



MERCER
COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

Course Number FIR 211	Course Title Fire Investigation II	Credits 3
Hours: 3 Lecture Lecture/Lab/Other	Co- or Pre-requisite: FIR 206, Fire Investigation I	Implementation Semester & Year January 2022

Catalog description:

This course is intended to provide the student with advanced technical knowledge on rule of law, fire scene analysis, fire behavior, evidence collection and preservation, scene documentation, case preparation and courtroom testimony.

General Education Category:

Not GenEd

Choose an item.

Course coordinator:

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

Required texts & Other materials:

Kirk's Fire Investigation, John DeHaan, Brady Publishing.

NFPA Standard #921 Fire Guide for Fire and Explosion Investigations, National Fire Protection Association, 2017 edition

Course Student Learning Outcomes (SLO):

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

1. Explain the rule of law as it pertains to arrest, search and seizure procedures and their application to fire investigations. (ILG 1, 10, 11), (PLO 1)
2. Recognize and interpret fire scenes common to various types of fires. (ILG 10, 11), (PLO 1, 2, 3)
3. Describe the chemistry of combustion and the relationship of atoms, elements, compounds, and organic compounds of fire. (ILG 1, 2, 3). (PLO 1, 2)
4. Explain the nature and behavior of fire including the effects of heat. (ILG 1, 2, 3), (PLO 1, 2)
5. Explain and identify the combustion properties of liquids, gases and solid fuels. (ILG 1, 3, 10, 11), (PLO 2)
6. Identify and explain electrical causes of fires.(ILG 1, 3, 4, 11), (PLO 1, 2, 3, 4, 5, 6, 7)
7. List and explain the procedures for lifting fingerprints, evidence collection and preservation. (ILG 1, 3, 4), (PLO 1)

8. List and identify the make-up and use of incendiary devices, explosives, and bombs. (ILG 1, 2, 3, 4, 11), (PLO 1, 2)
9. List the procedures for documenting fire scenes, including sketching, photography, and report writing. (ILG 1, 2, 3, 4), (PLO 1, 2, 3, 6)
10. Analyze fire-related deaths and injuries and describe methods of documentation. (ILG 1, 3, 4, 5, 11), (PLO 1, 2, 3, 4, 5, 6, 7)
11. Identify the techniques for interviewing and questioning suspects and subjects. (ILG 1, 5, 9, 10, 11), (PLO 1, 3, 6)
12. Explain the role of the fire investigator in courtroom proceedings including courtroom demeanor and testifying. (ILG 1, 3, 4, 5, 9, 10, 11), (PLO 1, 2, 3, 4, 5, 6, 7)
13. Identify and list the sources and technology available for fire investigations. (ILG 1, 3, 4, 10, 11), (PLO 1, 2, 3, 4, 5, 6, 7)
14. Identify and analyze the causes involved in the 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, 5, 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 2. Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

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 5. Social Science. Students will use social science theories and concepts to analyze human behavior and social and political institutions and to act as responsible citizens.

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. ***Rule of Law:*** The student shall explain the rule of law as it pertains to arrest, search and seizure procedures and their application to fire investigation. (Support SLO 1)
 - A. Arrest Procedures
 - B. Search and Seizure
 - C. Warrant Searches
- II. ***Interpretations of Fire Scenes:*** The student will recognize and interpret fire scenes common to various types of fires. (Support SLO 2)
 - A. Structure Fires
 - B. Vehicle Fires
 - C. Ship Fires
 - D. Explosions
 - E. Wildland Fires
 - F. Hazardous Materials Fires
- III. ***Chemistry of Combustion:*** The student will describe the chemistry of combustion and the relationship of atoms, elements, compounds and organic compounds of fire. (Supports SLO 3)
 - A. Atoms
 - B. Elements
 - C. Compounds
 - D. Organic Compounds
- IV. ***Behavior of Fire:*** The student will explain the nature and behavior of fire including the effects of heat. (Supports SLO 4)
 - A. Heat
 - B. Flame Plumes
 - C. Sequence of a Room Fire
 - D. Effects of Environmental Conditions
- V. ***Combustion Properties:*** The student will explain and identify the combustion properties of liquids, gases, and solid fuels. (Supports SLO 5)
 - A. Liquids
 - B. Gases
 - C. Solids
- VI. ***Electrical Causes of Fires:*** The student will identify and explain electrical causes of fires. (Supports SLO 6)
 - A. Wiring Systems
 - B. Ignition Sources

- C. Investigation of Fires
- VII. **Collection of evidence:** The student will list and explain the procedures for lifting fingerprints, evidence collecting and preservation. (Supports SLO 7)
 - A. Photography Procedures
 - B. Sketching Procedures and Techniques:
 - C. Fingerprint Lifting and Collection Techniques
 - D. Preservation of Evidence
- VIII. **Incendiary Systems:** The student will list and identify the make up and use of incendiary devices, explosives and bombs. (Supports SLO 8)
 - A. Basic Incendiary Devices
 - B. Explosives
 - C. Bombs
- IX. **Documentation of Fire Scene:** The student will list and demonstrate the procedures for documenting fire scenes, including sketching photography and report writing. (Supports SLO 9)
 - A. Sketches
 - B. Photographs
 - C. Incident Reports
 - D. Log Sheets
 - E. Investigation Report
 - F. Chain of Custody
- X. **Investigation of Fire-related Deaths and Injuries:** The student will analyze fire related deaths and injuries and describe methods of documentation. (Supports SLO 10)
 - A. Homicide Fire Investigation
 - B. Scene Security
 - C. Scene Examination and Search
 - D. Scene Documentation
 - E. Autopsy Report
- XI. **Interview Techniques:** The student will identify the techniques for interviewing and questioning suspects and subjects. (Supports SLO 11)
 - A. Interviewing
 - B. Questioning
 - C. Advising of Rights
 - D. Exceptions to the Rule
 - E. Waiver of Rights
- XII. **Courtroom Demeanor:** The student will explain the role of the fire investigator in courtroom proceedings including courtroom demeanor and testifying. (Supports SLO 12)
 - A. Court Procedures
 - B. Pre-trial Preparation
 - C. Trial Exhibits
 - D. Physical Appearance
 - E. Testifying
 - F. Court Decisions

- XIII. **Sources of Information:** The student will identify and list the sources and technology available to fire investigators. (Supports SLO 13)
- A. Local
 - B. State
 - C. Federal
 - D. Website
- XIV. **Fire Investigation:** The student will, as part of a group, demonstrate the investigation and documentation skills developed through this course by determining the cause of a fire set as part of the instructional process. (Supports SLO 1 thru 14)
- XV. **Courtroom testimony:** The student, as a representative of a group, will, using skills developed through this course, offer testimony concerning the fire investigation conducted in Unit XIV in a mock courtroom setting. (Supports SLO 1 thru 14)

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 or group projects papers are encouraged.