Private Fire Protection Systems I

Title: Master Syllabus
Date: October 20, 2016

Course Title	Private Fire Protection Systems I
Course Number	FFP1540, BFST1540, ATPC1540
Prerequisite(s)	None
Revision Date	October 20, 2016
College Credit Recommendation	This course has a college recommendation of 3 credits.
Continuing Education Units (CEU's)	40 CEUs for Firesafety Inspector renewal.
Class Days/Time	Monday – Friday 8:00 a.m. – 5:00 p.m.
Instructional Supervisor	Name: Dr. Barbara Klingensmith Email: Barbara.Klingensmith@myfloridacfo.com
Program Specialist Contact Info	Name: Mike Swartz Email: Mike.Swartz@myfloridacfo.com
Class Location	Room 105
Course Description	This is a study of Private Fire Protection and Detection Systems such as sprinkler and standpipe systems, chemical extinguishing systems, and detection systems and devices. Each system is discussed as to its need, construction, preventative maintenance and individual uses.
Student Learning Outcomes	After the successful completion of this course, the student will be able to do the following: 1. Understand fire behavior and its relationship to detection and extinguishment. 2. Describe the development of codes and their relationship to fire protection. 3. Identify the water supply components of a fire protection system. 4. Describe the components and codes relating to standpipes and related hose systems. 5. Describe the components and codes relating to automatic fire sprinkler systems. 6. Describe the components and codes relating to specialized water based fire protection systems. 7. Recognize fire alarm system components and their functions. 8. Identify the requirements for various types of alarm and detection systems. 9. Compare and contrast the components of wet and dry chemical extinguishing systems. 10. Describe gaseous agent extinguishing systems.

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<tr><td></td><td>11. Describe the various types of portable extinguishers and their uses and operation.
12. Explain the purpose of smoke control and management systems as it relates to life safety.
13. Describe the relationship between property security, emergency response, and fire protection systems.
14. Discuss new technologies in the field of protection systems.</td></tr>
<tr><td>Required Textbook</td><td>Fire Protection Systems; 2nd Edition, A Maurice Jones Jr.</td></tr>
<tr><td>Required Materials</td><td>None.</td></tr>
<tr><td>Method of Instruction</td><td>Classroom</td></tr>
<tr><td>Grading</td><td>Passing 70%</td></tr>
<tr><td>Certification(s)</td><td>One of eight required courses for Fire Officer I certification and one of five required courses for Firesafety Inspector I certification.</td></tr>
<tr><td>Attendance Policy</td><td>You are required to attend all sessions of the course and complete all pre-course assignments. Failure to appear in class for a scheduled activity will be considered an absence. Students are allowed to miss 10% of the class and still receive credit. There are no makeup sessions.</td></tr>
<tr><td>Academic Integrity</td><td>Academic integrity is crucial to the learning community and indicates respect for the college, the instructor, the course, your classmates and yourself. Any violation of this trust, including but not limited to cheating, plagiarism, collusion, or using or having any content of an un-administered test, will result in immediate dismissal from the course. Under Florida Statute 633, any student dismissed for academic dishonesty can be refused acceptance for any course administered by FSFC.

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<tr><td>Qualification Description</td><td>FIRESAFETY INSPECTOR 1</td></tr>
<tr><td>Training Provider Message</td><td>You must be certified by the State of Florida as an Instructor I, II, or III, or a State of Florida recognized Fire Department, or hold a certification as a Single Course Exemption Instructor. Applications can be made through the Bureau of Fire Standards and Training. Organization Providers are Schools, Government Entities, and Businesses that need to apply and be approved by the Florida State Fire College.</td></tr>
<tr><td>Instructor Message</td><td>You may teach courses for this type of Certification or Competency only if you hold the certification, and the appropriate disciplines.</td></tr>
<tr><td>Pre-Certification Message</td><td>To be certified as a Firesafety Inspector I in the State of Florida, an individual must; never have been convicted of felony, successfully complete 200 hours of basic certification training for firesafety inspectors, or</td></tr>
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		have received equivalent training in another state, and pass a state written examination. To apply for this certification, login as a student, click on Apply, select certification exam and follow the process to submission. Supporting documentation may be scanned and attached or faxed to 352-732-1374. When faxing, note "on-line application" on the fax along with a contact phone number. You will need to have your fingerprints digitally taken and submitted. Directions on how to do this are on the home page. NOTE*** WHEN YOU ARE APPROVED TO TEST OR IF ADDITIONAL INFORMATION IS REQUIRED, A MESSAGE WILL BE SENT TO YOUR INBOX. PLEASE CHECK YOUR INBOX ON A REGULAR BASIS.
	Renewal Message	You must complete 54 hours of continuing education within your 4 year time frame. You may opt to take the examination in place of the 54 hours as indicated on your renewal application. In the event that the applicant for renewal fails the examination he/she shall be required to repeat the Firesafety Inspector Training Program, per FAC 69A-39.009. When taking a state exam, please ensure that your personal profile matches the identification that you plan to produce at Pearsonvue.
	NFPA Subject and Level	Fire Safety Inspector I/II
Students with Disabilities	Any student who has a permanent or temporary disability that may require a reasonable accommodation to participate in the course must present documentation of the disability and requested accommodation no later than the beginning of the course.	
Emergency Evacuation Policy	Occupants of buildings on the Florida State Fire College campus are required to evacuate and assemble outside when a fire alarm is activated or an announcement is made. Please be aware of the following policies regarding evacuation. • Familiarize yourself with all exit doors of the classroom and the building. • Remember that the nearest exit door may not be the one you used when you entered the building. • If you require assistance to evacuate, inform the instructor on the first day of class. • In the event of an evacuation, follow the guidance of the instructor. • Do not re-enter a building unless you are given instructions by	

	Florida State Fire College personnel to do so.
Requesting Emergency Care	Any request for emergency care should be initiated by calling "911" from any phone on campus of the Florida State Fire College. Phones are located in each classroom. Additionally, in the event of any emergency, immediately contact an instructor or staff member.
Critical Event Procedures	**Severe Weather –** there is a lightning detection system on campus which has an audible 15 second blast of an air horn. If you are outside, please follow your instructor or move to the closest permanent building. Once the threat is over, there will be three 5 second blasts of the signal. **Security –** During the daytime, security is handled by full time faculty and staff. There are security guards on duty in the evenings and weekends. Please comply with the requests made of security officers. Failure to do so can result in removal from campus. **Student Badges –** You will be issued a badge to be worn anytime you are on campus.
Enabling Objectives	Given information from discussion and reading materials, the student will perform the following objectives to a written test accuracy of at least 70% and meet the applicable job performance requirements of NFPA 1021 (2009) and NFPA 1031 (2009). **<u>Basics of Fire Behavior</u>** 1. Define, identify, describe and understand the difference between fire and combustion. 2. Define, identify, describe and understand the fire triangle and fire tetrahedron. 3. Define, identify, describe and understand the classes of fire and their relationship to extinguishing agents. 4. Define, identify, describe and understand the different types of fire. 5. Define, identify, describe and understand the different stages of fire. 6. Define, identify, describe and understand methods of heat transfer. 7. Define, identify, describe and understand methods used to extinguish fires. 8. Define, identify, describe and understand the aspects of fire behavior as they relate to the fire protection systems. 9. Define, identify, describe and understand the concept of heating at the molecular level. 10. Define, identify, describe and understand the concept of flame spread and complications associated with flashover. 11. Define, identify, describe and understand various heat sources capable of being a source of ignition. 12. Define, identify, describe and understand the concept of spontaneous

	ignition and where it can and cannot occur. **Fire Protection Systems and the Model Code Process** 1. Define, identify, describe and understand most important conditions determining the installation requirements for fire protection systems. 2. Define code and model code. 3. Name the two most prominent model code organizations. 4. Describe the NFPA model code development process. 5. Define, identify, describe and understand referenced standard and code amendment. 6. Describe the advantages to governments and organizations that adopt model codes. 7. Describe the laws addressing fire protection systems as defined in Florida Statues. 8. Describe the administrative code requirements as defined by the Florida Fire Marshal's Rules **WATER-BASED FIRE PROTECTION SYSTEMS (SECTION 2)** **Water Supply** 1. Define, identify, describe and understand the extinguishing properties of water. 2. Define, identify, describe and understand advantages and disadvantages of water as an extinguishing agent. 3. Reference the design and installation requirements and standards that apply water supply. 4. Define, identify, describe and understand the terms pressure, flow, and duration as they relate to the movement of water. 5. Define, identify, describe and understand the different types of pressures: atmospheric, gauge, head, normal operating, residual, static, and velocity (flow). 6. Define, identify, describe and understand the principles or laws of pressure, friction loss and discuss how it affects water flow. 7. Discuss conditions or factors that affect friction loss. 8. Describe the components of a water supply and distribution network.\ 9. Discuss the difference between a municipal/public water system and private water system. 10. Define, identify, describe and understand how gravity, pumped, and combined supply systems operate. 11. Define, identify, describe and understand the components of a water distribution system. 12. Define, identify, describe and understand fire hydrant location, distribution and flow and the methods to test. 13. Define, identify, describe and understand private water supply systems. 14. Define, identify, describe and understand water flow requirements for

	and building. 15. Define, identify, describe and understand water flow requirements for a sprinkler system/ **Fire Pumps** 1. Define, identify, describe and understand the types of fire pumps. 2. Define, identify, describe and understand the types of fire pump drivers. 3. Define, identify, describe and understand the types of pump controllers. 4. Reference the design and installation requirements and standards that apply to fire pumps. 5. Define, identify, describe and understand the components and accessories of a fire pumps. 6. Define, identify, describe and understand the types of pipes and fittings used with a fire pumps. 7. Define, identify, describe and understand the arrangement of components for installation of a fire pump. 8. Define, identify, describe and understand the functions of pressure relief valves. 9. Describe the method and procedures used to test and rate a fire pump. 10. Define, identify, describe and understand churn, rated performance, and peak performance/ 11. Describe proper inspection, maintenance and testing methods required by code for fire pump. 12. Define, identify, describe and understand the documentation, reports/records that should be maintained concerning fire pumps. 13. List and discuss the characteristics of the two types of NFPA-approved stationary fire pumps **Standpipe and Hose Systems** 1. State when and where standpipes and hose systems are required in buildings. 2. Define, identify, describe and understand the consideration for standpipes, sprinkler systems, and hose-lines. 3. Reference the design and installation requirements and standards that apply to standpipes. 4. Define, identify, describe and understand the different types of standpipes. 5. Describe the classification and use of a standpipe system. 6. Define, identify, describe and understand water flow requirements for a standpipe system. 7. Define, identify, describe and understand the components of a standpipe system.

	8. Define, identify, describe and understand the function of the FDC. 9. Define, identify, describe and understand the water pressure considerations for standpipes in high-rise buildings. 10. Recognize the possible impairments to standpipe systems. 11. Describe proper inspection, maintenance and testing methods required by code for standpipe and hose systems. 12. Define, identify, describe and understand the documentation, reports/records, that should be maintained concerning standpipe and hose systems. **Automatic Fire Sprinkler Systems** 1. Define, identify, describe and understand reasons why sprinkler systems should be installed. 2. Reference the design and installation requirements and standards that apply to sprinkler systems . 3. Define, identify, describe and understand the components of a sprinkler system. 4. Define, identify, describe and understand the function and types of heat sensitive devices. 5. Define, identify, describe and understand the affect of temperature ratings on sprinkler performance. 6. Define, identify, describe and understand the affect of sprinkler system design to control the fire. 7. Define, identify, describe and understand the application, function and theory of the Early-Suppression Fast-Response (EFSR) sprinkler. 8. Define, identify, describe and understand special considerations that are applicable in storage occupancies. 9. Define, identify, describe and understand classes of commodities and associated characteristics. 10. Define, identify, describe and understand basic piping layouts, including the differences between pipe schedule and hydraulic design. 11. Define, identify, describe and understand water supply systems for sprinkler systems/ 12. Define, identify, describe and understand the use and function of sprinkler system risers. 13. Define, identify, describe and understand sprinkler system control valves. 14. Define, identify, describe and understand sprinkler system check valves. 15, Define, identify, describe and understand backflow prevention. 16. Define, identify, describe and understand the function of the FDC. 17. Define, identify, describe and understand the four types of sprinkler systems and principle operation of each. 18. Define, identify, describe, and understand water flow alarm

components and systems.

19. Define, identify, describe and understand special considerations that are applicable to dry-pipe sprinkler systems
20. Define, identify, describe and understand the operation and purpose of quick-opening devices.
21. Define, identify, describe and understand special considerations that are applicable to deluge sprinkler systems.
22. Define, identify, describe and understand special considerations that are applicable to pre-action sprinkler systems.
23. Describe proper inspection, maintenance and testing methods required by code for sprinkler systems.
24. Define, identify, describe and understand the documentation, reports/records that should be maintained concerning sprinkler systems.
25. Identify and describe the characteristics of "NFPA 13, 13-R and 13 D" sprinkler systems and the different applications.

Specialized Water-Based Fire Protection

1. Reference the design and installation requirements and standards that apply water spray or mist fire protection systems.
2. State reasons to install other types of water-based fire protection systems instead of standard automatic fire sprinkler systems.
3. Discuss the characteristics and applications for water spray fixed systems.
4. Discuss the characteristics and applications for water mist systems.
5. Recognize the possible impairments to special water-based fire protection systems.
6. Describe proper inspection, maintenance and testing methods required by code for water spray or mist systems.
7. Define, identify, describe and understand the documentation, reports/records, that should be maintained concerning water spray or mist systems.

Foam

1. Define, identify, describe and understand types of foams.
2. Discuss the characteristics and applications for fixed foam systems reference the design and installation requirements and standards that apply to foam systems.
3. Discuss the characteristics and applications for foam-water sprinkler and foam-water spray systems Identify and describe the operation of foam systems.
4. Define, identify, describe and understand the application, indented use and design considerations associated with foam systems.
5. Define, identify, describe and understand safety considerations associated with foam systems.

	6. Define, identify, describe and understand foam concentrate, foam solution, and finished foam. 7. Define, identify, describe and understand foam proportioning systems including the venture principle. 8. Define, identify, describe and understand foam nozzles and appliances. 9. Describe proper inspection, maintenance and testing methods required by code for foam systems. 10. Define, identify, describe and understand the documentation, reports/records, which should be maintained concerning foam systems. **FIRE ALARM AND DETECTION SYSTEMS (SECTION 3)** **Fire Alarm and Detection Systems** 1. Define, identify, describe and understand a fire alarm system. 2. Reference the design and installation requirements and standards that apply to fire alarm systems. 3. Explain functions fire alarm systems provide. 4. Define, identify, describe and understand types of fire alarm signals. 5. Define, identify, describe and understand the functions of a fire alarm control panel and annunciation panel. 6. Identify the different components that make up a fire alarm system 7. Define, identify, describe and understand devices that interface with a fire alarm system to supervise the condition of fire protection systems 8. List and discuss the different conditions, situations, and circumstances used to determine manual fire alarm and detection system installation requirements 9. Define, identify, describe and understand the characteristics of conventional fire alarm system technology 10. Define, identify, describe and understand the characteristics of addressable fire alarm system technology 11. Define, identify, describe and understand the characteristics of Emergency Voice Alarm Communications systems 12. Define, identify, describe and understand the characteristics of residential smoke alarm systems 13. Define, identify, describe and understand the different fire alarm system classifications 14. Define, identify, describe and understand basic components of fire alarm and detection systems 15. Define, identify, describe and understand the types and test methods for fire alarm and detection systems power supplies 16. Define, identify, describe and understand fire alarm and detection systems initiating devices 17. Define, identify, describe and understand type and operation of signaling systems for fire alarm and detection equipment. 18. Identify and describe factors that determine the types of fire alarm and

detection systems that should be used in different occupancies.

19. Define, identify, describe and understand the characteristics of high-rise buildings fire alarm systems.
20. Define, identify, describe and understand the operation of voice fire alarm systems.
21. Define, identify, describe and understand the operation of manual fire alarm initiating devices.
22. Define, identify, describe and understand the operation of automatic fire alarm initiating devices.
23. Define, identify, describe and understand the operating principles of smoke, heat, combustion gas, flame and combination detectors.
24. Describe proper inspection, maintenance and testing methods required by code for fire alarm and detection systems.
25. Define, identify, describe and understand the documentation, reports/records, that should be maintained concerning fire alarm and detection systems.

FIRE SUPPRESSION SYSTEMS AND AGENTS (SECTION 4)

Wet and Dry Chemical Extinguishing Systems

1. Describe the characteristics and types of wet and dry chemical systems.
2. Reference the design and installation requirements and standards that apply wet and dry chemical extinguishing systems.
3. Discuss the most likely hazards wet and dry chemical systems protect.
4. Define, identify, describe and understand pre-engineered system.
5. Define, identify, describe and understand types of specialized extinguishing (wet, dry chemical, dry powder and gaseous) agent systems.
6. Describe the operation of wet and dry chemical extinguishing agent systems.
7. Discuss the events that lead to the standardization of UL300.
8. Define, identify, describe and understand the major components that make up wet and dry chemical systems.
9. Define, identify, describe and understand how wet and dry chemical agents control and extinguish fire.
10. Describe proper inspection, maintenance and testing methods required by code for wet and dry chemical agent systems.
11. Identify and describe the documentation, reports/records, that should be maintained concerning wet and dry chemical extinguishing agent systems,

Gaseous and Clean Agent Extinguishing Systems

1. Define, identify, describe and understand the physical characteristics of carbon dioxide.
2. Define, identify, describe and understand the application methods of delivery for carbon dioxide.

	3. Explain the reason for and the impact of the Montreal Protocol. 4. Define, identify, describe and understand the physical characteristics of halogenated hydrocarbons (halons). 5. Explain the halon numbering identification system. 6. Define, identify, describe and understand the physical characteristics of halocarbons and inert gases (clean agents). 7. Name the two categories of clean agents. 8. Define, identify, describe and understand types of gaseous and clean agent extinguishing systems. 9. Define, identify, describe and understand the operation of gaseous and clean agent extinguishing systems. 10. Define, identify, describe and understand the application, indented use and design considerations associated with gaseous and clean agent extinguishing systems. 11. Define, identify, describe and understand safety considerations associated with each specialized extinguishing agent systems gaseous and clean agent extinguishing systems. 12. Describe proper inspection, maintenance and testing methods required by code for gaseous and clean agent extinguishing systems. 13. Identify and describe the documentation, reports/records, that should be maintained concerning gaseous and clean agent extinguishing systems. **Portable Fire Extinguishers** 1. Discuss the fire extinguisher classification system. 2. Reference the design and installation requirements and standards that apply portable fire extinguishers. 3. Discuss the fire extinguisher rating system for each classification of portable fire extinguishers. 4. Explain why a certain extinguisher classification requires a conductivity test. 5. Explain the acronym PASS in relation to fire extinguisher operation. 6. Define, identify, describe and understand the different types of fire extinguishers and their operation. 7. Define, identify, describe and understand the different extinguishing agents and their applications. 8. Define, identify, describe and understand portable fire extinguisher symbols and ratings 9. Describe the types of fire extinguishing agents. 10. Define, identify, describe and understand the test methods used to rate portable fire extinguishers. 11. Define, identify, describe and understand advantages and disadvantages of extinguishing agents. 12. Define, identify, describe and understand hazards associated with

certain extinguishing agents.
13. Define, identify, describe, understand and demonstrate proper operating principles of fire extinguishers.
14. Determine the selection and distribution of fire extinguishers.
15. Define, identify, describe and understand the component of a portable fire extinguisher.
16. Describe proper inspection, maintenance and testing methods required by code for portable fire extinguishers.

CONTROL AND MANAGEMENT SYSTEMS, PROPERTY SECURITY, AND FIRE PROTECTION SYSTEMS / EMERGING TECHNOLOGIES (SECTION 5)

Smoke Control and Management Systems

1. Define smoke control and smoke management.
2. Reference the design and installation requirements and standards that apply smoke control.
3. State the design goals for smoke control and smoke management systems.
4. Define, identify, describe and understand general methods used to control smoke movement.
5. Define, identify, describe and understand pressure differential methods used to control smoke.
6. Define, identify, describe and understand design requirements or operational characteristics of smoke control systems.
7. List the different life safety and fire protection systems that interface with smoke control systems and describe how they interact.
8. Discuss the importance of the acceptance testing and annual retesting processes for smoke control systems.

Property Security, Emergency Response, and Fire Protection Systems

1. List the three components to the means of egress.
2. List and describe the override requirements for exit stairway doors in high-rise buildings.
3. List and describe the requirements for delayed egress locks.
4. List and describe the requirements for access controlled egress doors.
5. Define, identify, describe and understand the purpose of an emergency building entrance system.
6. Define, identify, describe and understand what is typically inside an emergency building entrance system.
7. List and describe the different methods of property access through security gates and vehicle barriers.

Emerging Technologies

1. Define the terms interoperability and building information modeling.
2. Discuss the applications for computer fire modeling and performance-based design.

	3. Explain the concept behind the use of video cameras as fire detectors. 4. Discuss the purpose of mass notification systems. 5. Define, identify, describe and understand the characteristics of a multipurpose piping system. 6. Define, identify, describe and understand the characteristics of compressed-air foam fixed fire suppression systems. 7. Define, identify, describe and understand the characteristics of aerosol fire suppression systems.