

Hazardous Materials

Course Outcome Summary

Course Information

Organization	MATC
Developers	Lisa Seidman, Ph.D.
Development Date	2/12/2003
Course Number	10007108
Potential Hours of Instruction	72

Description

This course surveys the potential laboratory hazards and safety procedures. Covers regulation of chemicals: flammable, reactive, corrosive, and toxic substances. Lab included.

Types of Instruction

Instruction Type	Contact Hours	Credits
Classroom Presentation	36	
On Campus Laboratory and Clinicals	36	
Individualize/Independent Study		
Simulated or Actual Work Experience		
On-the-Job Experience		

Textbooks

Biosafety in the Laboratory: Prudent Practices for Handling. National Research Council.

Joseph Accrocco and Michael Cinquanti. *Right to Know Pocket Guide for Laboratory Employees.*

University of Wisconsin Safety Department. *Radiation Safety for Radiation Workers.*

Learner Supplies

Lab coat.

Safety goggles.

Lab notebook.

Calculator with scientific notation.

Competencies

Unit I. Right to Know Standard

1. Describe the Right to Know standard for laboratory personnel.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you list and explain the responsibilities of the manufacturer, employer, and employee.

2. Interpret Material Safety Data Sheet (MSDS) for a hazardous compound.

You will demonstrate your competence:

- o through the completion of written assignments.

- o through written examinations.

Your performance will be successful when:

- o you identify and discuss information and hazards associated with compound.
- o you identify symbols representing various physical and health hazards.

3. Interpret container label of hazardous compound.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you identify and discuss information and hazards associated with compound.
- o you identify symbols representing various physical and health hazards.

4. Develop awareness that lab safety is no accident and must be worked on all the time.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you show awareness of dangers in the work environment.
- o you list safety tips for working with hazardous materials.
- o you list personal protective attire and laboratory safety equipment.

Unit II. Flammable Materials

1. Discuss theory and safety.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you describe the components required for fire to occur.
- o you describe the characteristics of solvent fires.
- o you list causes of electrical fires.
- o you explain the hazard rating index and signal system of the NFPA.

2. Identify proper extinguisher for given type of fire.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you describe the fire extinguisher symbol and rating system.
- o you identify each type of extinguisher correctly.

3. Demonstrate proper use of fire extinguisher.

You will demonstrate your competence:

- o through the completion of laboratory activities.

Your performance will be successful when:

- o you extinguish a fire.

4. Describe first aid for burns.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you describe first aid according to first aid manual.

Unit III. Toxic Chemicals

1. Describe the classifications of health hazards.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you define and contrast mutagenesis, carcinogenesis, and teratogenesis.
- o you define and contrast acute and chronic toxicity.
- o you describe common modes of entry for toxic chemicals.

2. Discuss the relationship between epidemiology and toxicity testing.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you define epidemiology
- o you describe an example of the use of epidemiology in toxicity determinations.
- o you discuss the advantages and disadvantages of the various methods used for toxicity testing.
- o you define and contrast LD50, LD56, TD50, TC50, PEL, IDLH, TLV, and TWA.

3. Identify personal protective attire.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you list types of face and eye protection.
- o you describe types of respirators and their use.
- o you describe major types of safety gloves.

4. Describe proper packaging of toxic materials.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you describe packaging according to industry standards.

5. Weigh and dissolve simulated toxic chemicals without contaminating self or lab.

You will demonstrate your competence:

- o through the completion of laboratory activities.
- o through the completion of written explanations of results and observations of laboratory activities.

Your performance will be successful when:

- o you show no contamination as determined by using fluorescent lamp and fluorescent simulated compound.

Unit IV. Corrosives

1. Discuss common corrosive substances used in lab.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.
- o through the completion of written explanations of results and observations of laboratory activities.

Your performance will be successful when:

- o you define the term "corrosive material."
- o you list common corrosive substance used in lab.
- o you explain basic principles of acid-base chemistry including pH, acidity, alkalinity and

neutralization.

2. Describer proper attire for handling corrosives.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you correct describe proper attire.

3. List procedures for using corrosives.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you describe procedures correctly.

4. Describe first aid for corrosive burns.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you describe first aid correctly.

Unit V. Reactives

1. Discuss the classification of reactive compounds.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you define reactive compound.
- o you list common reactive compounds used in labs.
- o you describe the types of unstable compounds and mixtures.
- o you explain the basic principles of oxidation and reduction.

2. Discuss the safety procedures associated with reactive compounds.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you give examples of incompatible chemical groups.
- o you describe safety procedures to use with water reactives.
- o you describe safety procedures to use with air reactives.

Unit VI. Chemical Storage, Disposal, and Spills in the Lab

1. Define proper chemical storage methods.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you describe Baker Chemical Company storage method.
- o you describe Flinn Chemical Company storage method.
- o you list potential problems due to improper storage.

2. Discuss the storage and disposal methods for compounds.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you select proper storage methods for common lab chemicals.
- o you select proper disposal methods for common lab chemicals.

3. Demonstrate proper spill clean-up procedure and disposal method.

You will demonstrate your competence:

- o through the completion of laboratory activities.
- o through the completion of written explanations of results and observations of laboratory activities.

Your performance will be successful when:

- o you neutralize and dispose of a solution of acid or base.
- o you inactivate and dispose of a reactive compound.
- o you demonstrate a cleaning procedure for a caustic or acid spill.
- o you demonstrate a cleaning procedure for a solvent spill.

Unit VII. Physical Hazards

1. Indicate safety issues associated with cryogenics.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you define cryogen.
- o you list safety procedures for handling cryogenes.
- o you describe the proper attire for handling cryogenes.

2. Identify hazards associated with the following compressed gases: CO, O, N, He and air.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you list major hazards.

3. Demonstrate proper use of CO tank regulator.

You will demonstrate your competence:

- o through the completion of laboratory activities.

Your performance will be successful when:

- o you put a regulator on a tank and take it off properly.
- o you turn a tank on and off properly.

4. List safety precautions regarding electricity and lab equipment.

You will demonstrate your competence:

- o through the completion of written assignments.
- o through written examinations.

Your performance will be successful when:

- o you list safety precautions.
- o you describe the property procedure for operating a centrifuge, electrophoresis apparatus, and chemical hood.

5. Demonstrate proper use of lab equipment.

You will demonstrate your competence:

- o through the completion of laboratory activities.
- o through the completion of written documentation and explanation of laboratory work.

Your performance will be successful when:

- o you safely operates centrifuge.
- o you safely operate electrophoresis apparatus.