Private Fire Protection Systems I

Title: Master Syllabus
Date: October 2017

Course Title	Private Fire Protection Systems I
Course Number	FFP1540, BFST1540, ATPC1540
Prerequisite(s)	None
Revision Date	October, 2017
College Credit Recommendation/Contact hours	This course has a college recommendation of 3 credits.
Continuing Education Units (CEU's)	45 CEUs for Firesafety Inspector renewal.
Class Days/Time	If on the Fire College Campus - 8:00am to 5:00pm with 5 additional hours of out of class work may be required.
Instructional Supervisor ***Program Specialist Contact Info***	Name: Francis J. Ennist Email: frank.ennist@myfloridacfo.com
Instructor Qualifications	69A-37.065(3) Firesafety Inspector I - (a) Instructor Qualification: An Instructor I must hold certification as a Firesafety Inspector I. (b) Instructor II or III may teach Provided he or she has successfully completed the course. Firesafety Inspector II (a) Instructor must hold a certificate of competency as a Fire Safety Inspector II (b) Instructor II or III may teach provided he or she has successfully completed the course.
(c) Class Location	Florida State Fire College
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. 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.
Textbook used by BFST	*Fire Protection Systems; 2nd Edition, A Maurice Jones Jr.*
Required Materials	None.
Method of Instruction	Classroom
Grading	Passing 70%
Certification(s)	One of eight required courses for Fire Officer I certification and one of five required courses for Firesafety Inspector I certification.
Attendance Policy	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 unless you make arrangements with the instructor for a make-up session. Failure to make up missed sessions prior to the next session will result in an absence. Students are allowed to miss 10% of the class and still receive credit
Academic Integrity	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.
	Qualification Description: FIRESAFETY INSPECTOR 1
	Training Provider Message: 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.
	Instructor Message: You may teach courses for this type of Certification or Competency only if you hold the certification, and the appropriate disciplines.
	Pre-Certification Message: 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 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 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	Emergency procedures for the institution or training facility should be followed. If on the Florida State Fire College campus, the occupants of the buildings on 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	Emergency procedures for the institution or training facility should be followed. If on the Florida State Fire College campus, 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	Emergency procedures for the institution or training facility should be followed. If on the Florida State Fire College campus: **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.

	13. Define BTU rates. **<u>Fire Protection Systems and the Model Code Process</u>** 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. 9. Describe the different types of licensing for fire protection and alarm contractors as regulated by the SFMO and DBPR. 10. Describe the requirements of FAC 61G. 11. Describe the role of engineers and architects in fire protection systems and design. 12. Briefly discuss the differences between adopted codes throughout the United States of America and how it affects plan submittal by architects. **<u>WATER-BASED FIRE PRTECTION SYSTEMS (Section 2)</u>** **<u>Water Supply</u>** 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/ **<u>Fire Pumps</u>** 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 14. Understand why fire pumps are typically required for fire sprinkler systems and stand pipes. **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. Understand the difference between a automatic, dry, and manual wet standpipe system. 6. Describe the classification and use of a standpipe system. 7. Define, identify, describe, and understand water flow requirements for standpipe systems. 8. Understand how hydraulic calculations are conducted and reviewed on standpipe systems. 9. Define, identify, describe, and understand the components of a standpipe system. 10. Define, identify, describe, and understand the function of the FDC. 11. Define, identify, describe, and understand the water pressure considerations for standpipes in high-rise buildings. 12. Recognize the possible impairments to standpipe systems. 13. Describe proper inspection, maintenance and testing methods required by code for standpipe and hose systems. 14. Define, identify, describe, and understand the documentation, reports/records, that should be maintained concerning standpipe and hose systems. 15. Discuss Pressure Reducing Valves (PRV) and their advantages and disadvantages. **<u>Automatic Fire Sprinkler Systems</u>** 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. Understand how available water supply impacts the design of a fire sprinkler system. 4. Define, identify, describe, and understand the components of sprinkler systems. 5. Define, identify, describe, and understand the function and types of heat sensitive devices. 6. Define, identify, describe, and understand the affect of temperature ratings on sprinkler performance. 7. Define, identify, describe, and understand the affect of sprinkler system design to control the fire. 8. Define, identify, describe, and understand the application, function and theory of the Early-Suppression Fast-Response (EFSR) sprinkler. 9. Define, identify, describe, and understand special considerations that are applicable in storage occupancies. 10. Define, identify, describe, and understand classes of commodities and associated characteristics. 11. Define, identify, describe, and understand basic piping layouts, including the differences between pipe schedule and hydraulic design. 12. Understand hydraulic calculation for a fire sprinkler system designs and identify the major items to check when reviewing the hydraulic calculations submittal. 13. Define, identify, describe, and understand water supply systems for sprinkler systems 14. Define, identify, describe, and understand the use and function of sprinkler system risers. 15. Define, identify, describe, and understand sprinkler system control valves. 16. Define, identify, describe, and understand sprinkler system check valves. 17. Define, identify, describe, and understand backflow prevention and code requirements for backflow prevention. 18. Define, identify, describe, and understand the function of the FDC. 19. Define, identify, describe, and understand the four types of sprinkler systems and principle operation of each. 20. Define, identify, describe, and understand water flow alarm components and systems. 21. Define, identify, describe, and understand special considerations

	that are applicable to dry-pipe sprinkler systems 22. Define, identify, describe, and understand the operation and purpose of quick-opening devices. 23. Define, identify, describe, and understand special considerations that are applicable to deluge sprinkler systems. 24. Define, identify, describe, and understand special considerations that are applicable to pre-action sprinkler systems. 25. Describe proper inspection, maintenance and testing methods required by code for sprinkler systems. 26. Define, identify, describe, and understand the documentation, reports/records that should be maintained concerning sprinkler systems. 27. Identify and describe the characteristics of "NFPA 13, 13-R and 13 D" sprinkler systems and the different applications. 28. Understand the different design options for the water supply for a NFPA 13D system and the impact of water meters and backflow protection. 29. Conduct a basic plan review on a NFPA 13, NFPA 13R, and NFPA 13D fire sprinkler system. **<u>Specialized Water-Based Fire Protection</u>** 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. **<u>Foam</u>** 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. 26. Understand the different requirements in NFPA 72 for offsite transmission of alarms. 27. Understand the various communications technologies and code requirements that are applicable to transmission of signals to remote or central stations. 28. Understand various methods to reduce nuisance alarms. 29. Understand the importance of asking for a Fire Alarm System

	Agent (FASA) identification card on an inspection. 30. Understand how to report an unlicensed Fire Alarm Contractor. 31. Know how to search DBPR database for ECLB current license. **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. 8. Discuss in-building radio communication systems and the various Options to deal with in-building radio communications deficiencies.