



MERCER
COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

Course Number FIR 206	Course Title Fire Investigation	Credits 3
Hours: 3 Lecture Lecture/Lab/Other	Co- or Pre-requisite: N/A	Implementation Semester & Year January 2022

Catalog description:

Provides the fundamental and technical knowledge needed for proper fire scene interpretations, including recognizing and conduction origin and cause, preservation of evidence and documentation, scene security, motives of the fire setter, and types of fire causes.

General Education Category:

[Not GenEd](#)

Choose an item.

Course coordinator:

James McCann, (609) 799-3245 or mccannj@mccc.edu

Required texts & Other materials:

NFPA 921, Guide for Fire and Explosion Investigations, 2017 edition.

NFPA Fire Investigator Workbook Principles & Practices to NFPA 921 & 1033, 4th Edition,

Course Student Learning Outcomes (SLO):

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

1. Identify and explain the responsibilities of the fire department from a firefighter's perspective when responding to the scene of a fire, including the possibility of incendiary devices often encountered. (ILG 3, 10), (PLO 1, 2, 3 7)
2. Define criminal law and explain the constitutional amendments (4th, 5th, 6th, 8th, 14th) as they apply to fire investigations. (ILG 1, 9, 10, 11), (PLO 1)
3. Analyze the precedents set by constitutional law case studies that have affected fire investigations. (ILG 1, 9, 10, 11), (PLO 1)
4. Define and explain the common terms used in fire investigations. (ILG 1, 3), (PLO 1, 2)
5. Describe the basic elements of fire dynamics and how they affect cause determination including fire behavior, characteristics of fuels and methods of heat transfer. (ILG 1, 3, 4, 9, 10, 11), (PLO 1, 2, 3)
6. Analyze the relationship of building construction on fire investigations including types of construction, construction and finish materials. (ILG 1, 3), (PLO 2, 4, 5, 6, 7)
7. Evaluate fire protection systems and building services and discuss how their installation affects the ignition of fires in buildings. (ILG 1, 3, 4), (PLO 3, 4, 5, 6, 7)

8. Discuss the basic principles of electricity. (ILG 3), (PLO 2, 3)
9. Explain the role of the fire investigator in recognizing health and safety concerns including potential hazardous materials awareness. (ILG 1, 3, 4, 10, 11), (PLO 6, 7)
10. Describe fire scene investigations and the process of conducting investigations using the scientific method. (ILG 1, 3, 10, 11), (PLO 1, 2, 3, 6)
11. Explain how an investigator determines the point of origin in a room. (ILG 3, 4, 10, 11), (PLO 2, 3, 6)
12. Identify the types of fire causes and differentiate between accidental and incendiary causes. (ILG 3, 10, 11), (PLO 2, 3)
13. Describe and explain the basic procedures used for investigating vehicle fires. (ILG 3, 4, 9, 10, 11), (PLO 1, 2)
14. Identify the characteristics of arson and common motives of the fire setter. (ILG 3, 4, 9, 10, 11), (PLO 1, 2, 3)
15. Identify and analyze the causes involved in line of duty firefighter deaths related to structural and wildland firefighting, training and research and the reduction of emergency risks and accidents. (ILG 1, 3, 4, 9, 10, 11). (PLO 1, 2, 3, 4, 5, 6, 7)

Course-specific Institutional Learning Goals (ILG):

Institutional Learning Goal 1. Written and Oral Communication in English. Students will communicate effectively in both speech and writing.

Institutional Learning Goal 3. Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

Institutional Learning Goal 4. Technology. Students will use computer systems or other appropriate forms of technology to achieve educational and personal goals.

Institutional Learning Goal 9. Ethical Reasoning and Action. Students will understand ethical frameworks, issues, and situations.

Institutional Learning Goal 10. Information Literacy: Students will recognize when information is needed and have the knowledge and skills to locate, evaluate, and effectively use information for college level work.

Institutional Learning Goal 11. Critical Thinking: Students will use critical thinking skills understand, analyze, or apply information or solve problems.

Program Learning Outcomes for (PLO)

1. Discuss the history, support organizations, resources, incident management, training, and emergency operations and relate how each plays a role within the fire service.
2. Define and use basic terms and concepts associated with the chemistry and dynamics of fire;
3. Apply principles of hydraulics, building construction, strategy, and tactics to fire ground operations;
4. Communicate the relationship of fire prevention and fire inspection;
5. Demonstrate the importance of public education in relation to fire prevention;
6. Evaluate facilities to appraise code compliance and potential hazards, building construction issues, and presence of appropriate fire protection systems to help ensure life safety both pre-incident and during an incident;
7. Employ safe work practices using recognized standards and regulations

Units of study in detail – Unit Student Learning Outcomes:

I. Emergency Responder Responsibilities and Observations (Supports SLO 1)

- A. Describe and explain Responsibilities of the Fire Department
- B. Describe and explain Responsibilities of the Firefighter
- C. Describe and explain Responsibilities of the Fire Officer
- D. Explain the importance of Observations When Approaching the Scene
- E. Explain the importance of Observations Upon Arrival
- F. Explain the importance of Observations During Firefighting Operations
- G. Describe the Identification of Incendiary Devices

II. Constitutional Law (Supports SLO 2)

- A. Understand Criminal Law
- B. Understand Constitutional Amendments

III. Case Studies (Supports SLO 3)

- A. Examine the case of Michigan v. Tyler
- B. Examine the case of Michigan v. Clifford
- C. Explain the importance of the Daubert Decision
- D. Explain the importance of Benfield Decision
- E. Explain the importance of Kuhmo/Carmichael Decision

IV. Fire Investigations Terminology (Supports SLO 4)

- A. Define Terms as They Apply to Structural Fires
- B. Define Terms as They Apply to Vehicle Fires
- C. Describe Other Common Investigative Terms

V. Basic elements of Fire Dynamics (Supports SLO 5)

- A. Understand and explain Ignition
- B. Understand and explain Heat Transfer
- C. Understand and explain Flame Spread
- D. Understand and explain Burning Rate
- E. Understand and explain Fire Plumes
- F. Understand and explain Fire Analysis

VI. Building Construction (Supports SLO 6)

- A. List the Types of Construction
- B. Describe the types of Building Materials
- C. Describe Building Components

VII. Fire Protection Systems (Supports SLO 7)

- A. Understand and explain Extinguishment Systems
- B. Understand and explain Detection Systems
- C. Understand and explain Signaling Systems
- D. Understand and explain Other Building Services

VIII. Basic Principles of Electricity (Supports SLO 8)

- A. Understand Basic Electricity
- B. Understand Wiring Systems
- C. Understand Common Electrical Systems

IX. Health and Safety (Supports SLO 9, 15)

- A. Describe the Methods of Identification
- B. Explain the Common Causes of Accidents
- C. Explain the Common Causes of Injuries

X. Fire Scene Investigations (Supports SLO 10)

- A. Explain Examining the Fire Scene
- B. Describe the importance of Securing the Fire Scene
- C. Understand and explain Documenting the Fire Scene
- D. Understand Evidence Collection and Preservation
- E. Describe the importance of an Exterior Examination

XI. Determining Point of Origin (Supports SLO 11)

- A. Understand the main points of Interior Examination
- B. Define and Describe Area of Origin
- C. Understand and Explain Fire Patterns
- D. Explain Other Indicators
- E. Describe the value of Scene Reconstruction
- F. Define Point of Origin

XII. Types of Fire Causes (Supports SLO 12)

- A. Describe Accidental fire causes
- B. Describe Natural fire causes
- C. Describe Incendiary fire causes
- D. Describe Undetermined fire causes

XIII. Vehicle Fires (Supports SLO 13)

- A. Describe the Examination of Scene for vehicle fires
- B. Describe the Examination of Exterior for vehicle fires
- C. Describe the Examination of Driver and Passenger Areas for vehicle fires
- D. Describe the Examination of Engine Compartment for vehicle fires
- E. Describe the Examination of Fuel System for vehicle fires
- F. Describe the Examination of Electrical System for vehicle fires.

XIV. Fire Setters (Supports SLO 14)

- A. Describe the Characteristics of Arson
- B. Understand the Common Motives

Evaluation of student learning: Students will be evaluated for mastery of learning objectives by methods of evaluation to be determined by the instructor. Periodic tests or quizzes as well as a final exam may be utilized. Other methods such as a research papers or group projects are encouraged.