Fire and Life Safety

Course Plan

Course Details

Certification: Fire Inspector 1

CTS Guide: Fire Inspector 1 Certification Training Standard (2014)

Description: This course provides students with a basic knowledge of fire and life safety aspects related to the roles and responsibilities of a Fire Inspector 1 including building construction, occupancy classifications, occupancy load, means of egress, hazardous conditions, fire growth potential, fire flow, and emergency planning and preparedness measures.

Designed For: Entry-level Inspector

Prerequisites: Fire Inspector 1A: Duties and Administration

Standard: Complete all activities and formative tests.

Complete all summative tests with a minimum score of 80%.

Hours: Lecture: 18:30

Activities: 3:30

Testing: 2:00

Hours (Total): 24:00

Maximum Class Size: 30

Instructor Level: Primary Instructor

Instructor/Student Ratio: 1:30

Restrictions: None

SFT Designation: CFSTES

Required Resources

Instructor Resources

To teach this course, instructors need:

- 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)

Reference manual options:

- *Fire Inspection and Code Enforcement Instructor Resource Kit*
  (IFSTA, 8th edition)

  Or the combination of the following:

- *Fire Inspector: Principles and Practice*
  (International Association of Fire Chiefs, Revised Enhanced 1st edition, Jones & Bartlett Learning,
  ISBN: 9781284137743)
- *Fire Inspector: Principles and Practice Instructor's ToolKit* CD-ROM
  (International Association of Fire Chiefs, Cdr edition, Jones & Bartlett Learning,
  ISBN: 9781284095654)

Online Instructor Resources

The following instructor resources are available online at https://osfm.fire.ca.gov/divisions/state-fire-training/cfstes-professional-certification/:

- Activity 2-1: Construction Types
- Activity 5-1: Means of Egress Elements\
- Course plan
- Website

Student Resources

To participate in this course, students need:

- California Fire Code
  (International Code Council, current edition)

Reference manual options:

- *Fire Inspection and Code Enforcement*
  (IFSTA, 8th edition, ISBN: 9780879396053)

  Or

- *Fire Inspector: Principles and Practice*
  (International Association of Fire Chiefs, Revised Enhanced 1st edition, ISBN: 9780763798574)

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, 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. What is a formative test?
2. What is a summative test?

Activities

1. To be determined by the instructor.

Topic 1-2: Fire Marshal Certification Process

Terminal Learning Objective

At the end of this topic, a student will be able to identify different levels in the Fire Marshal certification track, the courses and requirements for Fire Inspector 1 certification, and be able to describe the capstone task book and testing process.

Enabling Learning Objectives

1. Identify the different levels of certification in the Fire Inspctor certification track

- Fire Inspector 1
- Fire Inspector 2

2. Identify the other Fire Prevention certification tracks
   - Plan Examiner
   - Fire Marshal
3. Identify the courses required for Fire Inspector 1
   - Fire Inspector 1A: Duties and Administration
   - Fire Inspector 1B: Fire and Life Safety
   - Fire Inspector 1C: Field Inspection
   - Fire Inspector 1D: Field Inspection – California Specific
4. Identify any other requirements for Fire Inspector 1
5. Describe the capstone task book process
   - Complete all prerequisites and course work
   - Submit application and fees to request capstone task book
     - Must be employed by a California Fire Agency as a Fire Inspector
   - Complete all job performance requirements included in the task book
   - Must have identified evaluator verify individual task completion via signature
   - Must have Fire Chief or authorized representative verify task book completion via signature
6. Describe the capstone testing process
   - Complete coursework
   - Schedule online capstone test
   - Schedule skills evaluation test

Discussion Questions

1. How many levels are there in the Fire Marshal certification track? What are they?

Activities

1. To be determined by the instructor.

Unit 2: Building Construction

Topic 2-1: Verifying Construction Type for an Addition or Remodel

Terminal Learning Objective

At the end of this topic, a student given field observations or a description of a project and a description of materials being used will be able to verify the type of construction for an addition or remodel in order to identify and record the construction type in accordance with applicable codes and standards and jurisdictional policies.

Enabling Learning Objectives

1. Identify applicable codes and standards adopted by the jurisdiction
2. Identify types of construction
   - Type I (A and B)
     - California Building Code, Chapter 6, Table 601

    - IFSTA, p. 124 (7th ed.), Table 4.1
  - Type II (A and B)
    - California Building Code, Chapter 6, Section 602.2 and Table 601
    - IFSTA, p. 124 (7th ed.), Table 4.1
  - Type III (A and B)
    - California Building Code, Chapter 6, Section 602.3
    - IFSTA, p. 124 (7th ed.), Table 4.1
  - Type IV – Heavy Timber
    - California Building Code, Chapter 6, Section 602.4
    - IFSTA, p. 124 (7th ed.), Table 4.1
  - Type V (A and B) – Wood Frame
    - California Building Code, Chapter 6, Section 602.5
    - IFSTA, p. 124 (7th ed.), Table 4.1
3. Identify rated construction components
4. Identify accepted building construction methods and materials
   - Foundations
   - Exterior walls
   - Floor and ceiling assemblies
   - Roof covering and assembly classifications
   - Fire barriers
   - Fire partitions
   - Fire walls
   - Fire-resistant joint systems
   - Enclosed stairs
   - Horizontal assemblies (exit corridors, horizontal exits, rated, unrated)
   - Opening protection
   - Penetration protection
   - Shaft enclosures
   - Smoke barriers
   - Smoke partitions
   - Draft stops
   - Attic stops
   - Interior finishes
   - Fire sprinkler systems (impacts other features)
5. Read plans

Discussion Questions

1. What are the different types of construction?
2. What type of construction does the code approve for hospitals?
3. What is the purpose of a draft stop?
4. What are the components of a fire-resistance-rated wall?
5. What is the purpose of a parapet?

Activities

1. Activity 2-1: Construction Types

CTS Guide Reference: CTS 3-4

Unit 3: Occupancy Classifications

Topic 3-1: Identifying Occupancy Classifications for a Single-use Occupancy

Terminal Learning Objective

At the end of this topic, a student given a description of an occupancy and its use will be able to identify the occupancy classification of a single-use occupancy in accordance with applicable codes and standards.

Enabling Learning Objectives

1. Recognize occupancy classification types
2. Identify state-regulated occupancy classifications
3. Identify applicable codes, regulations, and standards adopted by the jurisdiction
4. Identify operational features that change the occupancy classification
5. Recognize fire hazards presented by various occupancies

Discussion Questions

1. What is the difference between gross and net square footage?
2. Who determines occupant classifications?

Activities

1. Given a fill-in-the-blank occupancy classification activity, have students identify the occupancy classification of different structures.

CTS Guide Reference: CTS 3-1

Unit 4: Occupancy Load

Topic 4-1: Computing the Allowable Occupant Load of a Single-use Occupancy

Terminal Learning Objective

At the end of this topic, a student given a detailed description of an occupancy will be able to compute the allowable occupant load of a single-use occupancy or portion thereof in accordance with applicable codes and standards.

Enabling Learning Objectives

1. Recognize occupant load factors
   - Table 1004.1.1 – Maximum Floor Area Allowances Per Occupant (California Fire Code or California Building Code)
2. Identify occupancy factors related to various occupancy classifications
3. Calculate occupant loads
4. Describe how to use measuring tools
   - Plans and scales
   - Field measuring devices

- Ceiling tiles
- Floor tiles

5. Describe how to make field sketches

Discussion Questions

1. What are the purposes and uses of a building's occupant load?
2. When does the code require the posting of an occupant load?

Activities

1. Given several scenarios, determine the occupant load of a building or portion thereof.

CTS Guide Reference: CTS 3-2

Unit 5: Means of Egress

Topic 5-1: Inspecting Means of Egress Elements

Terminal Learning Objective

At the end of this topic, a student given observations made during a field inspection of an existing building will be able to inspect means of egress elements in order to verify the maintenance of egress elements in compliance with applicable codes and standards, and identify, document, and report deficiencies in accordance with applicable codes and standards and jurisdictional policies.

Enabling Learning Objectives

1. Describe egress elements
   - Exit access
   - Exits
   - Exit discharge
2. Identify means of egress components, including:
   - Doors
   - Door swing
   - Access controlled doors
   - Hardware
   - Corridors
     - Walls
     - Ceilings
     - Floors
   - Special egress control devices
   - Stairs
   - Ramps
   - Fire escape ladders
   - Fire escape slides (slidescapes)
3. Identify applicable codes and standards adopted by the jurisdiction related to means of egress elements
4. Identify maintenance requirements of egress elements
   - Operational doors

- Unobstructed pathways
- Proper illumination
- Proper signage
- Under alarm conditions
  - Delayed egress locks
  - Access control egress
  - Pressurized stairways
  - Smoke-control systems
  - Automatic closing fire doors

5. Identify occupancy egress requirements
   - Occupant load
   - Number of exits
   - Separation
   - Travel distance
     - Fire sprinklers
     - Horizontal exits
     - Active vs. passive
6. Identify the relationship of fixed fire protection systems to egress requirements and to approved means of egress elements, including:
   - Doors
   - Hardware
   - Lights
7. Observe and recognize problems with egress elements
8. Make basic decisions related to means of egress

Discussion Questions

1. How does an inspector determine exit width?
2. What does the code cite as the minimum required exit width?
3. How do you determine the aisle width between unfixed tables and chairs?
4. What is the difference between a fire door and a smoke and draft assembly?
5. What mandates the maintenance of fire escapes?
6. When does the code require pathway illumination?
7. When does the code require floor-level exit signs?
8. Is an exterior path of egress part of an exit system?
9. Is a door that is part of a listed assembly always required to be self closing?
10. When does the code allow an exit to terminate before reaching a public way?

Activities

1. Activity 5-1: Means of Egress Elements
2. Given a plan, determine occupancy classification, square footage, occupant load, number of exits required, exit separation, door hardware, signage, and illumination.

CTS Guide Reference: CTS 3-3

Unit 6: Hazardous Conditions and Fire Growth Potential

Topic 6-1: Recognizing Hazardous Conditions

Terminal Learning Objective

At the end of this topic, a student given field observations will be able to recognize hazardous conditions involving equipment, processes, and operations in order to verify that equipment is maintained and processes and operations are conducted in accordance with applicable codes and standards, and identify, document, and report deficiencies in accordance with applicable codes and standards and jurisdictional policies.

Enabling Learning Objectives

1. Recognize basic fire behavior
    - Fire triangle / tetrahedron
    - Energy sources
    - Fire stages
    - Flame spread and smoke development
    - Heat transfer mechanisms
2. Identify ignition sources
3. Identify fire prevention practices
    - Dust production
    - Flammable and combustible materials
    - Hazardous materials storage and handling
    - Ignition sources
    - Vapor recovery
    - Cooking equipment
    - Electrical hazards
4. Identify safe housekeeping practices
5. Observe, recognize problems with, and make decisions about hazardous conditions
6. Apply codes and standards to hazardous conditions

Discussion Questions

1. What are the components of the fire tetrahedron?
2. In which stage of a fire does flashover occur?
3. What is the most common heat transfer method found in a structure fire?
4. What form of heat transfer takes place when a fire transfers from one structure to another?

Activities

1. To be determined by the instructor.

CTS Guide Reference: CTS 3-8

Topic 6-2: Recognizing Hazardous Fire Growth Potential in a Building or Space

Terminal Learning Objective

At the end of this topic, a student given field observations will be able to recognize hazardous fire growth potential in a building or space in order to identify, document, and report hazardous conditions in accordance with applicable codes and standards and jurisdictional policies.

Enabling Learning Objectives

1. Identify the flame spread and smoke development ratings of:
   - Contents
   - Interior finishes
   - Building construction elements
   - Decorations
   - Decorative materials
   - Furnishings
2. Identify safe housekeeping practices related to hazardous fire growth potential
3. Observe, recognize problems with, and make decisions about fire growth potential
4. Apply codes and standards related to hazardous fire growth potential
5. Recognize hazardous conditions

Discussion Questions

1. What do the results of a Steiner tunnel test reveal?
2. What passive and active systems failed in the MGM fire?
3. What impact would an unprotected shaft have on a multistory building during a fire?
4. How does a material's flame spread impact fire behavior?
5. What is the difference between piled storage and high piled storage?

Activities

1. Analyze a video of the MGM Grand fire (Las Vegas, November 1980).

CTS Guide Reference: CTS 3-14

Unit 7: Fire Flow

Topic 7-1: Verifying Fire Flows

Terminal Learning Objective

At the end of this topic, a student given fire flow test results and water supply data will be able to verify that fire flows for a site are in accordance with applicable codes and standards and identify, document, and report deficiencies in accordance with applicable codes and standards and jurisdictional policies.

Enabling Learning Objectives

1. Identify types of water distribution systems and other water sources in the local community
2. Identify water distribution system testing processes
3. Identify issues that impact water flow testing, including:

- Discharge requirements (National Pollutant Discharge Elimination System)
- Flood control authority policies
- Water purveyor policies

4. Identify characteristics of public and private water supply systems
   - Hydrant types
   - Hydrant spacing
   - Dead end water lines
5. Identify flow testing procedures
6. Use tools needed to evaluate available water flow, including:
   - Pitot gauge
   - Pressure gauge
   - Water map showing mains and direction of flow
   - Diffusers
   - Formulas
7. Calculate and graph fire flow results
8. Verify proper maintenance of required water supplies, including:
   - Verifying access to hydrants maintenance
   - Verifying proper maintenance of private hydrants in accordance with California Code of Regulations, Title 19, Chapter 5

Discussion Questions

1. How do you determine the fire flow for a building or project?
2. How does the installation of fire sprinklers affect fire flow?
3. What sprinkler systems qualify for fire flow reductions?
4. What are the minimum fire flow requirements for commercial and residential projects?
5. How do you determine hydrant spacing?
6. Is a recycled water system an approved water source for firefighting?

Activities

1. Given a data set, calculate and graph fire flow results.

CTS Guide Reference: CTS 3-15

Unit 8: Emergency Planning and Preparedness Measures

Topic 8-1: Verifying Emergency Planning and Preparedness Measures

Terminal Learning Objective

At the end of this topic, a student given field observations, copies of emergency plans, and records of exercises will be able to verify that emergency planning and preparedness measures are in place and practiced in accordance with applicable codes and standards, and identify, document, and report deficiencies in accordance with applicable codes and standards and jurisdictional policies.

Enabling Learning Objectives

1. Identify what occupancies are required to have an evacuation plan, including:
   - K-12 schools

- High-rise buildings
- Hospitals
- Care facilities
- Hotels
- Organized camps
- Office buildings with two or more stories
- Covered malls
- (See California Code of Regulations, Title 19, Article 1, Section 3.09)

2. Describe the elements of an evacuation plan, including:
   - Evacuation routes: maps identifying current location and egress routes
   - Types of evacuations (partial vs. full)
   - Monitor's duties when evaluating a fire drill
   - Occupants' duties in participating in fire drills
3. Identify requirements related to emergency evacuation drills required within the jurisdiction
4. Identify ways to conduct and/or evaluate fire drills in various occupancies
5. Recognize human behavior commonly exhibited during fires and other emergencies
6. Identify the emergency evacuation requirements contained in the applicable codes and standards
7. Interpret plans and reports

Discussion Questions

1. How often should a high-rise building have a fire drill?
2. What is the required frequency of fire drills for public schools?
3. In what code can you find the public school fire drill requirements?

Activities

1. To be determined by the instructor.

CTS Guide Reference: CTS 3-10

Time Table

Segment	Lecture Time	Activity Time	Total Unit Time
Unit 1: Introduction			
Topic 1-1: Orientation and Administration			
Lecture	00:30		
Activity 1-1: To be determined by instructor		00:00	
Topic 1-2: Fire Marshal Certification Process			
Lecture	00:30		
Activity 1-2: To be determined by instructor		00:00	
Unit 1 Totals	**1:00**	**00:00**	**1:00**
Unit 2: Building Construction			
Topic 2-1: Verifying Construction Type for a Building or Remodel			
Lecture	4:00		
Activity 2-1: Construction Types		00:30	
Unit 2 Totals	**4:00**	**00:30**	**4:30**
Unit 3: Occupancy Classifications			
Topic 3-1: Identifying Occupancy Classifications for a Single-use Occupancy			
Lecture	2:00		
Activity 3-1: See suggested activity		00:30	
Unit 3 Totals	**2:00**	**00:30**	**2:30**
Unit 4: Occupancy Load			
Topic 4-1: Computing the Allowable Occupant Load of a Single-use Occupancy			
Lecture	1:30		
Activity 4-1: See suggested activity		00:30	
Unit 4 Totals	**1:30**	**00:30**	**2:00**
Unit 5: Means of Egress			
Topic 5-1: Inspecting Means of Egress Elements			
Lecture	4:30		
Activity 5-1: Means of Egress Elements		00:30	
Activity: See suggested activity		00:30	
Unit 5 Totals	**4:30**	**1:00**	**5:30**

Segment	Lecture Time	Activity Time	Total Unit Time
Unit 6: Hazardous Conditions and Fire Growth Potential			
Topic 6-1: Recognizing Hazardous Conditions			
Lecture	1:00		
Activity 6-1: To be determined by instructor		00:00	
Topic 6-2: Recognizing Hazardous Fire Growth Potential in a Building or Space			
Lecture	1:00		
Activity 6-2: See suggested activity		00:30	
Unit 6 Totals	**2:00**	**00:30**	**2:30**
Unit 7: Fire Flow			
Topic 7-1: Verifying Fire Flows			
Lecture	1:30		
Activity 7-1: See suggested activity		00:30	
Unit 7 Totals	**1:30**	**00:30**	**2:00**
Unit 8: Emergency Planning and Preparedness Measures			
Topic 8-1: Verifying Emergency Planning and Preparedness Measures			
Lecture	2:00		
Activity 8-1: To be determined by instructor		00:00	
Unit 8 Totals	**2:00**	**00:00**	**2:00**
Lecture, Activity, and Unit Totals:	**18:30**	**3:30**	**22:00**

Course Totals

Segment Type	Time
Total Lecture Time (LT)	18:30
Total Activity Time (AT)	3:30
Total Testing Time (TT)	2:00
Total Course Time	**24:00**