Course Syllabus


Hours: 32:00 (29:00 = instruction / 3:00 = testing)

Designed For: The certified Fire Inspector I advancing to the Fire Inspector II classification

Description: Upon completion of this course, the student will be familiar with hazardous materials; maximum allowable quantities; requirements for storage, handling, use and dispensing; hazardous materials management plans; and how to evaluate industrials hazards and processes.

Prerequisites: Fire Inspector 2A: Fire Prevention Administration

Passing Criteria: 80%

Certification: Fire Inspector II

Class Size: 30

Restrictions: None

Required Student Materials

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<tr>
<th>Item</th>
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<th>Publisher</th>
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<tbody>
<tr>
<td>California Fire Code</td>
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<td>International Code Council (ICC)</td>
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<tr>
<td>California Building Code</td>
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<td>Fire Inspection and Code Enforcement</td>
<td>7th</td>
<td>IFSTA</td>
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Required Instructor Materials

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<td>California Code of Regulations (CCR)</td>
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<td>Print: Barclays (<a href="http://www.west.thompson.com">www.west.thompson.com</a>)</td>
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<td>Inspection and Code Enforcement Instructor Resource Kit</td>
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FIRE INSPECTOR 2D: HAZARDOUS MATERIALS, OPERATIONS AND PROCESSES COURSE SYLLABUS

Course Objectives: to provide the student with...

a) A review of hazardous materials
b) An introduction to hazardous material maximum allowable quantities
c) General provisions for hazardous materials
d) Information about storage requirements
e) Information about storage, use and dispensing
f) An introduction to hazardous materials management plans
g) The ability to evaluate industrial hazards and processes

Course Content..................................................................................................................................................32:00

Unit 1: Introduction

Topic 1: Orientation and Administration .................................................................................................0:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to

Enabling Learning Objectives (ELO):
1. Identify the requirements of the facility that is hosting the program
2. Will complete all required paperwork for State Fire Training and the organization that is hosting the class.

Discussion Questions
1. To be determined by instructor

Activities
1. Complete State Fire Paperwork and Organizational paperwork

Evaluation: Formative Test, Summative Test
Unit 2: Hazardous Materials Review (CTS: 2-6)

Topic 1: Hazardous Materials Review ................................................................. 1:30

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define the terms “liquid,” “gas” and “solid”; identify physical and chemical properties of liquids, gases and solids; and describe the physical and health hazards of various hazardous materials.

Enabling Learning Objectives (ELO):
1. Define solid, liquid and gas
2. Identify physical properties of liquids, gases and solids
3. Identify chemical properties of liquids, gases and solids
4. Describe the physical hazards of:
   - Explosives and blasting agents
   - Flammable and combustible liquids
   - Flammable solids and gases
   - Organic peroxide materials
   - Oxidizer materials
   - Pyrophoric materials
   - Unstable (reactive) materials
   - Water reactive solids and liquids
   - Cryogenic fluids
   - Combustible fibers
5. Describe the health hazards of:
   - Highly toxic materials
   - Toxic materials
   - Corrosive materials

Discussion Questions
1. What is a solid? A liquid? A gas?
2. How would you classify a product with more than one hazardous property?

Activities (Instructor to develop)
1. Match US Department of Transportation labels with various hazardous materials and products.

Evaluation: Formative Test, Summative Test

Unit 3: Maximum Allowable Quantities (CTS: 2-6)

Topic 1: Determining Maximum Allowable Quantities........................................ 3:00

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define “maximum allowable quantity”; determine a product’s hazard classification and physical state; identify appropriate units of measure; determine which table to use to determine maximum allowable quantity; and apply table footnotes.

Enabling Learning Objectives (ELO):
1. Define “maximum allowable quantity”
2. Describe how to determine a product’s hazard classification
3. Describe how to determine a product’s physical state
4. Describe how to identify an appropriate unit of measure
5. Describe how to determine which table to use to determine maximum allowable quantity
   - CFC Table 2703.1.1(1) – Hazardous Material Posing a Physical Hazard
   - CFC Table 2703.1.1(2) – Hazardous Material Posing a Health Hazard
   - CFC Table 2703.1.1(3) – Physical Hazard in an Outdoor Control Area
   - CFC Table 2703.1.1(4) – Health Hazard in an Outdoor Control Area
   - CFC Table 2703.11.1 – Indoor and Outdoor Control Area in Group M and S Occupancies
6. Describe how to apply table footnotes

Discussion Questions
1. What is a “maximum allowable quantity”?
2. What happens if maximum allowable quantities are exceeded?
Activities (Instructor to develop)
1. Given an MSDS sheet and the appropriate tables, determine MAQ for various products.
   Evaluation: Formative Test, Summative Test

Topic 2: Control Areas .................................................................................................................................. 2:00
Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define “control area”
   and apply CFC Table 2703.8.3.2 to determine the maximum allowable quantity of hazardous materials
   permitted within a building.
   Enabling Learning Objectives (ELO):
   1. Define “control area”
   2. Describe how to apply CFC Table 2703.8.3.2 – Design and Number of Control Areas
   Discussion Questions
   1. What kind of fire-rated wall defines control areas?
   2. What is the purpose of a control area?
   Activities (Instructor to develop)
   1. Given a multi-story floor plan and an inventory of hazardous materials, list the maximum allowable
      quantity for each material assuming those materials are stored on the 6th floor.
   Evaluation: Formative Test, Summative Test

Unit 4: General Provisions for Hazardous Materials (CTS: 2-6) ................................................................. 4:00
Topic 1: Codes and General Provisions ......................................................................................................... 4:00
Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify applicable
   CFC chapters for hazardous materials and describe general requirements for quantities not exceeding
   maximum allowable quantities per control area.
   Enabling Learning Objectives (ELO):
   1. Identify the applicable CFC chapter for hazardous materials:
      - Hazardous materials – CFC, chapter 27
      - Compressed gases – CFC, chapter 30
      - Corrosive materials – CFC, chapter 31
      - Cryogenic fluids – CFC, chapter 32
      - Flammable and combustible liquids – CFC, chapter 34
      - Flammable solids – CFC, chapter 36
      - Highly toxic and toxic materials – CFC, chapter 37
      - Liquefied petroleum gases – CFC, chapter 38
      - Organic peroxides – CFC, chapter 39
      - Oxidizers – CFC, chapter 40
      - Unstable materials – CFC, chapter 43
      - Water-reactive solids and liquids – CFC, chapter 44
      - Radioactive materials – Nuclear Regulatory Commission
   2. Describe general requirements for quantities not exceeding maximum allowable quantities per control
      area, including:
      - Systems, equipment and processes
      - Hazard identification signs
      - Ignition sources
      - Construction requirements
      - General safety precautions
      - Handling and transportation
      - Group M storage and display
      - Group S storage
      - Outdoor control areas
   Discussion Questions
   1. In what occupancy types might you find these hazardous materials?
2. What hazard identification sign does indoor storage require?
3. Why are special requirements applied to Group M and Group S occupancies?

Activities
1. To be determined by instructor.
Evaluation: Formative Test, Summative Test

Unit 5: Storage Requirements (CTS: 2-6)

Topic 1: General Storage Provisions

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define "storage" and describe general storage types, and requirements related to: secondary containment, storage locations, ventilation for indoor storage areas, separation, explosion control, stand-by emergency power, fire protection, and weather protection.

Enabling Learning Objectives (ELO):
1. Define “storage”
   - Indoor vs. outdoor
   - Storage vs. in use
   - Shelving
2. Describe general storage types, including:
   - Container
   - Portable tank
   - Stationary tank
3. Describe secondary containment requirements
4. Describe specific requirements depending on storage location
5. Describe ventilation requirements for indoor storage areas
6. Describe separation requirements, including:
   - Incompatible materials
   - Property lines
   - Distance to buildings
   - Clearance from combustibles
7. Describe explosion control requirements
8. Describe stand-by emergency power requirements
9. Describe fire protection requirements
10. Describe weather protection requirements

Discussion Questions
1. What is considered a portable tank?
2. What is the proper distance from a fire station to locate an above-ground protected diesel storage tank?

Activities
1. To be determined by instructor.
Evaluation: Formative Test, Summative Test

Unit 6: Handling, Use and Dispensing (CTS: 2-6)

Topic 1: General Provisions for Handling, Use and Dispensing

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to define “handling,” “use” and “dispensing”; describe requirements related to separating incompatible materials, non-combustible floors, spill control and secondary containment, limit control, stand-by or emergency power, supervision, lighting, ventilation, liquid transfer, indoor dispensing and use, explosion control, outdoor dispensing and use, clearance from combustibles, weather protection, and emergency alarms; and evaluate alternate protection measures for storage, handling, and use of hazardous materials to ensure the proposed protection level is equivalent to the intent of applicable codes and standards.

Enabling Learning Objectives (ELO):
1. Define:
   - Handling
   - Use
     - Open vs. closed
• Dispensing
2. Describe requirements for separating incompatible materials
3. Describe non-combustible floor requirements
4. Describe spill control and secondary containment requirements
5. Describe limit control requirements
   • Temperature
   • Pressure
6. Describe stand-by or emergency power requirements
7. Describe supervision requirements
   • Manual alarm
   • Detection and automatic fire extinguishing system
8. Describe lighting requirements
9. Describe ventilation requirements
10. Describe liquid transfer requirements
11. Describe indoor dispensing and use requirements
12. Describe explosion control requirements
13. Describe outdoor dispensing and use requirements
14. Describe clearance from combustibles requirements
15. Describe weather protection requirements
16. Describe emergency alarm requirements
17. Describe how to evaluate alternate protection measures for storage, handling, and use of hazardous materials to ensure the proposed protection level is equivalent to the intent of applicable codes and standards
   • The alternate level of protection must provide equivalent or greater protection than the applicable code or standard

Discussion Questions
1. Is an emergency alarm for hazardous materials part of the fire alarm system?
2. What handling, use and dispensing information from your inspection can assist in pre-fire planning?
3. Which of these requirements are unique to H occupancies?

Activities
1. To be determined by instructor.

Evaluation: Formative Test, Summative Test

Unit 7: Hazardous Materials Management Plans (CTS: 2-6)

Topic 1: Hazardous Materials Management Plan

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to describe the requirements for, and contents of, a Hazardous Materials Management Plan, and evaluate control areas, compliance regulations related to reporting unauthorized hazardous materials discharges, general safety regulations related to personnel training and emergency procedures, and regulatory compliance regarding facility closure.

Enabling Learning Objectives (ELO):
1. Describe the requirements for, and contents of, a Hazardous Materials Management Plan, including:
   • Requirements
     o As determined by AHJ
   • Contents
     o Storage and use areas
     o Maximum amount stored or used in each area
     o Range of container sizes
     o Location of emergency, isolation and mitigation valves and devices
     o Product conveying piping containing liquids or gases
     o On and off valve positions
     o Storage plan
     o Location and type of on-site emergency equipment
2. Describe how to evaluate control areas as they relate to hazardous materials storage, including:
• Maximum allowable quantities (MAQ’s)
• Material compatibility
• Indoor or outdoor storage areas

3. Describe how to evaluate compliance with regulations related to reporting unauthorized discharges of hazardous materials, including:
   • Mandatory notification of fire code official
   • CCR Title 19 Sections 2703 and 2705
   • CFC Sections 2703.3.1.1 – 2703.3.1.4

4. Describe how to review records to evaluate compliance with general safety regulations related to personnel training and emergency procedures for sites storing or using hazardous materials, including:
   • Being familiar with chemical characteristics of materials
   • Being aware of necessary action for mitigation

5. Describe how to evaluate compliance with regulations related to closing a facility that has used hazardous materials, including:
   • Requiring a closure plan for facility
   • Reviewing the plan to confirm proper handling and mitigation of all hazardous chemicals and processes
   • Inspecting facility to ensure compliance with closure plan

Discussion Questions
1. When is a Hazardous Materials Management Plan required?
2. What are the components of a Hazardous Materials Management Plan?

Activities
(Instructor to develop)

Evaluation: Formative Test, Summative Test

Unit 8: Industrial Hazards and Processes (CTS: 2-4)

Topic 1: Industrial Hazards and Processes Evaluation

Terminal Learning Objective (TLO): At the end of this topic, the student will be able to identify the applicable CFC chapter for industrial hazards and processes, and evaluate code compliance, hazardous conditions, alternate protection measures, and fire protection plans and practices related to hazardous equipment, processes and operations.

Enabling Learning Objectives (ELO):
1. Identify the applicable CFC chapter for industrial hazards and processes:
   • CFC Chapter 3

2. Describe how to evaluate code compliance for industrial hazards and processes, including:
   • Welding
   • Flammable finishes
   • Dipping and coating
   • Quenching
   • Dry cleaning
   • Dust hazards
   • Asphalt and tar kettles
   • Semiconductor/electronic manufacturing
   • Motion picture and television production
   • Aviation facilities
   • Fruit ripening
   • Fumigation
   • Woodworking
   • Waste handling
   • Industrial ovens

3. Describe how to evaluate hazardous conditions involving equipment, processes or operations so that the equipment, processes or operations are in accordance with applicable codes and standards, including:
• Identifying hazard condition
• Reviewing applicable codes and standards
• Identifying code violations
4. Describe how to verify and resolve deficiencies, including:
   • Observation and documentation
   • Reporting in accordance with jurisdictional policies
   • Taking appropriate action to gain code compliance
   • Referring to the appropriate level when necessary
5. Describe how to evaluate alternate protection measures for equipment, operations or processes to ensure the proposed protection level is equivalent to the intent of applicable codes and standards
   • The alternate level of protection must provide equivalent or greater protection than the applicable code or standard
6. Describe how to evaluate fire protection plans and practices for a facility housing a complex process or operation, including:
   • Determining fire growth potential
   • Level of protection appropriate for hazard
   • In accordance with applicable standards and the policies of the jurisdiction

Discussion Questions
1. Where would you find the code requirements for spraying operations?
2. When does the fire code not regulate a dry cleaning establishment?
3. Where would you find permit requirements for hazardous processes?

Activities
1. To be determined by instructor.

Evaluation: Formative Test, Summative Test