



Hazardous Materials, Operations, and Processes (2024)

Course Plan

Course Details

Certification:	Fire Inspector
CTS Guide:	Fire Inspector Certification Training Standards Guide (2024)
Description:	This course provides students with a basic knowledge of hazardous materials, operations, and processes related to the roles and responsibilities of a Fire Inspector including evaluating hazardous conditions involving equipment, processes, and operations; and evaluating code compliances for storage, handling, and use of hazardous materials, including flammable and combustible liquids and gases.
Designed For:	Personnel preparing to pursue Fire Inspector certification or anyone who performs the duties of an inspector within their agency
Prerequisites:	Fire Inspector 2A: Fire Prevention Administration (2014 or newer)
Standard:	Complete all activities and formative tests. Complete all summative tests with a minimum score of 80%.
Hours (Total):	30 hours (22 lecture / 5 application / 2 testing)
Maximum Class Size:	30
Instructor Level:	SFT Fire Inspector Registered Instructor
Instructor/Student Ratio:	1:30
Restrictions:	None
SFT Designation:	CFSTES

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Required Resources

Instructor Resources

To teach this course, instructors need:

- One of the following textbooks (including Instructor Resource kit)
 - *Fire Inspection and Code Enforcement* (IFSTA, 9th edition, 2023)
 - or
 - *Fire Inspector: Principles and Practice* (Jones & Bartlett, revised enhanced 1st edition, 2016)
- California Building Code (International Code Council, current edition)
- California Code of Regulations (CCR) Title 19 (Office of Administrative Law, <https://oal.ca.gov/>)
- California Fire Code (International Code Council, current edition)

Online Instructor Resources

The following instructor resources are available online at <https://osfm.fire.ca.gov/what-we-do/state-fire-training/professional-certifications>:

- None

Student Resources

To participate in this course, students need:

- Required textbook chosen by the instructor
- California Fire Code (International Code Council, current edition)
- Access to a computer and printer

Facilities, Equipment, and Personnel

Facilities

The following facilities are required to deliver this course:

- Standard learning environment or facility, which may include:
 - Writing board or paper easel chart
 - Markers, erasers
 - Amplification devices
 - Projector and screen
 - Laptop or tablet with presentation or other viewing software
 - Internet access with appropriate broadband capabilities

Time Table

Segment	Lecture	Application	Unit Total
Unit 1: Introduction			
Topic 1-1: Orientation and Administration	0.50	0.00	
Topic 1-2: Fire Inspector Certification Process	0.50	0.00	
Unit 1 Totals	1.00	0.00	1.00
Unit 2: Hazardous Conditions			
Topic 2-1: Evaluating Hazardous Conditions Involving Equipment, Processes, and Operations	5.00	1.50	
Unit 2 Totals	5.00	1.50	6.50
Unit 3: Hazardous Materials			
Topic 3-1: Evaluating Code Compliance for Hazardous Materials	6.00	1.50	
Topic 3-2: Evaluating Code Compliance for Storing Hazardous Materials	8.00	3.00	
Topic 3-3: Evaluating Code Compliance for the Handling and Use of Hazardous Materials	2.00	0.00	
Unit 4 Totals	16.00	4.50	20.50
Formative Assessments			
Determined by AHJ or educational institution	0.00	0.00	0.00
Summative Assessment			
Determined by AHJ or educational institution	0.00	2.00	2.00
Course Totals	22.00	8.00	30.00

Time Table Key

1. The Time Table documents the amount of time estimated to deliver the content included in the course plan.
2. Time is documented using the quarter system: 15 min. = .25 / 30 min. = .50 / 45 min. = .75 / 60 min. = 1.0.
3. The Course Totals do not reflect time for lunch (1 hour) or breaks (10 minutes per each 50 minutes of instruction or assessment). It is the instructor's responsibility to add this time based on the course delivery schedule.
4. Application (activities, skills exercises, and formative testing) time will vary depending on the number of students enrolled. The Application time documented is based on the maximum class size identified in the Course Details section.

5. Summative Assessments are determined and scheduled by the authority having jurisdiction. These are not the written or psychomotor State Fire Training certification exams. These are in-class assessments to evaluate student progress and calculate course grades.

Unit 1: Introduction

Topic 1-1: Orientation and Administration

Terminal Learning Objective

At the end of this topic, a student will be able to identify facility and classroom requirements and identify course objectives, events, requirements, assignments, activities, skills exercises, resources, evaluation methods, and participation requirements in the course syllabus.

Enabling Learning Objectives

1. Identify facility requirements
 - Restroom locations
 - Food locations
 - Smoking locations
 - Emergency procedures
2. Identify classroom requirements
 - Start and end times
 - Breaks
 - Electronic device policies
 - Special needs and accommodations
 - Other requirements as applicable
3. Review course syllabus
 - Course objectives
 - Calendar of events
 - Course requirements
 - Student evaluation process
 - Assignments
 - Activities
 - Required student resources
 - Class participation requirements

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Topic 1-2: Fire Inspector Certification Process

Terminal Learning Objective

At the end of this topic a student will be able to identify the requirements for Fire Inspector certification and describe the certification task book and testing process.

Enabling Learning Objectives

1. Identify the levels of certification in the Fire Inspector certification track
 - First Responder Inspector
 - Fire Inspector
2. Identify other Fire Prevention certification tracks
 - Fire Plans Examiner
 - Fire Marshal
3. Identify the prerequisites for Fire Inspector certification
 - OSFM Fire Inspector 1 (2014) **or** First Responder Inspector (2024) certification
4. Identify the course work required for Fire Inspector certification
 - Fire Inspector 2A: Fire Prevention Administration (2014 or newer)
 - Fire Inspector 2B: Fire and Life Safety Requirements (2014 or newer)
 - Fire Inspector 2C: Fire and Life Safety Systems and Equipment Inspections (2014 or newer)
 - Fire Inspector 2D: Hazardous Materials, Operations, and Processes (2014 or newer)
 - Statutes and Regulations (SFT – Completed within the last 10 years)
 - Fire and Life Safety Educator 1A: Fire and Life Safety Educator 1
5. Identify the exam requirements for Fire Inspector certification
 - None
6. Identify the task book requirements for Fire Inspector certification
 - Fire Inspector Certification Task Book (2024)
7. Identify the experience requirements for Fire Inspector certification
 - Has a minimum of three (3) years' full-time paid experience or six (6) years' volunteer or part-time paid experience in a recognized California fire agency as a Fire Inspector or Prevention Officer
8. Identify the position requirements for Fire Inspector 1 certification
 - None
9. Identify the supporting documentation requirements for Fire Inspector certification
 - International Code Council Fire Code Inspector 1 certification
10. Describe the certification task book process
11. Describe the certification testing process
 - Not applicable
 - All formative and summative testing is completed in individual courses

Discussion Questions

1. Determined by instructor

Application

1. Determined by instructor

Unit 2: Hazardous Conditions

Topic 2-1: Evaluating Hazardous Conditions Involving Equipment, Processes, and Operations

Terminal Learning Objective

At the end of this topic a student, given field observations and documentation, will be able to evaluate hazardous conditions involving equipment, processes, and operations, so that the equipment, processes, or operations are installed in accordance with applicable codes, standards, and ordinances, and deficiencies are identified, documented, and reported in accordance with AHJ policies.

Enabling Learning Objectives

1. Identify applicable codes and standards
 - Energy systems
 - Welding
 - Flammable finishes
 - Manufacturer of organic coating
 - Quenching
 - Dry cleaning
 - Combustible dust- and fiber-producing operations
 - Combustible fibers
 - Asphalt and tar kettles
 - Semiconductor fabrication facilities
 - Motion picture and television production
 - Processing and extraction facilities
 - Motor fuel dispensing facilities and repair garages
 - Aviation facilities
 - Fruit and crop ripening
 - Fumigation
 - Industrial ovens
2. Describe accepted fire protection practices
3. Evaluate fire behavior related to hazardous conditions, equipment, and processes
4. Evaluate ignition sources related to hazardous conditions, equipment, and processes
5. Describe safe housekeeping practices
6. Identify additional reference materials related to protection of hazardous processes and code enforcement
7. Observe hazardous conditions created by equipment installation, processes, and operations
8. Recognize deficiencies with equipment, processes, and operations involving hazardous conditions
9. Interpret codes and communicate deficiencies in accordance with AHJ policies
10. Apply decision-making skills to determine adequate fire and life safety conditions for equipment, processes, and operations

Discussion Questions

1. When is an operational permit required?
2. How many operational permits can one business have?
3. For an existing occupancy/business, what conditions could elevate the existing conditions to be upgraded to an operational permit?

Application

1. Determined by instructor

Instructor Notes

1. Review Chapter Descriptions Part IV - Special Occupancies and Operations at the beginning of the California Fire Code.

CTS Guide Reference: CTS 4-7

Unit 3: Hazardous Materials

Topic 3-1: Evaluating Code Compliance for Hazardous Materials

Terminal Learning Objective

At the end of this topic a student, given field observations, will be able to evaluate code compliance regarding general requirements for hazardous materials so that deficiencies are identified, documented, and reported in accordance with applicable codes, standards, and ordinances and AHJ policies.

Enabling Learning Objectives

1. Identify applicable codes, standards, and ordinances
 - Hazardous materials - CFC, chapter 27
 - Compressed gases - CFC, chapter 30
 - Corrosive materials - CFC, chapter 31
 - Cryogenic fluids - CFC, chapter 32
 - Flammable & combustible liquids, 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 properties and hazards associated with hazardous materials
3. Describe safety data sheets (SDS)
4. Describe fire protection systems and equipment approved for hazardous materials
5. Identify safety procedures
6. Describe chemical reactions
7. Describe fire behavior related to:
 - Flammable and combustible liquids and gases
 - Hazardous materials
8. Observe and recognize problems with storage, handling, and use of flammable and combustible liquids and gases
9. Identify and evaluate fire hazards associated with processes or operations utilizing hazardous materials
10. Communicate deficiencies in accordance with applicable codes, standards, and ordinances and AHJ policies
11. Describe a Hazardous Materials Management Plan
 - Requirements
 - Contents

Discussion Questions

1. In what occupancy types might you find hazardous materials

2. What hazard identification signs do indoor storage require?
3. Why are special requirements applied to group M and group S occupancies?
4. What type of fire protection system is required for flammable liquids and gases?

Application

1. Given SDS sheets and appropriate tables, have students determine MAQs for different types of flammable liquids and gases.

Instructor Notes

1. None

CTS Guide Reference: CTS 4-10, CTS 4-11

Topic 3-2: Evaluating Code Compliance for Storing Hazardous Materials

Terminal Learning Objective

Evaluate code compliance for storing hazardous materials, given field observations, so that deficiencies are identified, documented, and reported in accordance with the applicable codes, standards, ordinances, and AHJ policies.

Enabling Learning Objectives

1. Identify storage compatibility requirements
2. Observe and recognize deficiencies with storing hazardous materials
3. Identify types of storage
 - Bulk
 - Cabinets
 - Tanks
 - Mercantile (ready for sale)
 - Exterior storage
4. Describe how to determine maximum allowable quantities (MAQ)
5. Describe control areas
6. Describe how to evaluate control areas as they relate to hazardous materials storage
7. Describe general requirements for quantities not exceeding maximum allowable quantities per control area
8. Evaluate MAQs and control areas as they relate to hazardous materials storage
9. Interpret codes to make appropriate decisions related to the compliant storage of hazardous materials
10. Communicate deficiencies in accordance with applicable codes, standards, ordinances, and AHJ policies

Discussion Questions

1. What is considered a portable tank?
2. What is the proper distance for a fire station to locate an above-ground protected diesel storage tank?
3. What happens if maximum allowable quantities are exceeded?
4. What kind of fire-rated wall defines control areas?
5. What is the purpose of a control area?

Application

1. Given a multi-story floor plan and an inventory of hazardous materials, have students list the maximum allowable quantity for each material assuming those materials are stored on the 6th floor.

Instructor Notes

1. None

CTS Guide Reference: CTS 4-10, CTS 4-11

Topic 3-3: Evaluating Code Compliance for the Handling and Use of Hazardous Materials

Terminal Learning Objective

Evaluate code compliance for the handling and use of hazardous materials, given field observations, so that deficiencies are identified, documented, and reported in accordance with the applicable codes, standards, ordinances, and AHJ policies.

Enabling Learning Objectives

1. Describe safe handling, use, and dispensing practices for hazardous materials
2. Observe and recognize problems with the handling and use of hazardous materials
3. Interpret codes to make decisions related to the compliant handling and use of hazardous materials
4. Communicate deficiencies in accordance with applicable codes, standards, ordinances, and AHJ policies

Discussion Questions

1. When should you include hazardous materials actively being handled and/or in use as part of your MAQ calculation?
 - How is this applied to O2 administered in a hospital?
2. When issues arise regarding hazardous materials during an inspection, how much information or responsibility is shared with the owner of the building versus the operator within the building?

Application

1. Determined by instructor

Instructor Notes

1. None

CTS Guide Reference: CTS 4-10, CTS 4-11

How to Read a Course Plan

A course plan identifies the details, logistics, resources, and training and education content for an individual course. Whenever possible, course content is directly tied to a national or state standard. SFT uses the course plan as the training and education standard for an individual course. Individuals at fire agencies, academies, and community colleges use course plans to obtain their institution's consent to offer course and provide credit for their completion. Instructors use course plans to develop syllabi and lesson plans for course delivery.

Course Details

The Course Details segment identifies the logistical information required for planning, scheduling, and delivering a course.

Required Resources

The Required Resources segment identifies the resources, equipment, facilities, and personnel required to deliver the course.

Unit

Each Unit represents a collection of aligned topics. Unit 1 is the same for all SFT courses. An instructor is not required to repeat Unit 1 when teaching multiple courses within a single instructional period or academy.

Topics

Each Topic documents a single Terminal Learning Objective and the instructional activities that support it.

Terminal Learning Objective

A Terminal Learning Objective (TLO) states the instructor's expectations of student performance at the end of a specific lesson or unit. Each TLO includes a task (what the student must be able to do), a condition (the setting and supplies needed), and a standard (how well or to whose specifications the task must be performed). TLOs target the performance required when students are evaluated, not what they will do as part of the course.

Enabling Learning Objectives

The Enabling Learning Objectives (ELO) specify a detailed sequence of student activities that make up the instructional content of a lesson plan. ELOs cover the cognitive, affective, and psychomotor skills students must master to complete the TLO.

Discussion Questions

The Discussion Questions are designed to guide students into a topic or to enhance their understanding of a topic. Instructors may add to or adjust the questions to suit their students.

Application

The Application segment documents experiences that enable students to apply lecture content through cognitive and psychomotor activities, skills exercises, and formative testing. Application experiences included in the course plan are required. Instructors may add additional application experiences to suit their student population if time permits.

Instructor Notes

The Instructor Notes segment documents suggestions and resources to enhance an instructor's ability to teach a specific topic.

CTS Guide Reference

The CTS Guide Reference segment documents the standard(s) from the corresponding Certification Training Standard Guide upon which each topic within the course is based. This segment is eliminated if the course is not based on a standard.

Skill Sheet

The Skill Sheet segment documents the skill sheet that tests the content contained within the topic. This segment is eliminated if the course does not have skill sheets.