DISCIPLINE: Fire Science
COURSE TITLE: FSTE 161 Fire Investigation I

CR.HR: 3  LECT HR: 3  LAB HR: 0  CLIN/INTERN HR: 0  CLOCK HR: 0

CATALOG DESCRIPTION
This course is intended to provide the student with the fundamentals and technical knowledge needed for proper fire scene interpretations, including recognizing and conducting origin and cause, preservation of evidence and documentation, scene security, motives of the firesetter, and types of fire causes.

PREREQUISITES

None

EXPECTED STUDENT OUTCOMES IN THE COURSE (ESO)

Upon completion of this course, the student will be able to:

1. Identify the responsibilities of a firefighter when responding to the scene of a fire, including scene security and evidence preservation.
2. Describe the implications of constitutional amendments as they apply to fire investigations.
3. Identify key case law decisions that have affected fire investigations.
4. Define the common terms used in fire investigations.
5. Explain the basic elements of fire dynamics and how they affect cause determination.
6. Compare the types of building construction on fire progression.
7. Describe how fire progression is affected by fire protection systems and building design.
8. Discuss the basic principles of electricity as an ignition source.
9. Describe potential health and safety hazards.
10. Describe the process of conducting investigations using the scientific method.
11. Identify cause and origin and differentiate between accidental and incendiary.
12. Explain the procedures used for investigating vehicle fires.
13. Identify the characteristics of an incendiary fire and common motives of the fire setter.
GENERAL EDUCATION OUTCOMES (ESO)
Specify which general education outcomes, if any, are substantially addressed by the course. Numbers in parentheses identify the Expected Student Outcomes linked to the specific General Education Outcome.

2. Critical Thinking
   A. Formulate a hypothesis:
      - Generate relevant questions (1, 2, 3, 11, 12, 13)
      - Provide supporting arguments, evidence, and/or experimentation (1, 2, 3, 11, 12, 13)
      - Construct and verify logically sound arguments (1, 2, 3, 11, 12, 13)

3. Lifelong Learning
   B. Personal and Professional Development
      - Pursue structured learning opportunities, certification, and/or degrees (1-7)
PROGRAM-LEVEL OUTCOMES

CAREER AND TECHNICAL EDUCATION PROGRAM OUTCOMES
Specify which Career and Technical program outcomes, if any, are substantially addressed by the course by completing the “Career and Technical Education template” to show the relationship between course and program outcomes to assessment measures.

The student will be able to explain and demonstrate the safety and health procedures/requirements set by the National Fire Protection Association

- Recognize the appropriate use and care of personal protective equipment, (Bunker gear, SCBA)
- Identify the National Fire Protection Administration’s standard on fire service health and safety (NFPA 1500)

The student will be able to explain fire behavior and demonstrate the ability to extinguish class A, B, C, & D fires

- Recognize the elements of fire behavior and growth, the transfer of heat and energy, and The control theories if fire extinguishment
- Demonstrate the handling, care, and testing of fire service hose, nozzles and appliances
- Demonstrate the handling, care, and testing of fire service extinguishers
- Recognize the elements of building construction and its relationship to fire spread and behavior
- Demonstrate the use of, care of, and testing of fire service water supply systems
- Demonstrate the ability to remove fire byproducts including smoke, heat and toxic gasses from structures
- Demonstrate the use of various fire streams in the extinguishment of fires

The student will be able to explain and demonstrate the ability to Investigate a fire scene as to its cause and origin

- Recognize the responsibilities of the firefighter and fire department as it relates to fire investigations
- Recognize the laws, statues’, case studies and standards (NFPA 921) that apply to fire investigations
- Demonstrate the ability to evidence preservation on collection related to fire investigations

CLASS-LEVEL ASSESSMENT MEASURES
Student accomplishment of expected student outcomes will be assessed using the following measures. (Identify which measures are used to assess which outcomes.)

Students will be evaluated for mastery of learning objectives by written examination, online discussions, and assignments
This course is intended to provide the student with the fundamentals and technical knowledge needed for proper fire scene interpretations, including recognizing and conducting origin and cause, preservation of evidence and documentation, scene security, motives of the firesetter, and types of fire causes.

I. Emergency Responder Responsibilities and Observations
   A. Responsibilities of the Fire Department
   B. Responsibilities of the Firefighter
   C. Responsibilities of the Fire Officer
   D. Observations When Approaching the Scene
   E. Observations Upon Arrival
   F. Observations During Firefighting Operations
   G. Identification of Incendiary Devices

II. Constitutional Law
   A. Criminal Law
   B. Constitutional Amendments

III. Case Studies
   A. Michigan v. Tyler
   B. Michigan v. Clifford
   C. Daubert Decision
   D. Benfield Decision
   E. Kuhmo/Carmichael Decision

IV. Fire Investigations Terminology
   A. Terms as They Apply to Structural Fires
   B. Terms as They Apply to Vehicle Fires
   C. Other Common Investigative Terms

V. Basic elements of Fire Dynamics
   A. Ignition
   B. Heat Transfer
   C. Flame Spread
   D. Burning Rate
   E. Fire Plumes
   F. Fire Analysis

VI. Building Construction
   A. Types of Construction
   B. Building Materials
   C. Building Components

VII. Fire Protection Systems
   A. Extinguishment Systems
   B. Detection Systems
   C. Signaling Systems
   D. Other Building Services
VIII. Basic Principles of Electricity
   A. Basic Electricity
   B. Wiring Systems
   C. Common Electrical Systems

IX. Health and Safety
   A. Methods of Identification
   B. Common Causes of Accidents
   C. Common Causes of Injuries

X. Fire Scene Investigations
   A. Examining the Fire Scene
   B. Securing the Fire Scene
   C. Documenting the Fire Scene
   D. Evidence Collection and Preservation
   E. Exterior Examination

XI. Determining Point of Origin
   A. Interior Examination
   B. Area of Origin
   C. Fire Patterns
   D. Other Indicators
   E. Scene Reconstruction
   F. Point of Origin

XII. Types of Fire Causes
   A. Accidental
   B. Natural
   C. Incendiary
   D. Undetermined

XIII. Vehicle Fires
   A. Examination of Scene
   B. Examination of Exterior
   C. Examination of Driver and Passenger Areas
   D. Examination of Engine Compartment
   E. Examination of Fuel System
   F. Examination of Electrical System

XIV. Firesetters
   A. Characteristics of Arson
   B. Common Motives