM 7489R Special Topics in Pharmacy Credits: 1-5

PHARM 7489RB Special Topics Pharmacy Credits: 1-5

A course designed to deal with a topic which is not available in the regular course offerings. Topics, instructors and prerequisites to be listed in the term bulletin. Elective

PHARM 7489SI Special Topics in Pharmacy Credits: 1-5

A course designed to deal with a topic which is not available in the regular course offerings. Topics, instructors and prerequisites to be listed in the term bulletin. Elective.

PHARM 7497E Directed Individual Study-Clinical Pharmacy Credits: 1-4

Study in areas of special interest under individual faculty direction. Elective. Not to exceed five semester credits.