



DEPARTMENT OF FINANCIAL SERVICES

Division of State Fire Marshal
Bureau of Fire Standards & Training

Fire Investigation: Origin and Cause

Title: Master Syllabus

Date: October 19, 2016

Course Title	Fire Investigation: Origin and Cause
Course Number	FFP2610, BFST2610, ATPC2610
Prerequisite(s)	None
Revision Date	November 17, 2016
College Credit Recommendation	This course has a college recommendation of 3 credits.
Continuing Education Units (CEU's)	40 hours towards Fire Inspector renewal.
Class Days/Time	Monday – Friday 8:00 a.m. – 5:00 p.m.
Instructional Supervisor	Name: Barbara Klingensmith Email: Barbara.Klingensmith@myfloridacfo.com
Program Specialist	Name: Karl Morgan Email: Karl.morgan@myfloridacfo.com
Class Location	Florida State Fire College
Course Description	<p>The curriculum in this course is designed to Provide the foundation of the investigation of fires. It will assist in the determination of the origin and cause of a fire.</p> <p>Specific topics include fire behavior review, investigator ethics, construction, ignition sources, fire patterns and scene reconstruction. Special topics include electrical fire investigation, woodland fires, vehicle fires, mobile home fires, RV & boat & ship fires. Additional topics include special emphasis on fire scene documentation and photography. This course follows the requirements for qualifications as a fire investigator as set for in the NFPA 1033 Standards for Professional Qualifications for Fire Investigators.</p>
Student Learning Outcomes	<p>After the successful completion of this course, the student will be able to do the following:</p> <ol style="list-style-type: none">1. Define origin and cause and explain the purpose of an origin and cause investigation.2. Describe a systematic approach to investigating a fire and explain how the scientific method applies to investigation.3. Understand legal and liability issues with regard to fire scene investigations.4. Explain the elements of a fire investigation that becomes a criminal

	<p>investigation.</p> <ol style="list-style-type: none"> 5. Demonstrate appropriate safety measures at a fire scene. 6. Describe the basic principles involved in the determination of an area or point of origin. 7. Describe the basic principles involved in the determination of the cause of a fire. 8. Identify sources of information available to the origin and cause investigator. 9. Describe the Accelerant Detection Canine Team and their application to the investigation of fires. 10. Apply the principles of placing the human being in the chain of events in a fire. 11. Explain the impact of weather on a fire investigation. 12. Describe the requirements to document a fire scene. 13. Describe the importance and techniques involved in fire scene photography. 14. Describe the basic tenets and objectives of a fire scene sketch. 15. Explain procedures for evidence handling, collection and spoliation. 16. Describe qualifying terminology in detailing an accurate written depiction of the fire scene. 17. Apply origin and cause concepts to the investigation of structure fires. 18. Identify special circumstances with regard to manufactured homes and its relationship to fires. 19. Explain the nature of arson fires and describe procedures to conduct a fire investigation. 20. Describe the process and background of wildland fire investigations. 21. Explain electricity and its relationship to fires. 22. Apply the concepts of manufacturers' recalls of products and use warnings to fire investigation. 23. Apply concepts of ethical conduct in the investigation of fires. 24. Demonstrate how to conduct an initial investigation at a fire scene functioning as a member of a team.
Required Textbook	Florida Fire Investigation Manual (2017) Publisher: Department of Financial Services, Division of Investigative & Forensic Services.
Required Materials	Hardhat, gloves, protective shoes/boots, and clothing appropriate for fire scene reconstruction for Thursday practical exercise.

Method of Instruction	Classroom and practical exercise.
Grading	Passing 70%
Certification(s)	<p>One of four required classes for Fire Investigator I;</p> <p><u>FFP2120, BFST2120, or ATPC2120</u> BUILDING CONSTRUCTION FOR T SERVICE</p> <p><u>FFP2111, BFST2111, or ATPC2111</u> FIRE CHEMISTRY</p> <p><u>FFP2610, BFST2610, or ATPC2610</u> FIRE INVESTIGATION: ORIGIN AN</p> <p><u>FFP1540, BFST1540, or ATPC1540</u> PRIVATE FIRE PROTECTION SYST</p> <p>One of four required classes for Firesafety Inspector II.</p> <p><u>FFP1793, BFST1793, or ATPC1793</u> FIRE AND LIFE SAFETY EDUCATOR I</p> <p><u>FFP2111, BFST2111, or ATPC2111</u> FIRE CHEMISTRY</p> <p><u>FFP2610, BFST2610, or ATPC2610</u> FIRE INVESTIGATION: ORIGIN AND CAUSE</p> <p><u>FFP2541, BFST2541, or ATPC2541</u> PRIVATE FIRE PROTECTION SYSTEMS II</p> <p><u>FFP2706, BFST2706, or ATPC2706</u> PUBLIC INFORMATION OFFICER</p>
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. Students are allowed to miss 10% of the class and still receive credit. There are no makeup sessions.
Academic Integrity	<p>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.</p> <p>Qualification FIRE INVESTIGATOR I Description</p> <p>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.</p>

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 Fire Investigator I in the State of Florida, an individual must be a Florida State Certified Firefighter, Firesafety Inspector or Law Enforcement Officer and successfully complete 160 hours of basic certification training for fire investigators, 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. When taking a state exam, please ensure that your personal profile matches the identification that you plan to produce at Pearson Vue.
Qualification Description	FIRESAFETY INSPECTOR I / II / PLANS EXAMINER I
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 II, you must be a Florida certified Firesafety Inspector I, successfully complete 4 courses of 40 hours each, submit an application and pay the required processing fee. Equivalency of courses other than hours required for certification are considered only upon presentation of course description and objectives. Equivalency will be granted to those courses of similar content and time on a course for course basis. NOTE ***YOU ARE REQUIRED TO COMPLETE ONLY ONE OF THE FOLLOWING 40 HOUR COURSES: FIRE AND LIFE SAFETY EDUCATOR I OR PUBLIC INFORMATION OFFICER.

	NFPA FIRESAFETY INSPECTOR I / II / PLANS EXAMINER I Subject and Level
<i>Students with Disabilities</i>	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.
<i>Emergency Evacuation Policy</i>	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. <ul style="list-style-type: none"> • 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.
<i>Requesting Emergency Care</i>	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.
<i>Critical Event Procedures</i>	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.
<i>Enabling Objectives</i>	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. <u>Unit 1 Lesson 2: History of Fire Investigation in Florida</u> 1. Explain the history of fire investigation in Florida

Unit 1 Lesson 3: Why address origin and cause of fires?

1. Identify the correct definition of origin.
2. Identify the correct definition of cause.
3. Know the elected official responsible for the public safety with regard to fires.
4. Recognize the state agency constitutionally tasked with investigating fires and their causes.
5. Explain the progression of a fire investigation.
6. Identify the minimum qualifications for a fire investigator in the State of Florida.

Unit 1 Lesson 4: The Systematic Approach & Scientific Method

1. Define the scientific method.
2. List the elements of the scientific method in the correct and logical order.
3. Describe the role of reasoning in fire investigations.
4. Demonstrate the application of Occum’s Razor.
5. State the three advantages the systematic approach offers.

Unit 1 Lesson 5: Liability and Legal Issues

1. Know and apply the role of NFPA 921 in a fire investigation.
2. Recognize the major points of Thompson vs. State Farm as it applies to the fire investigator.
3. Recognize the major points of Michigan vs. Tyler and Michigan vs. Clifford as it applies to the fire investigator.
4. Understand and apply the remedy when NFPA 921 guidelines are not followed in an investigation.
5. Know the definition of spoliation and its relevance to a fire investigation.
6. Know that the attitude of the investigator is a prerequisite for success.
7. Explain the fourth methods of legal entry to a property.
8. Know the remedy when NFPA 921 is not followed.

Unit 1 Lesson 5.1: Florida Administrative Rule 69D

1. Describe the legal progression of a fire scene to a crime scene.
2. Identify the four triggers of Florida Administrative Rule 69D.
3. Describe the difference between a fire scene and a crime scene.
4. Understand the fire agencies responsibility to protect a possible crime scene.
5. State the four methods for a fire investigator to gain access to a fire scene.
6. The student will list the three cause determinations used by the Bureau of Fire and Arson Investigations.

Unit 1 Lesson 6: Fire Scene Safety

1. Recognize potential hazards most commonly found at fire scenes.
2. Describe recommended protective clothing and equipment.
3. Identify the proper method of decontaminating tools and protective gear.
4. Explain when to decontaminate tools.
5. Know the components of a fire scene safety assessment and its importance.

Unit 2 Lesson 1: Origin Indicators

1. Define the term origin.
2. Identify the accepted definition of area of origin.
3. State the accepted definition of direct flame impingement.
4. List the nine most common indicators in fire origin analysis.
5. Explain why the origin and source of ignition is the most critical element in an origin and cause investigation.
6. List the most universally accepted means to follow a fires path.
7. Explain how to conduct a fire investigation in terms of damaged areas.
8. Define of the room of origin.
9. Identify the term used in the excavation of a fire scene.

Unit 2 Lesson 2: Cause Indicators

1. List the three classifications of a fire.
2. Identify that the classification of a fire is the result of a process of elimination.
3. List the three possible indicators of the cause of a fire.
4. Explain accidental sources and how they affect the investigation.
5. Define cause.
6. List the two most common sources of ignition for intentionally set fires.

Unit 2 Lesson 3: Sources of Information

1. Identify correct sources of information.
2. List five forms of information available to the fire investigator.
3. List the three types of scene information.
4. List the four groups of people with pertinent knowledge of a fire.

Unit 2 Lesson 4: The Accelerant Detection K-9

1. Identify the process for requesting an ADK-9 at the scene of a fire.
2. List the minimum requirements for the safety of the ADK-9 Team.
3. Describe the normal operational limit of the ADK-9 Team at a fire scene.
4. Describe the motivation conditioning of the ADK-9.

Unit 2 Lesson 5: Human Factors and Indicators

1. ~~Explain 40/60/100% Rule.~~
2. Explain the general application of means, motive opportunity.
3. Apply the concept of chain of events leading to a fire event.

Unit 2 Lesson 6: Weather Factors

1. Describe why clouds and rain are vital components of lightning.
2. Describe the path that lightning follows.
3. List the approximate temperature and voltage of a lightning bolt.

Unit 2 Lesson 7: Documenting the Fire Scene

1. State the limits of a fire and explosion scene.
2. Describe the recommended procedural elements of a fire scene examination.
3. List the six basic sources of information in a documented report.
4. Explain why documentation is essential to the investigation.

Unit 2 Lesson 8: Fire Scene Photography

1. List the “Rule of 8’s”.
2. Describe why crowds of on-lookers are photographed at a fire scene.
3. State the minimum photographic standard for a fire scene investigation.
4. Explain the importance and concept of scale within a photograph.

Unit 2 Lesson 9: Fire Scene Sketching

1. Explain the purpose of the fire scene sketch.
2. Describe the three methods of fire scene sketching.
3. Describe the two types of sketches.
4. Demonstrate placement of a north arrow on a sketch.
5. Describe the concept of scale.

Unit 2 Lesson 10: Evidence at the Fire Scene

1. Define and describe evidence.
2. List the procedures used to collect evidence.
3. Describe the legal procedures to properly keep evidence.
4. Describe when evidence is destroyed or displaced during firefighting.
5. Describe the chain of custody.
6. List appropriate evidence containers.
7. Describe clothing and materials needed to handle evidence.
8. Explain the use of latex gloves on a fire scene.

Unit 2 Lesson 11: Report Writing.

1. Identify the recommended level of destruction qualifiers.
2. List the minimum elements of an origin and cause report.
3. Identify the most critical form of communication in origin and cause investigations.

Unit 3 Lesson 1: Structure Fires

1. Describe how fire flows through a structure.
2. List five types of structure construction in Florida.
3. List the seven components of internal construction.
4. List the four primary areas of interest in the layout of a structure.
5. Describe the 12 General Rules of Fire Behavior.
6. Explain why burn patterns are the foundation of all fire investigations.
7. Describe the relationship between cigarettes and fires in furniture.

8. Define spalling.
9. Explain pin holes.
10. List the most likely point for an arsonist to initiate a fire.
11. Define annealing.
12. Describe the difference between a mechanically broken window and crazing.
13. List the indicators used to determine if a door was open or closed at the time of a fire.
14. Describe the burning characteristics of carpet.
15. Define fuel load.

Unit 3 Lesson 2: Manufactured Home Fires

1. List the three primary areas of fire hazard within a manufactured home.
2. Identify when manufacturing codes were established in regard to manufactured home fire safety.

Unit 3 Lesson 3: Vehicle Fires

1. Identify the five primary areas where heat and combustibles are collocated.
2. Describe how to rule out all accidental mechanical causes before determining the fire is incendiary.
3. Describe a carburetor fire pattern.
4. Explain the combustibility of lubricant oil.
5. Describe the characteristics of automobile glass exposed to extreme heat.
6. Identify where a vehicle investigation should be conducted.
7. Identify the average fuel load in a passenger automobile.
8. Describe the significance of fire damage to the top or bottom of a windshield.

Unit 3 Lesson 4: Wildland Fires

1. Define a crown / crowning fire.
2. List the associated smoke color of an agricultural product.
3. Define a hay clinker.
4. Define sleeper.
5. Explain why wildfire investigations are more difficult than other fires to investigate.

Unit 3 Lesson 5: Electrical

1. Identify the melting point of copper.
2. Identify the melting point of aluminum.
3. Define static electricity.
4. ~~Identify the significance of balled wire ends at a fire scene.~~
5. Explain the significance of “sleeving” at a fire scene.

Unit 3 Lesson 6: Manufacturers Recall’s

1. Research and apply a vehicle manufacturer’s recall notice.
2. Research and correctly interpret citizen complaints regarding vehicle

	<p>reports.</p> <p>3. Research and apply a product recall notice to a fire investigation.</p> <p><u>Unit 4 Lesson 1: Ethics in Origin and Cause Investigations</u></p> <p>1. Describe the impact ethics has in origin and cause investigations.</p> <p>2. Describe how ethics affects the agency.</p> <p>3. List common pitfalls affecting ethical investigations.</p>
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