

## Fire Science

New Horizons Regional Educational Center – Butler Farm  
757-766-1100

Instructor	Mike Gabany, Asst. Fire Chief (retired) BS Fire Administration, Pro-Board Certified 757-766-1100 e-mail: mike.gabany@nhrec.org
Grade Level	11 <sup>TH</sup> & 12 <sup>TH</sup>
Length of course	2.5 hrs/day for 180 days = 1 academic year (3 credits) (6 college credits)
State Course code #	Dept of Education – 8705 / 8706
Textbook/Materials	<i>Essentials of Fire Fighting-1<sup>st</sup>.Ed.</i> , International Fire Services Training Association <i>Hazardous Materials Student Manual</i> <i>Basic Life Support for Health Care Providers – AHA</i>
Facilities	Classroom, on campus and field trip training grounds, tower, SCBA maze.
Course Description	<p>This course prerequisite training would consist of certifications or recertifications in basic life support skills and hazardous materials awareness. This is an entry level course consisting of class work, homework scenarios and skill practice that prepares the student to carry out most fire ground functions under direct supervision. Provide an overview to fire protection; career opportunities in fire protection and related fields; philosophy and history of fire protection/service; fire loss analysis; organization and function to public and private fire protection services; fire departments as part of local government; laws and regulations affecting the fire service; fire service nomenclature; specific fire protection functions; basic fire chemistry and physics; introduction to fire protection systems; introduction to fire strategy and tactics. (FST 100) Students are introduced to fire behavior and combustion exploring the theories and fundamentals of how and why fires start, spread, and how they are controlled. (FST 110) Students will be introduced to basic firefighting tools, fireground safety, and the need for physical fitness. This course is physically challenging and requires the student meets the minimal physical requirements as set by the Department of Labor for the position description of Firefighter.</p> <p>The course training consists of certification, or certificates of completion, in:</p> <ul style="list-style-type: none"><li>• Basic Life Support (AHA)</li><li>• Introduction to Community Emergency Response Teams (FEMA: IS-317)</li><li>• Are You Ready: In-depth Guide to Citizen Preparedness (FEMA: IS-22)</li><li>• Introduction to Hazardous Materials (FEMA: IS-5.A)</li><li>• Household Hazardous Materials - A Guide for Citizens (FEMA: IS-55)</li><li>• Hazardous Materials Awareness (VD FP)</li><li>• Introduction to ICS for Operational First Responders (FEMA: ICS-100)</li><li>• Firefighter Safety: Calling the Mayday (FEMA: Q-133)</li></ul>

## Course Outline

## Units of Instruction Include;

### I. Basic Life Support for Health Care Providers

### II. Hazardous Materials

- Introduction to Hazardous Materials
- Properties of Hazardous Materials
- DOT Hazard Classification System
- Markings
- Information Systems
- Containers
- Behavior of Hazmat Incident
- Incident analysis and Risk Assessment
- Personal Protective Equipment

### III. Orientation to Fire Service

- Fire & Safety
- Fire Behavior
- Building Construction
- Protective Clothing & SCBA
- Portable Extinguishers
- Ropes & Ladders
- Building Search and Victim removal
- Forcible entry tools, construction & techniques
- Ground Ladders
- Ventilation
- Water supply
- Coupling, loading, rolling, laying, carrying & advancing Hose
- Water fire streams
- Class A,C,D, Vehicle & wet land fire control
- Sprinkler system foundations
- Salvage, overhaul & Protective evidence of fire cause
- FD communications Equipment & Techniques
- FD Prevention & Public Education

## Methods of Evaluation

The purpose of the evaluation process is to strengthen training efforts with a goal of promoting retention. Methods used will include written quizzes, test, practical skills evaluation and graded scenarios.

## Hazardous Materials Objectives

- The student shall describe the risks associated with the storage and transportation of hazardous materials within the community.
- The student shall describe the threats that hazardous materials pose to life, critical system, property and the environment.
- The student shall describe the role of the first responder as identified in local contingency plans for hazardous materials incident.
- The student shall describe at least two way that planning provides the first responder with information prior to a hazardous material incident.
- The student shall describe at least two elements of a hazardous materials contingency plan, which are required by federal law.
- The student shall be able to define the term hazardous materials, dangerous goods, hazardous substances, and hazardous chemicals.
- The student shall be able to describe the differences between a hazardous materials incident and other emergencies.
- The student shall identify typical locations where hazardous materials are manufactured, stored, used and disposed.
- Given the chemical properties of a hazardous material, the student shall identify the health, fire, and reactivity hazards for that material.
- Given the physical and chemical properties of a hazardous material, the student shall identify how the material will behave under incident conditions.
- Given terms associated with weapons of mass destruction, the student shall define the terms and identify the hazards associated with these materials.
- The student, when given definitions and other information about hazardous materials, will match the definitions and other information with the proper hazard class.
- The student will describe the identification markings found on hazardous material containers.
- The student shall be able to collect hazard and response information using the following sources:
  1. Material safety data sheets (MSDS)
  2. U.S. DOT emergency response guidebook (ERG)
  3. CHEMTREC
  4. The manufacturer or shipper of the material
- The student shall be able to identify how to obtain support from other resources by using the commonwealth of Virginia emergency operations center.
- When shown various containers used to store, transport, or distribute hazardous materials, the student shall identify the containers by type and capacity.
- Given information and factors of a simulated hazardous materials incident, the student shall identify the potential hazards and exposures of the incident.
- Given information and factors of a simulated hazardous materials incident, the student shall estimate the potential of harm caused by the hazardous materials.
- When given information on a hazardous materials incident, the student shall evaluate the incident factors and determine the type and degree of risk to life, critical systems, property, and the environment.
- When given information on a hazardous materials incident, the student shall used incident analysis and risk assessment to determine what is happening at the incident and what hazards may be present.
- The student shall identify the type of Personal Protective Equipment appropriate for hazardous materials incidents.
- The student shall identify the purpose, advantages, and limitations of Personal Protective Equipment at hazardous materials incidents.
- The student shall identify the safety precautions to be taken when using Personal Protective Equipment.
- The student shall demonstrate the proper donning, use, and doffing of Personal Protective Equipment.

- The student shall understand the proper procedures for using detection and monitoring equipment to establish hazard control zones.
- The student shall describe and compare the following terms:
  1. Exposure
  2. Contamination
  3. Secondary contamination
  4. Decontamination

## Firefighter Objectives

**Lesson 1**      **After completing this lesson, the student will be able to describe basic fire department organizational structure and operating procedures and distinguish among the duties and functions of fire department personnel.**

- Enabling      After completing this lesson, students will be able to —
1. State the mission of the fire service. *(NFPA 1001, 5.1.1.1)*
  2. Match fire department organizational principles to their descriptions. *(NFPA 1001, 5.1.1.1)*
  3. Match fire companies to their functions and duties. *(NFPA 1001, 5.1.1.1)*
  4. List the primary knowledge and skills needed by a firefighter to function effectively. *(NFPA 1001, 5.1.1.1)*
  5. List typical duties of a Firefighter I and a Firefighter II. *(NFPA 1001, 5.1.1.1)*
  6. Match fire department personnel to their primary roles. *(NFPA 1001, 5.1.1.1)*
  7. Match special operations personnel to their primary responsibilities. *(NFPA 1001, 5.1.1.1)*
  8. Match fire prevention, emergency medical services, and training personnel to their primary responsibilities. *(NFPA 1001, 5.1.1.1)*
  9. Select facts about fire department regulations. *(NFPA 1001, 5.1.1.1)*
  10. Identify the major operational positions within the IMS structure. *(NFPA 1001, 5.1.1.1)*
  11. Match IMS terms to their definitions. *(NFPA 1001, 5.1.1.1)*
  12. Select facts about implementing an IMS. *(NFPA 1001, 5.1.1.1)*
  13. Select facts about fire service interaction with other organizations. *(NFPA 1001, 5.1.1.1)*

**Lesson 2**      **After completing this lesson, the student will be able to follow basic fire station, apparatus, and tool safety procedures and guidelines.**

- Enabling      After completing this lesson, students will be able to —
1. Select facts about firefighter safety. *(NFPA 1001, 5.1.1.1)*
  2. List firefighter health considerations. *(NFPA 1001, 5.1.1.1)*
  3. List areas in which an employee assistance program can help. *(NFPA 1001, 5.1.1.1)*
  4. Select facts about an employee assistance program. *(NFPA 1001, 5.1.1.1)*
  5. Select facts about safety on the apparatus. *(NFPA 1001, 5.3.2A)*
  6. Safely mount, use apparatus safety equipment, and dismount apparatus. *(NFPA 1001, 5.3.2B;*

7. Select facts about personal safety in the fire station. (*NFPA 1001, 5.1.1.1*)
8. Demonstrate proper lifting techniques. (*NFPA 1001, 5.1.1.1*)
9. List general safety procedures for using station shop hand tools and power tools. (*NFPA 1001, 5.1.1.1*)
10. List safety rules for using power saws. (*NFPA 1001, 5.1.1.1*)
11. Select facts about training safety. (*NFPA 1001, 5.1.1.1*)
12. Select facts about emergency scene safety. (*NFPA 1001, 5.1.1.1*)

**Lesson 3**     **After completing this lesson, the student will be able to predict probable fire behaviors and know the actions necessary to change or prevent these behaviors.**

Enabling     After completing this lesson, students will be able to —

1. Match measurement terms to their definitions.
2. Define *energy* and *work*.
3. Match types and states of energy to their definitions.
4. Define *power*.
5. Match heat and temperature terms to their definitions.
6. Distinguish among the three methods of heat transfer. (*NFPA 5.3.12A*)
7. Match properties of matter to their definitions. (*NFPA 5.3.10A*)
8. State the Law of Conservation of Mass-Energy. (*NFPA 5.3.11A*)
9. Identify chemical reactions. (*NFPA 5.3.10A*)
10. Define *fire*. (*NFPA 5.3.11A*)
11. Provide examples of oxidation.
12. Use the fire tetrahedron to explain combustion. (*NFPA 1001, 5.3.11A*)
13. Select facts about oxidizing agents. (*NFPA 5.3.11A*)
14. Select and correct incorrect statements about fuel characteristics. (*NFPA 5.3.10A*)
15. Explain how fuel gases evolve from solids and liquids. (*NFPA 5.3.10A*)
16. Provide specific examples of each source of chemical and electrical heat energy.
17. Describe ways in which mechanical and nuclear heat are generated.
18. Identify stages of compartment fire development. (*NFPA 1001, 5.3.11A*)
19. List factors that affect fire development. (*NFPA 5.3.11A*)
20. Define *flameover/rollover*. (*NFPA 5.3.11A*)
21. Explain why thermal layering is critical to fire fighting activities. (*NFPA 5.3.12A*)
22. List signs of possible backdraft. (*NFPA 1001, 5.3.11A*)
23. Select facts about the products of combustion. (*NFPA 1001, 5.3.11A, 5.3.16A*)
24. Select facts about fire extinguishment theory. (*NFPA 3.3.11A*)
25. Match fire classes to their descriptions. (*NFPA 5.3.16A*)

26. Match fire classes to their primary extinguishment methods. (*NFPA 1001, 5.3.16A*)

**Lesson 4a**    **After completing this lesson, you will be able to don and doff protective clothing and use a PASS device.**

Enabling    After reviewing materials, and completing related activities, you will be able to —

1. Match articles of protective clothing and equipment to their correct functions.
2. Select facts about personal protective gear.
3. Don and doff articles of protective clothing/equipment.
4. List the four hazardous atmospheres that require the firefighter to wear SCBA.
5. Match toxic atmospheres to their characteristics.
6. Match toxic atmospheres to their sources.
7. Match toxic atmospheres to locations in which they are most likely to be found.
8. Select facts about hazardous substances and atmospheres.

**Lesson 4b**    **After completing this lesson, the student will be able to safely use, clean, refill, inspect, and store SCBA.**

Enabling    After reviewing materials, and completing related activities, you will be able to —

1. List physical, mental, and medical factors that affect the firefighter's ability to use SCBA.
2. Describe equipment and air-supply limitations of SCBA.
3. List characteristics of open-circuit and closed-circuit SCBA.
4. Label the components and safety features of an SCBA.
5. Match SCBA components to their functions.
6. Complete precautions for safe SCBA use.
7. Complete guidelines for correcting emergency situations while wearing SCBA.
8. Complete recommendations for the use of PASS devices.
9. Select from a list guidelines general to donning the facepiece and doffing all types of SCBA.
10. Don and doff open-circuit SCBA, using over-the-head and coat methods, and from compartment or backup mounts.
11. Operate in areas of obscured visibility while wearing SCBA.
12. Exit a constricted opening while wearing standard SCBA.
13. Change an SCBA cylinder "on scene."
14. Refill an SCBA cylinder.
15. Select facts about SCBA operation, use, and maintenance.
16. Clean, sanitize, and inspect an SCBA unit.

**Lesson 5**     **After completing this lesson, you will be able to identify and use portable fire extinguishers to extinguish small Class A, Class B, and Class C fires.**

Enabling     After reviewing materials and completing related activities, you will be able to —

1. Identify types of portable fire extinguishers.
2. Select facts about the portable fire extinguisher rating system.
3. Match extinguisher symbol shapes to fire classification letters.
4. Match extinguisher pictographs to the extinguisher's intended applications.
5. List factors for selecting the proper portable extinguisher.
6. List general guidelines for portable extinguisher operation.
7. Extinguish small Class A, Class B, and Class C fires with the proper portable fire extinguishers.
8. Select facts about fire extinguisher inspection, damage, and obsolescence

**Lesson 6**     **After completing this lesson, you will be able to identify and properly knot, use, and maintain various types of rope used in the fire service.**

Enabling     After reviewing materials and activities, you will be able to —

1. Distinguish between life safety and utility rope applications.
2. List criteria for reusing life safety rope.
3. Match rope materials to their descriptions.
4. Select facts about rope construction.
5. List basic guidelines for rope care and maintenance.
6. List reasons for removing rope from service.
7. Inspect rope.
8. Select facts about rope cleaning and storage.
9. Coil and uncoil rope.
10. Bag or bird's-nest coil rope for machine washing or storage.
11. Clean rope.
12. Label knot elements.
13. Match knots to their primary applications.
14. Tie knots commonly used in the fire service.
15. List hoisting safety considerations.
16. Tie approved knots and hoist tools and equipment.

**Lesson 7**    **After completing this lesson, you will be able to conduct a search and rescue in a structure operating as a member of a team.**

Enabling    After reviewing materials and completing related activities, you will be able to —

1.     Distinguish between rescue and extrication operations.
2.     State the objectives of building search.
3.     Define *primary search* and *secondary search*.
4.     Select guidelines for rescue from burning buildings.
5.     Select facts about firefighters who become trapped or disoriented.
6.     List safety guidelines for search operations within buildings.
7.     Select facts about victim removal.
8.     Move an injured victim to safety using appropriate carries, drags, and stretchers.

**Lesson 8a**    **After completing this lesson, you will be able to identify and know appropriate applications and safety and maintenance procedures for forcible entry tools.**

Enabling    After reviewing materials and completing related activities, you will be able to —

1.     Identify cutting tools.
2.     Identify prying tools.
3.     Identify pushing/pulling tools.
4.     Identify striking tools.
5.     Match selected forcible entry tools to their basic applications.
6.     Identify tools used for through-the-lock forcible entry.
7.     Break a door lock.
8.     Identify tools for breaking padlocks.
9.     Break a padlock.
10.    List forcible entry tool safety rules.
11.    Describe correct methods for carrying forcible entry tools.
12.    List general care and maintenance practices for forcible entry tools.

**Lesson 8b**    **After completing this lesson, you will be able to recognize various types of construction components and use appropriate forcible entry techniques.**

Enabling    After reviewing materials and completing related activities, you will be able to —

1.     Identify types of wood swinging doors and jambs.
2.     Match metal swinging doors to their descriptions.
3.     Identify types of sliding, revolving, and overhead doors.
4.     Select facts about fire doors.

5. Identify locks and locking devices.
6. Complete safety rules for breaking glass.
7. Properly break ordinary and tempered plate glass.
8. Select facts about forcing swinging, sliding, revolving, and overhead doors.
9. Force doors of different types and mounts.
10. List methods of forcible entry in special circumstances.
11. Describe ways of gaining entry past fences.
12. Identify types of windows.
13. Select facts about forcing windows and screened and barred openings.
14. Force different types of windows.
15. Select facts about opening floors and walls.
16. Open a metal wall.
17. Open a wood floor.

**Lesson 9**     **After completing this lesson, you will be able to identify, carry, raise, climb, inspect, and maintain fire service ground ladders.**

Enabling     After reviewing materials and completing related activities, you will be able to —

1. Label the parts of a fire service ladder.
2. Identify types of fire service ground ladders.
3. Clean and inspect a ladder.
4. List ladder safety rules.
5. Select facts about selecting the proper ladder for the job.
6. Demonstrate ladder lifts and carries.
7. Select facts about ground ladder placement.
8. Secure a raised ladder.
9. Demonstrate ladder raises from various carries.
10. Properly climb and work from ground ladders, with and without a safety harness.
11. Assist conscious and unconscious victims down ground ladders.

**Lesson 10**     **After completing this lesson, you will be able to apply the principles of ventilation to appropriately ventilate a building.**

Enabling     After reviewing materials and completing related activities, you will be able to —

1. Define ventilation.
2. Match types of ventilation to their descriptions.
3. List advantages of ventilation for rescue, attack, fire control, and suppression operations.
4. Identify signs of potential backdraft.

5. List the primary ventilation method used to prevent backdraft.
6. Select and correct false statements about ventilation decisions.
7. List life safety hazards that can affect firefighters and rescue workers in unventilated buildings.
8. Select from a list building factors that aid the firefighter in determining whether to use vertical or horizontal ventilation.
9. List special considerations associated with high-rise buildings.
10. List special considerations associated with windowless buildings and basements.
11. Select from a list ways in which vertical fire extension occurs.
12. List factors that have a bearing on the location and size of a ventilation opening.
13. Select and correct false statements about safety precautions that should be observed when performing vertical ventilation.
14. Identify roof construction designs.
15. Identify existing roof openings.
16. Discuss the three basic types of roofs as they relate to ventilation operations.
17. Ventilate pitched and flat roofs.
18. Describe ways in which horizontal fire extension occurs.
19. List advantages and disadvantages of forced ventilation.
20. Demonstrate mechanical positive- and negative-pressure ventilation.
21. Demonstrate hydraulic ventilation.

**Lesson 11**    **After completing this lesson, you will be able to describe the fundamentals of a water supply system and will be able to connect a fire department pumper to various water sources.**

Enabling      After reviewing materials and completing related activities, you will be able to —

1. Match to their correct definitions terms associated with water supply.
2. List the four fundamental components of a modern water system.
3. Explain methods of moving water from municipal supply to distribution systems.
4. Explain the function of a processing or treatment facility and tell what the fire department's main concern is regarding these facilities.
5. Label the parts of a system.
6. State recommended system pipe sizes for residential, business and industrial, and long mains.
7. Identify types of water main valves.
8. List causes of friction loss in water mains.
9. Distinguish between wet-barrel and dry-barrel fire hydrants.
10. Fully open and close a hydrant.
11. Make soft-sleeve and hard-suction hydrant connections.
12. Provide examples of alternative static water supply sources.

13. Select facts about water shuttling and relay pumping.
14. Deploy a portable water tank.
15. Connect and place a hard-suction hose for drafting from a static water source.

**Lesson 12a After completing this lesson, the student will be able to couple, load, and roll hose.**

Enabling After reviewing materials and completing related activities, you will be able to —

1. Match terms associated with fire hose to their definitions.
2. Match pumper hose sizes and types as required by *NFPA 1901* to their correct applications.
3. Select the proper nozzle and hose for given fire attack situations.
4. Identify types of hose couplings.
5. Inspect hose couplings and replace a hose gasket.
6. List general guidelines for loading hose.
7. Identify hose loads and finishes.
8. Match hose loads to their advantages and disadvantages.
9. Load and unload hose.
10. Identify hose rolls.
11. Roll hose.

**Lesson 12b After completing this lesson, you will be able to make hydrant connections from various lays and will be able to carry, drag, advance, and handle both charged and uncharged hoselines.**

Enabling After reviewing materials on caring for hose and on laying, carrying, and advancing hose and completing related activities, you will be able to —

1. Distinguish among descriptions of hose lays.
2. List basic safety guidelines for laying hose.
3. List advantages and disadvantages of forward and reverse lays.
4. Make hydrant connections from forward and reverse lays.
5. Identify hose carries and drags.
6. Carry and drag hose.
7. List safety precautions for advancing lines to a fire.
8. Advance charged and uncharged lines.
9. Handle charged attack lines.
10. List methods of preventing mechanical, thermal, organic, and chemical hose damage.
11. Select facts about cleaning, inspecting, and storing hose.
12. Inspect, clean, and dry hose.

**Lesson 13**     **After completing this lesson, you will be able to identify and operate a given selection of nozzles and tips for water fire streams.**

Enabling     After reviewing materials and completing related activities, you will be able to —

1. Select facts about the properties and extinguishing capabilities of water.
2. List guidelines for reducing friction loss and preventing water hammer.
3. List discharge rates for low-volume, handline, and master streams.
4. Describe the advantages and disadvantages associated with handling solid and fog streams.
5. Select facts about water fire streams.
6. Identify types of nozzles.
7. Operate various fire hose nozzles.
8. Explain the operation of ball, slide, and rotary nozzle valves.
9. List areas to check when maintaining and cleaning nozzles.

**Lesson 14**     **After completing this lesson, you will be able to operate as part of a team to control and/or extinguish interior and exterior Class A fires and passenger vehicle and wildland fires.**

Enabling     After reviewing materials and completing activities, you will be able to —

1. Select facts about suppressing Class A (structural) fires.
2. Distinguish among direct, indirect, and combination attacks on Class A fires.
3. Select facts about deploying and operating a master stream device.
4. Deploy and operate a master stream device.
5. Select facts about Class C fire control.
6. List safety guidelines for electrical emergencies.
7. Select facts about Class D fire control.
8. Select facts about company tactics for fire control.
9. Control and/or extinguish a Class A fire within a structure.
10. List guidelines for controlling passenger vehicle fires.
11. Identify hazards associated with controlling passenger vehicle fires.
12. Attack a passenger vehicle fire.
13. Extinguish a fire in a trash container.
14. Select facts about fires and emergencies in confined spaces.
15. Select facts about wildland fires.
16. Label the parts of a wildland fire.
17. List standard fire orders for wildland fire fighting.
18. Analyze wildland fire scenarios.

**Lesson 15** After completing this lesson, you will be able to perform basic operations at properties protected by automatic sprinklers.

Enabling After reviewing materials and completing related activities, you will be able to —

1. Label the parts of a sprinkler head.
2. Identify automatic sprinkler head release mechanisms.
3. Describe pendant, upright, and sidewall sprinkler designs.
4. Manually stop the flow of water from a sprinkler head.
5. Identify the main control valve on an automatic sprinkler system.
6. Identify sprinkler system control valves.
7. Operate a sprinkler system control valve.
8. Select facts about a sprinkler system's fire department connection.
9. Connect hoseline to a sprinkler system FDC.

**Lesson 16-17** After completing this lesson, you will be able to safely and efficiently perform salvage and overhaul at a fire scene while protecting evidence for fire cause determination.

Enabling After reviewing materials and completing related activities, you will be able to —

- 16-1. List the benefits of loss control to the public and the fire department.
- 16-2. State the purpose of salvage.
- 16-3. State the purposes of overhaul.
- 16-4. Select facts about salvage planning and procedures.
- 16-5. Select facts about salvage tools, equipment, and materials.
- 16-6. Fold and roll salvage covers.
- 16-7. Spread salvage covers from various folds and rolls.
- 16-8. Clean, inspect, and repair salvage covers.
- 16-9. Construct and splice water chutes.
- 16-10. Construct a catchall.
- 16-11. Cover or close building openings.
- 16-12. Match to their correct uses tools and equipment used in overhaul.
- 16-13. Select facts about overhaul safety and methods.
- 16-14. List the four basic methods of detecting hidden fires.
- 16-15. Select from a list indicators of hidden fires.
- 16-16. Use an infrared scanner.
- 16-17. Pull a ceiling.
- 16-18. Remove debris and route water from a structure.
- 17-1. Provide examples of information that should be noted/reported en route or in the vicinity of the fire scene.

- 17-2. Provide examples of information that should be noted/reported on arrival at the fire scene.
- 17-3. Provide examples of information that should be noted/recorded during fire fighting.
- 17-4. Select facts about preserving and protecting evidence during overhaul.

**Lesson 18**     **After completing this lesson, you will be able to identify and properly use various fire service communications systems and equipment.**

Enabling     After reviewing materials and completing related activities, you will be able to —

1. Select facts about telecommunications center personnel.
2. Select facts about fire department telecommunications equipment.
3. Select from a list proper etiquette for receiving a nonemergency call.
4. List basic procedures for answering emergency calls.
5. Handle business calls and reports of emergencies.
6. Select facts about public alerting systems.
7. List procedures for reporting a fire/emergency.
8. List methods of alerting fire department personnel.
9. List guidelines for proper two-way radio use and etiquette.
10. Analyze and correct two-way radio transmissions.
11. Role play transmitting arrival and progress reports based on scenario information.
12. Select facts about tactical channels, emergency radio traffic, and evacuation signals.
13. Use prescribed fire department radio procedures.

**Lesson 19**     **After completing this lesson, you will be able to identify residential fire hazards, conduct a fire station tour and a residential fire safety survey, and make and document a fire and life safety presentation.**

Enabling     After reviewing materials and completing related activities, you will be able to —

1. Define the terms fire safety survey, fire safety inspection, pre-incident survey and residential fire safety survey.
2. List types of fuel hazards and heat source hazards.
3. Distinguish among common fire hazards, special fire hazards, personal hazards, and target hazards.
4. List the main objectives of a residential fire safety survey.
5. Select from a list guidelines for conducting a residential fire safety survey.
6. List the most common causes of residential fires.
7. State aspects to check for interior residential survey concerns.
8. State aspects to check for outside residential survey concerns.
9. Conduct a residential fire safety survey.

10. Explain the main parts of a fire and life safety presentation.
11. Select facts about fire and life safety presentation topics.
12. Make and document a fire and life safety presentation.
13. Select facts about fire station tour procedures.
14. Conduct and document a fire station tour.

**Lesson 20**     **After completing this lesson, the student will be able to implement and maintain an Incident Management System and transfer command.**

Enabling     After completing this lesson, students will be able to —

1. List questions that the first person arriving at an emergency should answer. (*NFPA 1001, 6.1.1.1*)
2. Determine the need for command. (*NFPA 1001, 6.1.1.2*)
3. List the priorities of an Incident Action Plan. (*NFPA 1001, 6.1.1.1*)
4. Organize and maintain an Incident Management System until command is transferred. (*NFPA 1001, 6.1.1.2*)
5. Select facts about the transfer of command. (*NFPA 1001, 6.1.1.1*)
6. List information that should be included in a situation status report.
7. Function within an assigned role in the Incident Management System. (*NFPA 1001, 6.1.1.2*)
8. List aspects of response resources that should be tracked.
9. Assume and transfer command within an Incident Management System. (*NFPA 1001, 6.1.1.1*)
10. State the purpose of incident termination.

**Lesson 21**     **After completing this lesson, the student will be able to identify the effects of fire and fire suppression activities on structures.**

Enabling     After completing this lesson, students will be able to —

1. Complete statements about the effects of fire and fire suppression activities on selected building materials. (*NFPA 1001, 6.3.2A*)
2. List signs of structural instability and potential building collapse. (*NFPA 1001, 6.3.2A*)
3. Describe ways in which fire suppression activities may create dangerous building conditions. (*NFPA 1001, 6.3.2A*)
4. Determine developing hazardous building or fire conditions. (*NFPA 1001:6.3.2B*)
5. List actions to take when imminent building collapse is suspected. (*NFPA 1001, 6.3.2*)

**Lesson 22**     **After completing this lesson, the student will be able to identify and safely use various rescue and extrication tools.**

Enabling     After completing this lesson, students will be able to —

1. Match facts about power plants to the equipment to which they apply. (*NFPA 1001,*

6.5.2B)

2. List the two types of lighting commonly used to support emergency operations.
3. Complete statements regarding the care and use of auxiliary electrical equipment. (*NFPA 1001, 6.5.2A*)
4. Describe guidelines for maintaining power plants and lighting equipment. (*NFPA 1001, 6.5.2A*)
5. Safely set up service lighting equipment. (*NFPA 1001, 6.5.2B*)
6. Service and maintain portable power plants and light equipment. (*NFPA 1001, , 6.5.2B*)
7. Identify rescue and extrication tools and equipment. (*NFPA 1001, 6.4.1B*)
8. Match hydraulic extrication and rescue tools to their purposes. (*NFPA 1001, 6.4.1B*)
9. List hydraulic tool safety guidelines. (*NFPA 1001, 6.4.1B*)
10. Use hydraulic rescue and extrication tools. (*NFPA 1001, 6.4.1B*)
11. Match manual jacks and cribbing to their purposes. (*NFPA 1001, 6.4.1B*)
12. List jacking and cribbing safety guidelines. (*NFPA 1001, 6.4.1B*)
13. Use manual jacks and cribbing. (*NFPA 1001, 6.4.1B*)
14. Match pneumatic rescue and extrication tools to their purposes. (*NFPA 1001, 6.4.1B*)
15. List pneumatic tool safety guidelines. (*NFPA 1001, 6.4.1B*)
16. Use a pneumatic chisel/hammer. (*NFPA 1001, 6.4.1B*)
17. List winch safety guidelines. (*NFPA 1001, 6.4.1B*)
18. Use a truck-mounted winch. (*NFPA 1001, 6.4.1B*)
19. Use a come-along. (*NFPA 1001, 6.4.1B*)
20. Complete air lifting bag safety guidelines. (*NFPA 1001, 6.4.1B*)
21. Use air lifting bag(s). (*NFPA 1001, 6.4.1B*)
22. Label the parts of a block and tackle. (*NFPA 1001, 6.4.1B*)
23. List block and tackle safety guidelines. (*NFPA 1001, 6.4.1B*)
24. Use a block and tackle. (*NFPA 1001, 6.4.1B*)
25. Use various power saws. (*NFPA 1001, 6.4.1B*)
26. Select correct tools for specific situations. (*NFPA 1001, 6.4.1B*)

**Lesson 23**     **After completing this lesson, the student will be able to test the operability of and flow from a fire hydrant.**

Enabling     After completing this lesson, students will be able to —

1. Match to their correct definitions terms associated with water flow and pressure. (*NFPA 1001, 6.5.4A*)
2. Select from a list conditions that reduce hydrant effectiveness. (*NFPA 1001, 6.5.4A*)
3. Measure and record hydrant flow pressures. (*NFPA 1001, 6.5.4b*)

**Lesson 24**    **After completing this lesson, the student will be able to identify and use hose tools and appliances and service test hose.**

Enabling    After completing this lesson, students will be able to —

1. Identify types of valves and valve devices. (*NFPA 1001, 6.3.2A*)
2. Match types of valves to their functions. (*NFPA 1001, 6.3.2A*)
3. Identify hose fitting appliances. (*NFPA 1001, 6.3.2A*)
4. Identify tools used with hose. (*NFPA 1001, 6.3.2A*)
5. Match hose appliances and tools to their uses in specific fireground situations. (*NFPA 1001, 6.3.2A*)
6. Select adapters and appliances for given fireground situations. (*NFPA 1001, 6.3.2a*)
7. Use hose tools and appliances. (*NFPA 1001, 6.3.1, 6.3.2, 6.3.3*)
8. Select facts about service testing hose. (*NFPA 1001, 6.5.3A*)
9. List safety guidelines for service testing hose. (*NFPA 1001, 6.5.3A*)
10. Service test hose. (*NFPA 1001, 6.5.3*)

**Lesson 25**    **After completing this lesson, the student will be able to mix foam concentrate and assemble and operate a foam fire stream system.**

Enabling    After completing this lesson, students will be able to —

1. Describe the basic methods by which foam prevents or controls a hazard. (*NFPA 1001, 6.3.1A*)
2. Classify flammable liquids as hydrocarbon or polar solvent fuels. (*NFPA 1001, 6.3.1A*)
3. Explain how foam is generated. (*NFPA 1001, 6.3.1A*)
4. Describe the components of foam production. (*NFPA 1001, 6.3.1A*)
5. List factors that affect foam expansion. (*NFPA 1001, 6.3.1A*)
6. Classify foams by their expansion ratios. (*NFPA 1001, 6.3.1A*)
7. Distinguish between characteristics of Class A and Class B foams. (*NFPA 1001, 6.3.1A*)
8. List factors that affect Class B foam application rates. (*NFPA 1001, 6.3.1A*)
9. Select facts about proportioning. (*NFPA 1001, 6.3.1A*)
10. Match methods of proportioning to their descriptions. (*NFPA 1001, 6.3.1A*)
11. Select facts about proportioners. (*NFPA 1001, 6.3.1A*)
12. Select foams for specific fire situations. (*NFPA 1001, 6.3.1b*)
13. Match types of handline foam nozzles to their uses. (*NFPA 1001, 6.3.1A*)
14. Select nozzles for specific fire situations. (*NFPA 1001, 6.3.1a*)
15. List reasons for poor foam generation. (*NFPA 1001, 6.3.1A*)
16. Match foam application methods to their uses. (*NFPA 1001, 6.3.1A*)
17. List types of hazards associated with foam use. (*NFPA 1001, 6.3.1A*)

18. Install an in-line foam eductor and operate a high-expansion foam generator. (*NFPA 1001, 6.3.1b*)

**Lesson 26**     **After completing this lesson, the student will be able to operate as part of a team to coordinate an interior attack and to control and/or extinguish ignitable liquid fires and flammable gas cylinder fires.**

Enabling     After completing this lesson, students will be able to —

1. Distinguish between flammable liquids and combustible liquids.
2. Select facts about suppressing Class B fires. (*NFPA 1001, 6.3.3A*)
3. Describe signs and effects of BLEVE. (*NFPA 1001, 6.3.3A*)
4. List the four ways that water can be used to attack a Class B fire. (*NFPA 1001, 6.3.3A*)
5. List methods of identifying tank contents. (*NFPA 1001, 6.3.3A*)
6. Select facts about techniques for suppressing bulk transport vehicle fires. (*NFPA 1001, 6.3.3A*)
7. Use water to control an ignitable liquid fire in an open pan.
8. Distinguish between the characteristics of natural gas and liquid petroleum gas.
9. Control and/or extinguish a flammable gas cylinder fire. (*NFPA 1001, 6.3.3*)
10. Determine actions to take, including retreat, when dealing with specific Class B fire conditions. (*NFPA 1001, 6.3.3a*)

**Lesson 27**     **After completing this lesson, the student will be able to discuss the operation of typical automatic fire detection and suppression systems. The student will also be able to identify the components of typical automatic sprinkler systems and to inspect those systems.**

Enabling     After completing this lesson, students will be able to —

1. Match types of alarm-initiating devices to their descriptions. (*NFPA 1001, 6.5.1A*)
2. Select facts about heat detectors. (*NFPA 1001, 6.5.1A*)
3. Select facts about smoke detectors. (*NFPA 1001, 6.5.1A*)
4. Complete statements about flame detectors. (*NFPA 1001, 6.5.1A*)
5. Complete statements about fire-gas detectors. (*NFPA 1001, 6.5.1A*)
6. State the reason for having a variety of alarm-indicating devices. (*NFPA 1001, 6.5.1A*)
7. Match types of automatic alarm systems to their descriptions. (*NFPA 1001, 6.5.1A*)
8. Select facts about supervising fire alarm systems. (*NFPA 1001, 6.5.1A*)
9. List auxiliary services provided by fire detection and alarm systems. (*NFPA 1001, 6.5.1A*)
10. Complete statements about water flow alarms. (*NFPA 1001, 6.5.1A*)
11. Match sprinkler system applications to their descriptions. (*NFPA 1001, 6.5.1A*)
12. Identify components of fire suppression systems. (*NFPA 1001, 6.5.1A*)
13. Inspect protected property fire suppression systems. (*NFPA 1001, 6.5.1*)

**Lesson 28**     **After completing this lesson, the student will be able to identify his or her responsibilities in fire cause determination and protect evidence of fire cause and origin.**

Enabling     After completing this lesson, students will be able to —

1. List responsibilities of a fire investigator. (*NFPA 1001, 6.3.4A*)
2. Select facts about conduct and statements at the scene. (*NFPA 1001, 6.3.4A*)
3. Select facts about securing the scene and legal considerations. (*NFPA 1001, 6.3.4A*)
4. Select facts about protecting and preserving evidence. (*NFPA 1001, 6.3.4A*)
5. Protect evidence of fire cause and origin. (*NFPA 1001 6.3.4*)
6. Assess the origins and causes of fires. (*NFPA 1001, 6.3.4B*)

**Lesson 29**     **After completing this lesson, the student will be able to complete a basic incident report and communicate the need for team assistance.**

Enabling     After completing this lesson, students will be able to —

1. Select facts about making calls for additional response. (*NFPA 1001, 6.2.2*)
2. List information that should be included in incident reports. (*NFPA 1001, 6.2.1A*)
3. Identify appropriate incident report codes. (*NFPA 1001, 6.2.1A*)
4. Proofread incident reports. (*NFPA 1001, 6.2.1B*)
5. Create incident reports using department equipment. (*NFPA 1001, 6.2.1B*)

**Lesson 30**     **After completing this lesson, the student will be able to conduct a pre-incident survey, working as a member of a team.**

Enabling     After completing this lesson, students will be able to —

1. Provide examples of personal traits and skills required of personnel who conduct fire safety surveys.
2. Provide examples of the type of equipment required to conduct fire safety surveys.
3. List goals of pre-incident surveys. (*NFPA 1001, 6.5.1A*)
4. Provide examples of the types of information that a pre-incident survey can provide. (*NFPA 1001, 6.5.1A*)
5. Match standard map symbols to their correct meanings. (*NFPA 1001, 6.5.1A*)
6. Make field sketch and report drawings. (*NFPA 1001, 6.5.1B*)
7. List objectives of the exit interview during a pre-incident survey. (*NFPA 1001, 6.5.1A*).
8. Perform a pre incident survey and complete related documentation (*NFPA 1001, 6.5.1B*)