

Year 2

Theme: Medication Use Systems

Block 5 (7 wk)	Block 6 (9 wk)	Block 7 (20wk)	
Infection & Immunity	Principles of Drug Action I	Principles of Drug Action II	
	Pharmacokinetics & Biopharmaceutics	Clinical Pharmacokinetics	
	Natural Products / Pharmacognosy		
	Professional Elective	Pharmacy Law and Ethics I	
Medication Use Systems	Pharmacy Management: Operations	Pharmacy Management: Personnel	
Pharmacist Patient Care Experiences	Pharmacist Patient Care Experiences	Pharmacist Patient Care Experiences	Pharmacist Patient Care Experiences

Course: Infection and Immunity

Year, Block Offered: Year 2, Block 5

Hours Per Week: 16

Duration in Weeks: 7

Step in Curriculum: 2

Course Description: This course discusses the microbiology and the pathogenicity of infectious diseases as well as the immune response elicited toward the microbial organisms. Classes of infectious agents will be discussed including bacteria, fungi and viruses. Attention will be given to routes of entry, biologic mechanisms of disease, symptomatology, and specific findings with each organism. Students will isolate and identify an unknown pathogen. This information will be used to develop a therapeutic plan based upon presentation of the patient and typical sensitivities of the isolated bacteria.

Objectives: By the end of the course, the student will be able to:

1. demonstrate an understanding of the pathophysiology of infectious diseases as it relates to the microbial organisms that cause these diseases.
2. create a plan to isolate and identify an infectious organism including establishing antimicrobial sensitivities.
3. interpret the medical literature and to apply the molecular pharmacology of chemotherapeutics to the clinical treatment of microbial infections.

Director: Kenneth S. Rosenthal, Ph.D., Microbiology, Immunology and Biochemistry

Co-Director: Robb McGory, Pharm.D., Pharmacy Practice

HPE Coordinator: Marilda Ward

Course: Medication Use Systems

Year, Block Offered: Year 2, Block 5

Hours Per Week: 2

Duration in Weeks: 7

Step in Curriculum: 2

Course Description: This course provides students with an understanding of medication distribution systems in outpatient and institutional pharmacy settings, and the pharmacist's role and responsibilities in utilizing and maintaining such systems. The following technical aspects of drug distribution systems will be described: work flow design; personnel responsibilities; data entry; compounding and prescription order processing; electronic and manual record-keeping systems; medication packaging, labeling and dispensing; inpatient drug distribution systems; drug storage; inventory control; information systems; and an orientation to customer service. Pharmacy law and quality improvement methods that pertain to medication distribution systems will be introduced.

Objectives: At the end of the course, the student will be able to:

1. demonstrate an understanding of the medication distribution systems in ambulatory and institutional environments.
2. develop a general appreciation for the design of the medication use systems and their role in safety and regulatory compliance.
3. demonstrate a general understanding of legal issues, record keeping, automated dispensing systems, patient monitoring and information systems.

Director: Louis D. Barone, Pharm.D., Pharmacy Practice

Co-Director: Robb McGory, Pharm.D., Pharmacy Practice

HPE Coordinator:

Course:	Pharmacist Patient Care Experiences V Medication Distribution
Year, Block Offered:	Year 2, Block 5
Hours Per Week:	6
Duration in Weeks:	7
Step in Curriculum:	2
Course Description:	<p>This is the fifth of eleven courses that focus on professional skills development for contemporary pharmacy practice. In blocks 5 and 6 of Year 2, which focuses on Medication Distribution Systems, pharmacy students will be required to visit both community and institutional practice sites for 35 hours during the block. Supervised activities will include obtaining patient background information; evaluating new prescriptions for appropriateness using information in patient profiles; preparing correct drug, dose, quantity and labeling; and assisting customers with OTC selections. Students are expected to develop a broad initial understanding of medication therapy management services. Second year students will also be expected to mentor first year pharmacy students who are on rotation at the same site. On campus activities will include an interdisciplinary medication therapy management exercise, and continued practice of medication history, vital signs measurements, and OTC counseling skills, as well as journal clubs and answers to drug information questions.</p>
Objectives:	<p>At the end of the course, the student will be able to:</p> <ol style="list-style-type: none">1. appreciate the importance of patient-specific information to the prescribing and dispensing process.2. demonstrate accuracy in dispensing.3. demonstrate effective communication with patients and other health care providers.4. understand the value of medication therapy management services.
Director:	Janis J. MacKichan, PharmD, Pharmacy Practice
Co-Director:	Louis D. Barone, Pharm.D., Pharmacy Practice

HPE Coordinator: Laurie Zupp

Course: Principles of Drug Actions I

Year, Block Offered: Year 2, Block 6

Hours Per Week: 7.5

Duration in Weeks: 9

Step in Curriculum: 3

Course Description: This course introduces students to the relationship between drug design and the pharmacogenetics, metabolism and action of drugs; the influence of physical and chemical properties on structural activity relationships; and the molecular, cellular, and physiologic basis of drug action. The classes of drugs are presented on the basis of their effects on organ systems, particularly the nervous, cardiovascular, and renal systems. The course emphasizes the mechanisms of action, toxicity profiles, and pharmacokinetic activity of drugs in these classes.

Objectives: By the end of the course, the student will be able to:

1. explain the relationship between the design of drugs and their metabolism and mechanisms of action.
2. discuss the classes of drugs that affect certain organ systems, primarily the nervous, cardiovascular, and renal systems.
3. describe the toxicity profiles and pharmacokinetic activity of drugs used to treat disorders of specific organ systems.

Director: Cornelis Van der Schyf, Ph.D., Pharmaceutical Sciences

Co-Director: Werner Geldenhuys, Ph.D., Pharmaceutical Sciences

HPE Coordinator:

Course: Professional Elective

Year, Block Offered: Year 2, Block 6

Hours Per Week: 1.5

Duration in Weeks: 9

Step in Curriculum: 3

Course Description: TBD

Objectives: TBD

Director: TBD

Co-Director:

HPE Coordinator:

Course: Pharmacokinetics / Biopharmaceutics

Year, Block Offered: Year 2, Block 6

Hours Per Week: 3

Duration in Weeks: 9

Step in Curriculum: 3

Course Description: This course explores how the fate of drugs in the body is influenced by physiological and biochemical processes. Students learn methods to quantitate parameters that affect absorption, distribution, metabolism, and excretion of drugs, and how to use those to formulate appropriate drug dosage regimens. Topics include: the relationship between drug concentration and clinical response; graphical analyses and mathematical descriptions of drug concentration versus time data sets; physicochemical properties of drugs and the relevant pharmacogenomic and physiologic factors that affect bioavailability and pharmacokinetics; and pharmacokinetic variability caused by differences in body weight, age, sex, genetic factors, diseases, and drug interactions.

Objectives: By the end of the course, the student will be able to:

1. describe and explain the processes of drug absorption, distribution, metabolism, and excretion and how key dosage form and physiologic factors influences each.
2. graphically and mathematically determine a drug's bioavailability and key pharmacokinetic parameters, given a drug concentration versus time data set.
3. describe the FDA requirements for drug product testing as related to bioavailability and bioequivalence.
4. describe and explain how the parameters of bioavailable fraction, volume of distribution, clearance, and half-life and are used to determine appropriate drug dosage regimens.
5. explain the concepts of pharmacodynamics and therapeutic range.

Director: Anupam Bishayee, Ph.D., Pharmaceutical Sciences

Co-Director: Janis J. MacKichan, Pharm.D. Pharmacy Practice

HPE Coordinator:

Course: Natural Products / Pharmacognosy

Year, Block Offered: Year 2, Block 6

Hours Per Week: 3

Duration in Weeks: 9

Step in Curriculum: 3

Course Description: This course focuses on pharmaceuticals obtained from natural sources, such as plants, animals, and microbes. Discussion includes the historical importance, physiochemical properties, and pharmacological applications of these products. Basic terminology associated with the area of pharmacognosy is also presented, as are extraction and purification procedures for natural drugs. The course also discusses the implications of the lack of clinical testing, regulation, and standardization of many of these products. Pharmacy students will use NEOUCOM's Medicinal Herb Garden to complete assignments.

Objectives: By the end of the course, the student will be able to:

1. demonstrate an understanding of the botanical and animal origins of drugs obtained from natural sources.
2. describe the pharmaceutical preparation and clinical use of these natural products.

Director: Cornelis Van der Schyf, Ph.D., Pharmaceutical Sciences

Co-Director:

HPE Coordinator:

Course: Pharmacy Management: Operations

Year, Block Offered: Year 2, Block 6

Hours Per Week: 4

Duration in Weeks: 9

Step in Curriculum: 3

Course Description: This course introduces students to the role of management within pharmacy and exposes them to the variety of management theories, techniques, and tools that are used by pharmacists to provide patient centered care in an efficient manner. Areas covered include business planning, marketing, use of drug formularies, management of technology and information systems, quality improvement, as well as general operations management. Students will learn the responsibilities and legalities of owning, managing and working in a pharmacy. Different business models will be discussed for inpatient and outpatient pharmacy services. Systems will be described and assessed in relation to national standards for operating a pharmacy. The use of technology in storing, dispensing and monitoring drug use will be described. Students will be exposed to practice standards for employee performance and work place safety and various oversight committees to critique pharmacist performance.

Objectives: By the end of the course, the student will be able to:

1. describe the patient care responsibilities of individual pharmacists in a hospital department of pharmacy or a community setting.
2. understand the importance of management in all pharmacy practice settings.
3. define common terms used in accounting records and financial reports and be familiar with common types of budgets and budgeting techniques.
4. describe methods to obtain payment for prescription drugs and patient-oriented professional services.
5. understand the impact of the Medicare Modernization Act of 2003 on pharmacy practice, including the Part D drug benefit and medication therapy management services.
6. develop a marketing plan for a new or existing pharmacy service
7. forecast the impact of current and evolving technologies on pharmacy practice.
8. understand the basic principles and issues surrounding quality improvement and medication safety.
9. create a business plan for purchasing a community pharmacy, or setting up medication therapy monitoring services.

10. list the various hospital committees that interact with a department of pharmacy.
11. describe the use of robotic systems used to supply the health care provider or a patient with the correct medication.
12. provide a vision to govern the use of electronic order entry, computerized patient profiles and medication administration records in a patient care setting.

Director:

TBD

Co-Director:

Louis D. Barone, Pharm.D., Pharmacy Practice

HPE Coordinator:

Course: Pharmacist Patient Care Experiences VI
Medication Distribution

Year, Block Offered: Year 2, Block 6

Hours Per Week: 5

Duration in Weeks: 9

Step in Curriculum: 3

Course Description: This is the sixth of eleven courses that focus on professional skills development for contemporary pharmacy practice. In blocks 5 and 6 of Year 2, which focuses on medication distribution systems, pharmacy students will be required to visit both community and institutional practice sites for 35 hours during the block. Supervised activities will include obtaining patient background information; evaluating new prescriptions for appropriateness using information in patient profiles; preparing correct drug, dose, quantity and labeling; and assisting customers with OTC selections. Students are expected to develop a broad initial understanding of medication therapy management services. Second year students will also be expected to mentor first year pharmacy students who are on rotation at the same site. On campus activities will include an interdisciplinary medication therapy management exercise, and continued practice of medication history, vital signs measurements, and OTC counseling skills, as well as journal clubs and answers to drug information questions.

Objectives: At the end of the course, the student will be able to:

1. appreciate the importance of patient-specific information to the prescribing and dispensing process.
2. demonstrate accuracy in dispensing.
3. demonstrate effective communication with patients and other health care providers.
4. understand the value of medication therapy management services.

Director: Janis J. MacKichan, PharmD, Pharmacy Practice

Co-Director: Louis D. Barone, Pharm.D., Pharmacy Practice

HPE Coordinator: Laurie Zupp

Course: Principles of Drug Actions II

Year, Block Offered: Year 2, Block 7

Hours Per Week: 10

Duration in Weeks: 20

Step in Curriculum: 3

Course Description: This course introduces students to the relationship between drug design and the pharmacogenomics and metabolism and action of drugs; the influence of physical and chemical properties on structural activity relationships; and the molecular, cellular, and physiologic basis of drug action. The classes of drugs are presented on the basis of their effects on organ systems, particularly the nervous, cardiovascular, and renal systems. The course emphasizes the mechanisms of action, toxicity profiles, and pharmacokinetic activity of drugs in these classes. This course continues building the foundation of drug knowledge initiated in Molecular Pharmacology / Principles of Drug Actions I by discussing the concepts required for an understanding of drugs as organic chemicals that derive biological activity from their chemical structures and their physicochemical properties.

Objectives: By the end of the course, the student will be able to:

1. explain the relationship between the design of drugs and their metabolism and mechanisms of action.
2. discuss the classes of drugs that affect certain organ systems, primarily the nervous, cardiovascular, and renal systems.
3. describe the toxicity profiles and pharmacokinetic activity of drugs used to treat disorders of specific organ systems.

Director: Cornelis Van der Schyf, Ph.D. Pharmaceutical Sciences

Co-Director: Werner Geldenhuys, Ph.D. Pharmaceutical Sciences

HPE Coordinator:

Course: Clinical Pharmacokinetics

Year, Block Offered: Year 2, Block 7

Hours Per Week: 3

Duration in Weeks: 16

Step in Curriculum: 3

Course Description: Clinical Pharmacokinetics focuses on the application of mathematical principles for the purpose of optimizing drug therapy. Students will develop dosing regimens designed to maximize serum concentration while avoiding toxicities in patient with a variety of diseases and abilities to remove drug from the body. Monitoring plans will be created to confirm pharmacokinetic predictions and minimize adverse events. Students will learn to document information in a format to optimize communication to other health care practitioners. Students will practice their interventions in small group workshops.

Objectives: By the end of the course, the student will be able to:

1. identify the need for pharmacokinetic intervention.
2. specify pharmacokinetic treatment goals based on the patient's needs.
3. recommend an appropriate initial maintenance dosage regimen (dosage form, route, daily dose, and interval), including loading dose if applicable.
4. anticipate the need for and recommend dosage regimen adjustments based on changes in patient status or concurrent drug therapy.
5. write a clear and accurate summary of dosing and/or serum level monitoring recommendations suitable for documentation in the patient's medical chart or verbally present such recommendations.

Director: Janis J. MacKichan, Pharm.D., Pharmacy Practice

Co-Director: Robb McGory, Pharm.D., Pharmacy Practice

HPE Coordinator:

Course: Pharmacy Law and Ethics I

Year, Block Offered: Year 2, Block 7

Hours Per Week: 1

Duration in Weeks: 16

Step in Curriculum: 3

Course Description: This three part course sequence is designed to help students gain familiarity with the legal, regulatory, and ethical basis of the practice of pharmacy. The courses focus on the responsibility of the pharmacist for patient care and on the need for pharmacists to respect patients' autonomy. Students will discuss whether and to what degree the government and licensed health care professionals should play a role in protecting patients from the consequences of potentially risky choices regarding the use of drugs.

Part I of the series focuses on the foundation of pharmacy law including an understanding of the legislative and judicial processes. Distinction will be made in regulations guiding drug, food, device and cosmetics use. The drug approval process will be described in depth including the phases of drug research and rights of the study participant. The course will end by discussing specific state and federal laws that guide dispensing of medication and the use of controlled substances.

Objectives: By the end of the course, the student will be able to:

1. describe the historical and current legal basis of pharmacy practice.
2. discuss and explain ethical issues that affect the practice of pharmacy.
3. evaluate the legal process by which drugs, natural products and devices gain approval for use, are advertised and made available to the public.
4. demonstrate an understanding of the ethical issues involved in patient care and of the roles of government and licensed health care professionals in providing such care.
5. critique the common practices of prescription filling and filing, including scheduled substances.

Director: Richard J. Kasmer, Pharm.D., J.D., Pharmaceutical Sciences

Co-Director: Robb McGory, Pharm.D., Pharmacy Practice

HPE Coordinator:

Course: Pharmacy Management: Personnel

Year, Block Offered: Year 2, Block 7

Hours Per Week: 2

Duration in Weeks: 16

Step in Curriculum: 3

Course Description: This course focuses on managing people within organizations and ways of maximizing human performance. Skills developed in this course can also be applied to personal, interpersonal (with patients, peers, and other health professionals), and team/organizational lives. Since much of the practice of pharmacy involves working with people (e.g., patients, technicians, and other health care professionals), the overarching goal for the course is for students to learn how to work effectively with others in a variety of settings.

Objectives: By the end of the course, the student will be able to:

1. understand the meaning of terms commonly used on pharmacy personnel management.
2. describe key principles that guide fair interviewing, hiring, and supervisory practices.
3. prepare written (or deliver verbal) communications effectively and professionally in various management situations.
4. describe key mechanisms for motivating others.
5. prepare and deliver an objective performance evaluation.
6. demonstrate an awareness of standards for professional business conduct.

Director: TBD

Co-Director:

HPE Coordinator:

Course: Pharmacist Patient Care Experiences VII and VIII
Medication Distribution

Year, Block Offered: Year 2, Block 7

Hours Per Week: 9

Duration in Weeks: 8

Step in Curriculum: 3

Course Description: These are the seventh and eighth of eleven courses that focus on professional skills development for contemporary pharmacy practice. In block 7 of Year 2, which focuses on medication distribution systems, pharmacy students will be required to visit a pharmacy or clinics that are involved with patient assistance programs (underserved populations), as well as a pharmacy that specializes in home infusion or home care services. A total of 48 hours will be spent at both sites. Supervised activities at home infusion sites will include obtaining patient background information, evaluating new IV orders for appropriateness using information in patient profiles; formulating answers to drug information questions about stability and drug interactions; and preparing parenteral products using sterile technique. Supervised activities at underserved clinics will include obtaining patient background information; evaluating new prescriptions for appropriateness using information in patient profiles; identifying medication available through samples or patient assistance programs; assisting patients in applying for specific assistance programs; and receiving medication from manufacturer and preparing it for dispensing. Second year students will also be expected to mentor first year pharmacy students who are on rotation at the same site. On campus activities will include an interdisciplinary medication therapy management exercise, and continued practice of medication history, vital signs measurements, and OTC counseling skills, as well as journal clubs and answers to drug information questions.

Objectives: At the end of the course, the student will be able to:

1. appreciate the importance of patient-specific information to the prescribing and dispensing process.
2. demonstrate accuracy in dispensing and extemporaneous product preparation.
3. demonstrate effective communication with patients and other health care providers.
4. develop a broad understanding of the compounding, monitoring, and management of parenteral nutrition and medications for home-bound patients.

5. understand the multiple health care obstacles and difficulties that underserved communities encounter in the Northeast Ohio area.

Director: Janis J. MacKichan, PharmD, Pharmacy Practice
Co-Director: Louis D. Barone, Pharm.D., Pharmacy Practice
HPE Coordinator: Laurie Zupp