

COURSE OUTLINE
BIO 230 Biohazardous Risk Reduction
2 Credit Hours

Course Description: Theory and practice of Good Laboratory Practices (GLP), Good Manufacturing Practices (GMP) in the context of biosafety ideally practiced in all containment laboratories. The information presented is consistent with Center for Disease Control (CDC) and the National Institute of Health (NIH) guidelines.

Prerequisite(s): none

Purpose of Course: This course is designed to prepare new facility staff with the basics of biosafety for work in all levels of containment laboratories, critical or high-performance environments and includes a mixture of practical and classroom experiences. Students satisfactorily completing the assessment will receive a certificate of completion that identifies biosafety skills demonstrated.

Required Materials: BIO 230 Workbook

Learning Outcomes:

The intention is for the student to be able to:

1. Discuss biosafety principles and biosafety levels.
 - a. Describe containment environments such as BSL3 & BSL4 labs, clean rooms, data centers.
 - b. Demonstrate understanding of design and use differences in Bio Safety Level 2 (BSL-2), Bio Safety Level 3 (BSL-3) and Bio Safety Level (BSL-4) labs.
 - c. List secondary barriers used to contain pathogens.
2. Carry out successful risk assessments including recognition of potential biohazardous materials and the associated hazards.
 - a. Contrast the concepts of hazard and risk.
 - b. List the three steps of IAM Risk Management and explain their purpose.
3. Discuss unique biological hazards found in containment laboratories.
 - a. Describe differences between virulent and non-virulent; pathogenic and non-pathogenic.
 - b. Discuss how to keep biological hazards “out of you, off of you, and inside containment”.
 - c. Explain the links in the “Chain of Infection”.
 - d. Describe a typical medical health surveillance plan used by facilities with critical environments.
4. Discuss unique design and engineering needs of BSL3 labs.
 - a. Define 1°, 2°, 3° barriers and their purpose.
 - b. Predict possible breaches of containment barriers.
 - c. Give examples of BSL3 equipment and their standard use.
 - d. Explain proper airflow in BSL3 suite including BSC and fume hood.
5. Summarize correct behavior practices in various critical environments.
 - a. Describe the steps of donning and doffing Personal Protective Equipment (PPE)
 - b. Describe limitations of PPE.
 - c. Demonstrate appropriate reporting and response to compromised PPE.
 - d. Exhibit correct use of PPE when handling various hazardous materials or performing facility maintenance.
 - e. Show correct safety practices used with PPE.

- f. List appropriate safety procedures for various situations in various industrial or containment environments.
- 6. Compare and contrast waste management of biological, chemical and radiological materials.
 - a. Demonstrate proper waste segregation of biologic, chemical and radiologic materials.
 - b. Recognize and identify radiologic materials in the laboratory.
 - c. Explain work practices needed when working with radiologic materials.
 - d. Show proper operation of radiologic monitoring devices.
 - e. Demonstrate proper exposure protocol.
 - f. Explain small and large spill decontamination.
 - g. Demonstrate appropriate cleaning and disinfection of laboratory equipment.
- 7. Describe emergency management practices.
 - a. Describe limitations of equipment with engineering controls to ensure laboratory safety.
 - b. Describe incident command systems (ICS) and national incident management systems (NIMS) and the unique roles they play in emergencies.
 - c. List the unique components of an emergency plan for a critical environment.
 - d. Discuss unique building control features with a critical environment.
- 8. Defend laboratory safety and security operations and practices within critical environments.
 - a. Identify safety labels, signs and posted information.
 - b. Identify properly labeled samples, containers and cultures according to appropriate regulatory requirements.
 - c. Indicate knowledgeable use of Safety Data Sheet (SDS) materials including understanding of documented hazards.
 - d. Describe process for routine monitoring of facility and engineering control systems.
 - e. Describe pre-entry and exit verification procedures.
 - f. Efficiently work with emergency operating procedures.
 - g. Locate and use facility's emergency supplies.
 - h. Correctly secure affected areas or equipment during an event.
 - i. Discuss how to handle uninterruptable and critical systems during an emergency.
 - j. Discuss biosecurity as relates to select agent programs.

Learning Units

- I. Introduction to Critical Environments
- II. Risk Assessment
- III. Pathogenic Microbes
- IV. Mechanical Features of High Containment Facilities
- V. Behavior in High Containment
- VI. Introduction to Decontamination
- VII. Emergency Management, Agencies, Systems and Controls
- VIII. Enhanced Safety and Security in Critical Environments

Method of Delivery/Instruction

- X Face-to-face ☐ Blended ☐ Online

Method of Grading and Evaluation

The student will be graded on learning activities and assessment tasks. Grade determinants may include the following: daily work, quizzes, chapter or unit tests, comprehensive examinations, student projects, student presentations, class participation, and other methods of evaluation employed at the discretion of the instructor.