PHM-1350: PHARMACY PRACTICE I

Cuyahoga Community College

Viewing: PHM-1350 : Pharmacy Practice I

Board of Trustees:
January 2023

Academic Term:
Fall 2023

Subject Code
PHM - Pharmacy Technology

Course Number:
1350

Title:
Pharmacy Practice I

Catalog Description:
Overview of fundamentals of pharmacy practice in various practice settings with
respect to safe and accurate preparation and distribution of parenteral medications. Students learn the technician's role in drug preparation, drug packaging, and drug labeling.

Credit Hour(s):
3

Lecture Hour(s):
2

Lab Hour(s):
3

Other Hour(s):
0

Requisites

Prerequisite and Corequisite
Departmental approval: admission to program.

Outcomes

Course Outcome(s):
Demonstrate and apply personal and interpersonal knowledge and skills appropriate to pharmacy technicians.

Essential Learning Outcome Mapping:
Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.
Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):
a. Demonstrate ethical conduct in sterile compounding activities.
b. Model appropriate garb and behavior in sterile compounding activities.
c. Apply interpersonal skills, including teamwork to pharmacy compounding.
d. Demonstrate problem solving skills for medication orders requiring knowledge of concentrations, percentages, flow rates, IV dosage calculations, ratio and proportions, reconstitution, and dilutions using allegations.

Course Outcome(s):

Demonstrate appropriate foundational professional knowledge and skills in sterile compounding.

Essential Learning Outcome Mapping:

Quantitative Reasoning: Analyze problems, including real-world scenarios, through the application of mathematical and numerical concepts and skills, including the interpretation of data, tables, charts, or graphs.

Objective(s):

a. Describe the pharmacy technician’s role, pharmacist’s role, and other occupations in the healthcare environment where sterile preparations are prepared, dispensed, and administered.
b. Demonstrate basic knowledge of anatomy, physiology and pharmacology, and medical terminology relevant to the pharmacy technician’s role in sterile compounding.
c. Perform mathematical calculations essential to the duties of pharmacy technicians in sterile compounding and dispensing.
d. Explain the pharmacy technician's role in the medication-use process.
e. Practice and adhere to effective infection control procedures.

Course Outcome(s):

Participate in the processing and handling of medications and medication orders involving sterile preparations.

Essential Learning Outcome Mapping:

Information Literacy: Acquire, evaluate, and use information from credible sources in order to meet information needs for a specific research purpose.

Objective(s):

a. Receive, process, and prepare prescriptions/medication orders for completeness, accuracy, and authenticity to ensure safety.
b. Maintain pharmacy facilities and equipment.
c. Use information from Safety Data Sheets (SDS), National Institute of Occupational Safety and Health (NIOSH) Hazardous Drug List, and the United States Pharmacopeia (USP) to identify, handle, dispense, and safely dispose of hazardous medications and materials.
d. Use current technology to ensure the safety and accuracy of medication dispensing.
e. Describe basic concepts related to preparation for sterile compounding.
f. Explain accepted procedures utilized in identifying and disposing of expired medications.
g. Prepare compounded sterile preparations per applicable, current USP Chapters.
h. Review the process for chemotherapy/hazardous drug preparations per applicable, current USP Chapter.

Course Outcome(s):

Demonstrate knowledge and skills relevant to patient care, quality, and safety in settings where sterile preparations are compounded, dispensed, and administered.

Essential Learning Outcome Mapping:

Information Literacy: Acquire, evaluate, and use information from credible sources in order to meet information needs for a specific research purpose.

Objective(s):

1. Apply patient- and medication-safety practices in aspects of the pharmacy technician's roles associated with sterile compounding and dispensing.
2. Describe best practices regarding quality assurance measures according to leading quality organizations.

Course Outcome(s):

Discuss regulatory compliance related to sterile medication handling, compounding, storage, and dispensing.

Objective(s):

a. Describe pharmacy compliance with professional standards and relevant legal, regulatory, formulary, contractual, and safety requirements.

b. Describe Occupational Safety and Health Administration (OSHA), National Institute of Occupational Safety and Health (NIOSH), and United States Pharmacopeia (USP) requirements for prevention and treatment of exposure to hazardous substances (e.g., risk assessment, personal protective equipment, eyewash, spill kit).
c. Prepare to participate in pharmacy compliance with professional standards and relevant legal, regulatory, formulary, contractual, and safety requirements.

Course Outcome(s):

Receive and screen prescriptions/medication orders for completeness, accuracy, and authenticity.

Objective(s):

a. Define and discuss parenteral nutrition, its components, and methods of compounding and delivery.
b. Define and discuss the routes of parenteral medication delivery and the relative advantages and disadvantages of each.
c. Demonstrate use of appropriate pharmacy references (including package inserts, electronic databases, and Material Safety Data Sheet (SDS).

Course Outcome(s):

Practice effective infection control procedures.

Objective(s):

a. Demonstrate the correct technique for preparing sterile extemporaneous compounds, including reconstituting and preparing large volume parenterals, IV piggybacks, and hazardous substances.
b. Explain the importance of basic microbiology as it relates to pharmaceuticals.
c. Comprehensively describe the protocols for handwashing and aseptic technique.
d. List and describe the equipment and supplies required for compounding/manufacturing sterile drug products.
e. Explain and demonstrate the use of primary engineering controls (including laminar airflow workbench, compounding aseptic isolator, and biological safety cabinet) in sterile compounding.
f. Demonstrate appropriate disposal of pharmaceutical waste (including hazardous substances).

Course Outcome(s):

Assist pharmacists in preparing, storing, and distributing medication products requiring special handling and documentation.

Essential Learning Outcome Mapping:

Information Literacy: Acquire, evaluate, and use information from credible sources in order to meet information needs for a specific research purpose.

Objective(s):

a. List and describe the equipment and supplies required for compounding/manufacturing sterile drug products.
b. Explain and demonstrate the use of primary engineering controls (including laminar airflow workbench, compounding aseptic isolator, and biological safety cabinet) in sterile compounding.
c. Demonstrate appropriate disposal of pharmaceutical waste (including hazardous substances).

Course Outcome(s):

Prepare patient-specific medications for distribution.

Objective(s):

a. Define and discuss parenteral nutrition, its components, and methods of compounding and delivery.
b. Demonstrate the correct technique for preparing sterile extemporaneous compounds, including reconstituting and preparing large volume parenterals, IV piggybacks, and hazardous substances.
c. Utilize IV admixture software for patient profiles, work lists, and IV labels.
d. Demonstrate the ability to correctly label extemporaneous compounds.
e. Define and discuss the routes of parenteral medication delivery and the relative advantages and disadvantages of each.

Course Outcome(s):

Maintain pharmacy facilities and equipment, including automated dispensing equipment.

Objective(s):

a. List and describe the equipment and supplies required for compounding/manufacturing sterile drug products.
b. Explain and demonstrate the use of primary engineering controls (including laminar airflow workbench, compounding aseptic isolator, and biological safety cabinet) in sterile compounding.

Course Outcome(s):

Prepare medications requiring compounding of sterile and hazardous products.

Objective(s):

a. Define and discuss parenteral nutrition, its components, and methods of compounding and delivery.
b. Demonstrate the correct technique for preparing sterile extemporaneous compounds, including reconstituting and preparing large volume parenterals, IV piggybacks, and hazardous substances.
c. Explain and demonstrate the use of primary engineering controls (including laminar airflow workbench, compounding aseptic isolator, and biological safety cabinet) in sterile compounding.
d. Explain procedures for receiving, storing, and handling hazardous substances.
e. Demonstrate appropriate disposal of pharmaceutical waste (including hazardous substances).
f. Demonstrate use of appropriate pharmacy references (including package inserts, electronic databases, and Material Safety Data Sheet (SDS).

Course Outcome(s):

Describe the use of current technology in the healthcare environment to ensure the safety and accuracy of medication dispensing.

Objective(s):

a. Define and discuss parenteral nutrition, its components, and methods of compounding and delivery.
b. Utilize IV admixture software for patient profiles, work lists, and IV labels.
c. List and describe the equipment and supplies required for compounding/manufacturing sterile drug products.
d. Explain and demonstrate the use of primary engineering controls (including laminar airflow workbench, compounding aseptic isolator, and biological safety cabinet) in sterile compounding.

Course Outcome(s):

Apply quality assurance practices to pharmaceuticals, durable and non-durable medical equipment, devices, and supplies.

Essential Learning Outcome Mapping:

Critical/Creative Thinking: Analyze, evaluate, and synthesize information in order to consider problems/ideas and transform them in innovative or imaginative ways.

Objective(s):

a. Demonstrate the correct technique for preparing sterile extemporaneous compounds, including reconstituting and preparing large volume parenterals, IV piggybacks, and hazardous substances.
b. Demonstrate the ability to correctly label extemporaneous compounds.
c. Explain the importance of basic microbiology as it relates to pharmaceuticals.
d. Comprehensively describe the protocols for handwashing and aseptic technique.
e. List and describe the equipment and supplies required for compounding/manufacturing sterile drug products.
f. Explain and demonstrate the use of primary engineering controls (including laminar airflow workbench, compounding aseptic isolator, and biological safety cabinet) in sterile compounding.
g. Define and discuss the routes of parenteral medication delivery and the relative advantages and disadvantages of each.
h. Explain procedures for receiving, storing, and handling hazardous substances.
i. Demonstrate appropriate disposal of pharmaceutical waste (including hazardous substances).
j. Demonstrate use of appropriate pharmacy references (including package inserts, electronic databases, and Material Safety Data Sheet (SDS).

Methods of Evaluation:

a. Written assignments
b. Periodic quizzes
c. Laboratory assignments
d. Written examinations
e. Laboratory examinations

Course Content Outline:

a. Orientation to Sterile Preparations
    i. Terminology relevant to sterility
    ii. The importance of sterility for some routes of administration
    iii. Terminology relevant to pharmacy compounding and sterile products
    iv. Standards and responsibilities for sterile preparations in Pharmacy
b. Facilities, Equipment, and Supplies related to sterile compounding
    i. Requirements for cleanrooms
    ii. Common cleanroom equipment and supplies and their purposes
    iii. Procedures for cleaning and documentation in the cleanroom
c. Fundamentals of Aseptic Technique
    i. Definition of aseptic technique
    ii. Importance of proper aseptic technique
    iii. Tasks to complete in preparing to compound sterile preparations
    iv. Uses and manipulation of supplies used in aseptic compounding
    v. Reconstitution and admixture of a sterile preparation for intravenous use
d. Sterile Compounding Garb
    i. Personal Protective Equipment for sterile compounding
    ii. Required elements and properties of PPE
    iii. Cleanroom gowning procedures
    iv. Reasons for the garb and procedures studied
e. Orders, Terminology, and Labels in Pharmacy Dispensing of sterile preparations
    i. Legal definition of a prescription order
    ii. Elements of a hospital medication order
    iii. Terminology and abbreviations related to medication orders
    iv. Elements of labels for sterile preparations
    v. The Formulary System
    vi. Communication processes involved in medication orders and labels
f. Advanced Calculations for sterile preparations
    i. Drips and infusion rates
    ii. Overfills
    iii. Dosing by body weight
    iv. Body Surface Area
g. Properties of Intravenous Admixtures and Preparations
    i. Terms relevant to solutions
    ii. Properties of solutions and their application to suitability for administration
    iii. Maintenance and replacement therapy with IV fluids
    iv. Terms relevant to intravenous dosage forms
h. Stability and Incompatibility
    i. Definitions of stability and incompatibility and their relationship to one another
    ii. USP criteria for product stability and their definitions
    iii. Factors involved in stability and incompatibility
    iv. Methods to maximize stability of sterile preparations
    v. References with stability and compatibility information
    vi. Pharmacy staff responsibilities in dealing with stability issues for compounded products
i. Sterile Routes of administration
    i. Reasons for parenteral medication administration
    ii. Sterile dosage forms, compounding, and packaging
    iii. Disadvantages of parenteral administration
    iv. Injection-dependent routes of administration

v. Hazards of injected medications
vi. Non-injection routes of administration requiring sterile dosage forms

j. Intravenous Administration
i. Bioavailability consideration
ii. Advantages and disadvantages of IV administration
iii. Methods of IV administration
iv. Types of IV formulations
v. Equipment and supplies used in IV administration

k. Home Care Pharmacy Practice
i. Definition of Home Care Pharmacy and its importance
ii. Goals of homecare therapy
iii. Technologies, supplies, and equipment relevant to homecare
iv. Members of the homecare team
v. Common disease states and drug classes in the homecare setting
vi. Labeling and beyond-use dating requirements for homecare preparations

l. Parenteral Nutrition
i. Definitions of parenteral nutrition and associated terms and acronyms
ii. Macronutrients and micronutrients
iii. Distinctions between peripheral and central IV administration
iv. Methods for compounding parenteral nutrition admixtures
v. Automation related to parenteral nutrition

m. Hazardous and Cytotoxic drugs
i. Terms and acronyms related to cancer chemotherapy and hazardous drugs
ii. Regulations and standards for handling of hazardous drugs
iii. Characteristics of antineoplastic chemotherapy
iv. Precautions for handling, storing, preparing, labeling, and dispensing hazardous medications
v. Measures to be taken when accidents involving these substances occur

n. Drugs: classification, approval process
i. Terms drug, indication, and prophylaxis
ii. Drug development and approval process and explain the role of USP
iii. Chemical, brand, and generic names
iv. Elements of a commercial drug label
v. Elements of the NDC number

o. Special sterile preparations and packaging
i. Closed Transfer Packaging
ii. Patient Controlled Analgesia
iii. Whole Protein Injections (IVIG, blood factors, etc.)
iv. Intraspinal preparations

p. Quality Assurance for Pharmacy Prepared Sterile Preparations
i. Five “Rights” that signify pharmacy quality
ii. Definitions of terms related to quality and quality assurance
iii. Process validation, media-fill challenge testing, and end-product validation
iv. Risk levels for pharmacy-compounded sterile preparations
v. Pharmacy quality assurance activities and personnel involved
vi. Documentation necessary to the quality assurance process

q. Laboratory exercises in Sterile Compounding
i. Computer applications in sterile product labeling and distribution
ii. Use of equipment and supplies, including workbenches and automated devices
iii. Handwashing, garbing, and quality assurance exercises
iv. Practice in compounding sterile preparations (both non-hazardous and hazardous)
v. Basic Calculations applied to sterile compounding
1. Use of ratio/proportion and alligation methods where appropriate
2. Percentage notation for expression of medication strengths and doses
3. Estimating and evaluating calculation values

Resources

Bachenheimer, Bonnie S. (2019) *Manual for Pharmacy Technicians*, Bethesda MD: American Society of Health-System Pharmacists.

Buchanan EC, Schneider PJ, Forrey RA. *Compounding Sterile Preparations*. 4. Bethesda MD: American Society of Health-System Pharmacists, 2017.

Malacos K and Propes D. *Sterile Compounding for Pharmacy Technicians*. 1. New York: McGraw Hill, 2015.

McKiinnon SA. (2020) *Pharmacy Calculations for Technicians*, St. Paul MN: Paradigm.

Power L and Jorgenson J. *Safe Handling of Hazardous Drugs Video Training Program.* 1. Bethesda MD: American Society of Health-System Pharmacists, 2006.

Stuhan MA and Wakelin J. *PHM 1350: Pharmacy Practice I Laboratory Workbook*. 2018.

Resources Other

Lexicomp Online: collection of clinical databases (subscription content)

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