FIRE 61 Course Outline as of Fall 2018

CATALOG INFORMATION

Dept and Nbr: FIRE 61 Title: FIRE INVESTIGATION
Full Title: Fire Investigation
Last Reviewed: 9/25/2017

Units		Course Hours per Week		Nbr of Weeks	Course Hours Total	
Maximum	3.00	Lecture Scheduled	3.00	17.5	Lecture Scheduled	52.50
Minimum	3.00	Lab Scheduled	0	17.5	Lab Scheduled	0
		Contact DHR	0		Contact DHR	0
		Contact Total	3.00		Contact Total	52.50
		Non-contact DHR	0		Non-contact DHR	0

Total Out of Class Hours: 105.00 Total Student Learning Hours: 157.50

Title 5 Category:	AA Degree Applicable
Grading:	Grade Only
Repeatability:	00 - Two Repeats if Grade was D, F, NC, or NP
Also Listed As:	
Formerly:	

Catalog Description:
This course provides information on securing the fire scene and determining the origin and cause of the fire. Topics include responsibilities of a fire investigator, securing the fire ground, conducting an exterior and interior survey, analyzing fire patterns, interpreting individual fire patterns, discriminating the effects of explosions, examining and removing fire debris, reconstructing the area of origin and inspecting the performance of building systems. Upon successful completion of the course, the student will be awarded a Fire Investigation IA certificate from the State Board of Fire Services (SBFS).

Prerequisites/Corequisites:
Course Completion of FIRE 72

Recommended Preparation:
Eligibility for ENGL 100 or ESL 100

Limits on Enrollment:

Schedule of Classes Information:
Description: This course provides information on securing the fire scene and determining the origin and cause of the fire. Topics include responsibilities of a fire investigator, securing the fire

ground, conducting an exterior and interior survey, analyzing fire patterns, interpreting individual fire patterns, discriminating the effects of explosions, examining and removing fire debris, reconstructing the area of origin and inspecting the performance of building systems. Upon successful completion of the course, the student will be awarded a Fire Investigation IA certificate from the State Board of Fire Services (SBFS). (Grade Only)
Prerequisites/Corequisites: Course Completion of FIRE 72
Recommended: Eligibility for ENGL 100 or ESL 100
Limits on Enrollment:
Transfer Credit: CSU;
Repeatability: Two Repeats if Grade was D, F, NC, or NP

ARTICULATION, MAJOR, and CERTIFICATION INFORMATION:

AS Degree:	**Area**			Effective:	Inactive:
CSU GE:	**Transfer Area**			Effective:	Inactive:
IGETC:	**Transfer Area**			Effective:	Inactive:
CSU Transfer:	Transferable	Effective:	Fall 1981	Inactive:	
UC Transfer:		Effective:		Inactive:	

CID:

Certificate/Major Applicable:
Both Certificate and Major Applicable

COURSE CONTENT

Student Learning Outcomes:
At the conclusion of this course, the student should be able to:
1. Demonstrate a basic understanding of fire behavior, electrical theory and ethical standards for fire investigators.
2. Demonstrate the ability to conduct a complete fire investigation using the scientific process as identified in National Fire Protection Association (NFPA) standard 921.

Objectives:
At the conclusion of this course, the student should be able to:
1. Identify the course objectives, assignments, activities, evaluation methods, individual and group participation requirements.
2. Identify the courses and other requirements for State Fire Training (SFT) Fire Investigator Certification and other fire investigator certifications.
3. Demonstrate the ability to use the scientific method and NFPA standard 921 as the operating analytical process throughout the investigation.
4. Demonstrate the ability to secure a fire scene and protect all evidence given the appropriate tools, equipment and marking devices.
5. Demonstrate the ability to conduct an exterior survey to identify and preserve evidence, interpret fire damage, identify hazards and determine all potential means of egress/ingress.
6. Demonstrate the ability to conduct an interior survey to identify and preserve areas of potential evidentiary value requiring further examination, determine the value of the contents and identify hazards to avoid injury.
7. Demonstrate the ability to analyze fire patterns to determine fire development, evaluate

methods and effects of suppression activities, recognize false patterns and identify areas of origin.
8. Demonstrate the ability to interpret individual fire patterns and the burning characteristics of the materials involved and the mechanisms of heat transfer that led to the forming of the pattern.
9. Demonstrate the ability to discriminate the effects of explosions from other types of damage and to identify an explosion and preserve it's evidence.
10. Demonstrate the ability to examine and remove fire debris to check for fire cause evidence, identify potential ignition sources and preserve evidence without causing damage or contamination.
11. Demonstrate the ability to reconstruct the area of origin to identify and correlate all protected areas and fire patterns related to contents or structural remains, return items potentially critical to cause determination and photo documentation to their pre-fire location and identify the area of origin.
12 Demonstrate the ability to inspect the performance of building systems including, detection, suppression, heating ventilation and air conditioning (HVAC), utilities, and building compartmentation to determine the need for expert resources, consider and operating system's impact on fire growth and spread in identifying origin areas, identify defeated or failed systems and recognize the system's potential as a fire cause.

Topics and Scope:

I. Orientation and Administration
   A. Review of facilities
   B. Review of classroom requirements
   C. Review of syllabus, participation, assignments and evaluation methods
II. Fire Investigator Certification Process
   A. Courses required for SFT Fire Investigator certification
      1. Fire Investigation IA, Basic Fire Investigation
      2. Fire Investigation IB, Evidence and Documentation
      3. Fire Investigation IC, Preparation for Legal Proceed
      4. POST #31445, Interview and Interrogation class
      5. National Wildland Coordinating Group (NWCG) FI-210 Wildland Fire Origin and Cause Determination class
   B. Experience requirement for SFT Fire Investigator certification
      1. Minimum two (2) years full-time paid experience in a California fire department with the primary responsibility as a fire investigator; or,
      2. Minimum four (4) years volunteer or part-time experience in a California fire department with the primary responsibility as a fire investigator
      3. Investigate 20 fires, 10 of which must be structure fires as the primary investigator and developed the fire investigation reports
      4. Be appointed to the rank or position of Fire Investigator
   C. Certification Task Book process
      1. Prerequisites and course work
      2. Application process and required fee
      3. Task Book Job Performance Requirement (JPR)
      4. Use of an evaluator to sign off JPRs
      5. Fire Chief's approval
      6. Employment with a fire agency with assigned duties as a Fire Investigator
   D. Course certification testing process
      1. Completion of course work
      2. Completion of an on-line certification test

3. Completion of a skills evaluation test
E. Other fire investigator certifications
1. International Association of Arson Investigators(IAAI)
2. California Conference of Arson Investigators (CCAI)

III. Responsibilities of a Fire Investigator
A. The scientific method in relation to origin and cause
1. Recognize the need
2. Define the problem
3. Collect the data
4. Analyze the data
5. Develop the hypothesis - Inductive reasoning
6. Select the final hypothesis
B. The interrelationship of the investigation within the incident management system
C. Use of NPFA standard 921 as an investigation guidance document

IV. Securing the Fire Ground
A. Identify fire ground hazards including explosives and secondary devices
B. Identifying types of evidence
C. Marking devices and equipment used to secure the investigation scene
D. Securing a perimeter
E. Importance of scene security, evidence preservation and issues related to spoliation
F. Use of marking devices, tools and equipment

V. Conducting an Exterior Survey
A. Types of building construction
B. The effects of fire on construction materials
C. Identifying potential exterior ignition sources
D. Recognizing the types of evidence commonly found in the perimeter
E. Potential surveillance sources
1. Automated Teller Machines
2. Surveillance cameras
3. Bystander videos
4. Dash cameras
5. Social media
6. Cell towers
F. Evidence preservation methods
G. Effects of fire suppression efforts
H. Fire behavior and spread
I. Fires patterns
J. Recognizing the dangers of hazardous materials
K. Weather conditions at the time of the fire
L. Assessing fire ground and structural conditions
M. Damage from and effects of the fire
N. Interpreting fire patterns

VI. Conducting Interior Surveys
A. Types of interior finishes
B. Effects of fire on interior finishes
C. Identifying potential interior sources of ignition
D. Recognizing the effects of fire suppression efforts
E. Fire behavior and spread
F. Effects of building contents on fire growth
G. Relationship of building contents to the overall investigation
H. Assessing structural conditions
I. Observing and documenting the damage and effects of fire

J. Determining the impact of fire suppression efforts on fire flow and heat propagation
K. Evaluating protected areas to determine the presence and/or absence of contents

VII. Analyzing Fire Patterns
A. Fire behavior and spread based on fire chemistry, fire dynamics and fire physics
B. Effects of fire suppression on fire patterns
1. Fire streams
2. Ventilation
C. Effects of building construction on fire patterns
1. Design
2. Construction, including construction materials
3. Structural elements
4. Ventilation openings
D. Analyzing variations of fire patterns on different materials with consideration given to heat release rate, form and ignitability
E. Distinguishing the impact of different types of fuel loads
1. Fuel packages
2. Property of flames
F. Evaluating flame spread based on fuel load
G. Analyzing information

VIII. Interpreting Individual Fire Patterns
A. Fire dynamics
B. Fire development
C. The relationship of heat release rate, form and ignitability of materials
D. Effect of burn characteristics on different types of materials

IX. Discriminating the Effects of Explosions
A. Different types of explosions and their causes
B. Characteristics of an explosions
C. Differences between low and high order explosions
D. Explosive effects on glass, walls, foundations and other building materials
E. Distinguishing low and high order explosive effects
F. Analyzing damage to document the blast zone and origin

X. Examining and Removing Fire Debris
A. Recognizing ignition processes
B. Characteristics of ignition sources
C. Ignitability of various fuels
D. Use of tools and equipment used during the debris search
1. Common
2. Specialized
E. Layering and gridding techniques for debris removal
F. Types of fire cause evidence found in debris
G. Evidence gathering methods and documentation
H. Search techniques that further the discovery of fire cause evidence and ignition sources
I. Search techniques that incorporate documentation
J. Collecting and preserving evidence

XI. Reconstructing the Area of Origin
A. Effects of fire on different types of material
B. The reconstruction process
C. Importance and uses of reconstruction
D. Examining materials to determine the effects of fire
E. Identifying and distinguishing different types of fire damaged contents
F. Returning materials to their original position using protected areas and flame patterns

XII. Inspecting the Performance of Building Systems

A. Recognizing different types of detection, suppression, Heating, Ventilation and Air Conditioning (HVAC), utility systems and building compartmentalization
B. Types of expert resources for building systems
C. Impact of fire on various systems
D. Common methods used to defeat a system's functional capability
E. Types of building system failures
F. Determining the system's operation and its effect on the fire
G. Identifying alterations to and failure indicators of building systems
H. Impact of suppression efforts on building systems

Assignment:

1. Reading 20-30 pages weekly from textbook and State-supplied Student supplement
2. Research paper
3. Computer Base Training (CBT) On-line basic electricity assignment
4. CBT online ethics and the fire investigator assignment and quizzes (2-3)
5. Fire investigation report
6. Group fire investigation presentation
7. Quizzes (4 - 6) and a summative exam
8. Exterior scene survey field exercise
9. Interior scene survey field exercise
10. Fire investigation check list field exercise
11. Interpreting fire dynamics field exercise
12. Performing a minimum of one fire investigation

Methods of Evaluation/Basis of Grade:

Writing: Assessment tools that demonstrate writing skills and/or require students to select, organize and explain ideas in writing.

Research paper and fire investigation report	Writing 40 - 50%

Problem Solving: Assessment tools, other than exams, that demonstrate competence in computational or non-computational problem solving skills.

Online electrical and ethics training, interpreting fire dynamics, determining fire cause	Problem solving 20 - 30%

Skill Demonstrations: All skill-based and physical demonstrations used for assessment purposes including skill performance exams.

Performing a fire investigation, conducting a group presentation	Skill Demonstrations 10 - 20%

Exams: All forms of formal testing, other than skill performance exams.

Quizzes, online quizzes, summative exam	Exams 20 - 30%

Other: Includes any assessment tools that do not logically fit into the above categories.

None	Other Category 0 - 0%

Representative Textbooks and Materials:
Fire Investigator Principles and Practices. 4th ed. Publ. Jones and Bartlett. 2016
Fire Investigator. 2nd ed. Publ. International Fire Service Training Association. 2010 (classic)
NFPA Standard 921; Guide for Fire and Explosion Investigations. current edition