



Western Technical College

10503153 Hazardous Materials Awareness & Ops

Course Outcome Summary

Course Information

Description	This course provides basic chemistry relating to the categories of hazardous materials including recognition, identification, reactivity, and health hazards encountered by emergency services.
Career Cluster	Law, Public Safety, Corrections and Security
Instructional Level	Associate Degree Courses
Total Credits	1
Total Hours	27

Textbooks

Fundamentals of Fire Fighter Skills and Hazardous Materials Response - with Premier Access. 4th Edition. Copyright 2019. National Fire Protection Association. Publisher: Jones & Bartlett Publishers. **ISBN-13**: 978-1-284-15142-8. Required.

Success Abilities

1. Live Responsibly: Embrace Sustainability
2. Live Responsibly: Foster Accountability
3. Refine Professionalism: Act Ethically
4. Refine Professionalism: Improve Critical Thinking
5. Refine Professionalism: Participate Collaboratively
6. Refine Professionalism: Practice Effective Communication

Program Outcomes

1. Perform fire prevention activities including preplanning, public education, inspection, and investigation.
2. Apply incident management and mitigation skills to emergency incidents.
3. Meet professional fire and EMS credentialing standards.

4. Communicate clearly and effectively both verbally and through written documentation with clients, coworkers, other agencies, and supervisors.
5. Apply critical thinking skills to both emergency and non-emergency situations.

Course Competencies

1. Explore the basic chemical and physical properties of gases, liquids, and solids.

Assessment Strategies

- 1.1. Written Objective Test

Criteria

- 1.1. Score a minimum of 70%.
- 1.2. Complete exam within 90 minutes.
- 1.3. Complete exam without using any reference books or notes.
- 1.4. Complete exam at prescribed time and place.

Learning Objectives

- 1.a. Identify a substances state of matter.
- 1.b. Describe the process of physical and chemical change.
- 1.c. Define chemical properties as they pertain to Hazardous Materials.
- 1.d. Describe properties of radioactive materials.
- 1.e. Describe properties of WMDs.

2. Identify the nine U.S. Department of Transportation hazard classes and their respective divisions.

Assessment Strategies

- 2.1. Written Objective Test
- 2.2. Skill Demonstration

Criteria

You will know you are successful when:

- 2.1. Score a minimum of 70%.
- 2.2. Complete exam within 90 minutes.
- 2.3. Complete exam without using any reference books or notes.
- 2.4. Complete exam at prescribed time and place.
- 2.5. Identify hazard class when given a placard.
- 2.6. Identify hazard class when given a chemical or chemical property.

Learning Objectives

- 2.a. Define a hazardous material.
- 2.b. Describe how to identify a placard and label.
- 2.c. List the nine DOT chemical families.
- 2.d. Identify common examples of chemicals in each hazard class.
- 2.e. Identify the primary hazards associated with each hazard class.

3. Demonstrate the utilization of guidebooks, MSDS, and other reference materials to determine an initial course of action.

Assessment Strategies

- 3.1. Written Objective Test
- 3.2. Scenario Response

Criteria

You will know you are successful when:

- 3.1. Score a minimum of 70%.
- 3.2. Complete exam within 90 minutes.
- 3.3. Complete exam without using any reference books or notes.
- 3.4. Complete exam at prescribed time and place.
- 3.5. Identify hazard class given Hazmat emergency scenario.

- 3.6. Utilize the ERG given a HazMat emergency scenario.
- 3.7. Utilize a product Safety Data Sheet.
- 3.8. Utilize secondary hazardous materials identification methods.

Learning Objectives

- 3.a. List the four major sections of the Emergency Response Guidebook.
- 3.b. Demonstrate the ability to properly utilize the Emergency Response Guidebook.
- 3.c. Describe the information about a Hazardous Material found on a Material Safety Data Sheet.
- 3.d. Describe the role of CHEMTREC during a response.
- 3.e. Describe the role of the National Response Center during a hazardous materials response.
- 3.f. Describe the marking used by the military to indicate hazardous materials/WMD.
- 3.g. Describe the NFPA 704 hazard identification system.

4. Detect the Presence of Hazardous Materials/WMD

Assessment Strategies

- 4.1. Written Objective Test
- 4.2. Skill Demonstration

Criteria

- 4.1. Score a minimum of 70%.
- 4.2. Complete exam within 90 minutes.
- 4.3. Complete exam without using any reference books or notes.
- 4.4. Complete exam at prescribed time and place.
- 4.5. Identify the presence of hazardous materials given a photograph of a container.
- 4.6. Identify the presence of hazardous materials given a photograph of a facility.
- 4.7. Recognize the presence of criminal or terrorist activity when given a scenario.
- 4.8. Recognize whether a given scenario involves chemical or biological agents.

Learning Objectives

- 4.a. Identify typical occupancies and locations in a community where hazardous materials are manufactured, transported, stored used or disposed of.
- 4.b. Identify typical container shapes that can indicate the presence of hazardous materials or WMD.
- 4.c. Identify facility and transportation markings that indicate the presence of hazardous materials or WMD.
- 4.d. Describe the difference between a chemical and biological incident.
- 4.e. Identify at least four indicators of a criminal or terrorist activity.

5. Analyze Hazardous Materials/WMD Incidents

Assessment Strategies

- 5.1. Written Objective Test

Criteria

Performance will be satisfactory when:

- 5.1. Score a minimum of 70%.
- 5.2. Complete exam within 90 minutes.
- 5.3. Complete exam without using any reference books or notes.
- 5.4. Complete exam at prescribed time and place.

Learning Objectives

- 5.a. Survey a hazardous materials/WMD incident to identify whether materials have been released.
- 5.b. Collect hazard and response information from available sources.
- 5.c. Predict the likely behavior of a hazardous material/WMD and its container.
- 5.d. Estimate the potential harm at a hazardous material/WMD incident.

6. Implement Protective Actions.

Assessment Strategies

- 6.1. Written Objective Test

Criteria

- 6.1. Score a minimum of 70%.

- 6.2. Complete exam within 90 minutes.
- 6.3. Complete exam without using any reference books or notes.
- 6.4. Complete exam at prescribed time and place.

Learning Objectives

- 6.a. Describe defensive objectives.
- 6.b. Describe defensive actions.
- 6.c. Describe how to estimate the size and scope of a hazardous materials/weapons of mass destruction incident.
- 6.d. Describe a secondary attack and its impact on responders.
- 6.e. List the signs that indicate the possible presence of a secondary device.

7. Activate the Notification Process.

Assessment Strategies

- 7.1. Written Objective Test

Criteria

Performance will be satisfactory when:

- 7.1. Score a minimum of 70%.
- 7.2. Complete exam within 90 minutes.
- 7.3. Complete exam without using any reference books or notes.
- 7.4. Complete exam at prescribed time and place.

Learning Objectives

- 7.a. List the information to provide when reporting a hazardous materials incident.
- 7.b. Describe the hazardous materials incident levels.
- 7.c. Describe how to plan an initial response.
- 7.d. Perform initial notification actions.

8. Lay out response objectives.

Assessment Strategies

- 8.1. Written Objective Test

Criteria

Performance will be satisfactory when:

- 8.1. Score a minimum of 70%.
- 8.2. Complete exam within 90 minutes.
- 8.3. Complete exam without using any reference books or notes.
- 8.4. Complete exam at prescribed time and place.

Learning Objectives

- 8.a. List two protective actions that may be taken in a hazardous materials incident.
- 8.b. Describe the role of fire fighters during an evacuation.
- 8.c. Describe how and when a fire department conducts shelter-in-place operations with a local population.
- 8.d. Explain the special considerations to follow when performing search and rescue operations in a hazardous materials incident.
- 8.e. Describe confinement and containment operations.

9. Use Protective Clothing and Respiratory Protection appropriately

Assessment Strategies

- 9.1. Written Objective Test
- 9.2. Skill Demonstration

Criteria

- 9.1. Score a minimum of 70%.
- 9.2. Complete exam within 90 minutes.
- 9.3. Complete exam without using any reference books or notes.
- 9.4. Complete exam at prescribed time and place.
- 9.5. Correctly Don and Doff protective clothing
- 9.6. Use respiratory protection appropriately.

- 9.7. Perform required tasks in various chemical protective clothing.

Learning Objectives

- 9.a. Don a Level B encapsulated chemical-protective clothing ensemble.
- 9.b. Don a Level B nonencapsulated chemical-protective clothing ensemble.
- 9.c. Doff a Level B encapsulated chemical-protective clothing ensemble.
- 9.d. Doff a Level B nonencapsulated chemical-protective clothing ensemble.
- 9.e. Describe the physical capabilities required and limitations of personnel working in PPE.
- 9.f. Describe the purpose and components of high-temperature protective equipment.
- 9.g. Describe the purpose and components of chemical protective clothing and equipment. Describe the purpose and components of liquid splash protective clothing.
- 9.h. Describe the purpose and components of vapor-protective clothing.
- 9.i. Discuss respiratory protection in a hazardous materials incident.
- 9.j. Describe the levels of hazardous materials PPE.
- 9.k. List the ratings of chemical-protective clothing.

10. Evaluate the Status of a Planned Response.

Assessment Strategies

- 10.1. Written Objective Test

Criteria

Performance will be satisfactory when:

- 10.1. Score a minimum of 70%.
- 10.2. Complete exam within 90 minutes.
- 10.3. Complete exam without using any reference books or notes.
- 10.4. Complete exam at prescribed time and place.

Learning Objectives

- 10.a. Summarize how process of absorption can mitigate a hazardous materials incident.
- 10.b. Summarize how the process of adsorption can mitigate a hazardous materials incident.
- 10.c. Summarize how the process of diking can mitigate a hazardous materials incident.
- 10.d. Summarize how the process of damming can mitigate a hazardous materials incident.
- 10.e. Compare the three types of dams that may be constructed during a hazardous materials incident.
- 10.f. Summarize how the process of diversion can mitigate a hazardous materials incident.
- 10.g. Describe how the process of retention can mitigate a hazardous materials incident.
- 10.h. Describe how the process of vapor dispersion can mitigate a hazardous materials incident.
- 10.i. Describe how the process of vapor suppression can mitigate a hazardous materials incident.
- 10.j.

11. Perform Control Options

Assessment Strategies

- 11.1. Written Objective Test
- 11.2. Skill Demonstration

Criteria

Performance will be satisfactory when:

- 11.1. Score a minimum of 70%.
- 11.2. Complete exam within 90 minutes.
- 11.3. Complete exam without using any reference books or notes.
- 11.4. Complete exam at prescribed time and place.
- 11.5. Perform damming, diking and diverting.
- 11.6. Set up and participate in a decon line.
- 11.7. Perform vapor dispersion.
- 11.8. Perform Adsorption and Absorption.

Learning Objectives

- 11.a. Use a multigas meter to provide atmospheric monitoring.
- 11.b. Utilize absorption/adsorption to manage a hazardous materials incident.
- 11.c. Construct a dike.
- 11.d. Construct an overflow dam.

- 11.e. Construct an underflow dam.
- 11.f. Construct a diversion.
- 11.g. Construct a retention system.
- 11.h. Perform vapor dispersion to manage a hazardous materials incident.
- 11.i. Perform vapor suppression to manage a hazardous materials incident.