



MERCER
COUNTY COMMUNITY COLLEGE

COURSE OUTLINE

Course Number FIR 203	Course Title Fire Protection Systems	Credits 3
Hours: 3 Lecture Lecture/Lab/Other	Co- or Pre-requisite: N/A	Implementation Semester & Year January 2022

Catalog description:

Study of various automatic detection and signaling devices and systems, automatic sprinkler systems, standpipes, and special hazard extinguishing installations.

General Education Category:
Not GenEd

Choose an item.

Course coordinator:

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

Required texts & Other materials:

Jones & Bartlett, Fire Protection Systems, 2nd Edition, A. Maurice Jones Jr.,
ISBN: 9781284035377

Course Student Learning Outcomes (SLO):

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

This course provides information relating to the features of design and operation of fire alarm systems, water-based fire suppression systems, special hazard fire suppression systems, water supply for fire protection and portable fire extinguishers.

1. Explain the benefits of fire protection systems in various types of structures. (ILG 1, 3, 4, 10, 11), (PLO 3, 6)
2. Describe the basic elements of a public water supply system including sources, distribution networks, piping and hydrants. (ILG 1, 3, 4, 10), (PLO 6)
3. Explain why water is a widely used extinguishing agent and describe how water extinguishes fires. (ILG 1, 3, 4, 10, 11), (PLO 1, 3, 6)
4. Identify the different types and components of sprinkler, standpipe and foam systems. (ILG 1, 3, 4), (PLO 3, 6)
5. Define the benefits of residential sprinkler legislation. (ILG 1, 5), (PLO 3, 4, 5, 6)
6. Identify five different types of non-water based fire suppression systems and describe how these systems extinguish fire. (ILG 1, 3, 4, 11), (PLO 1, 2, 6, 7)

7. Describe the basic components of a fire alarm system. (ILG 1, 3, 4, 10, 11), (PLO 6, 7)
8. Identify three different types of detectors and explain how they detect fire. (ILG 1, 3, 4), (PLO 6, 7)
9. Describe the hazards of smoke and list the four factors that can influence smoke movement in a building. (ILG 1, 3), (PLO 1, 2, 3, 6)
10. Recognize the appropriate application of the different types of sprinklers. (ILG 3, 4), (PLO 3, 4, 6, 7)
11. Explain the operation and appropriate application for the different types of portable fire extinguishing systems. (ILG 1, 3, 4, 11), (PLO 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 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. Introduction to Fire Protection Systems (Supports SLO 1, 4, 5, 6, 7, 8, 10, 11)**

Understand and describe each of the following:

- A. The role fire protection systems play in protecting the life, safety and welfare of the general public and firefighters
- B. Overview of the different types of fire protection systems
- C. The role of codes & standards in fire protection system design

II. Water Supply Systems for Fire Protection Systems (Supports SLO 2)

Understand and describe each of the following:

- A. Sources of fire protection water supply
- B. Distribution networks
- C. Piping
- D. Hydrants
- E. Utility company interface with the fire department

III. Water-based fire suppression systems (Supports SLO 1, 3, 4, 5, 10)

Understand and describe each of the following:

- A. Properties of water
 1. Water as an effective extinguishing agent
 2. How water extinguishes fire
- B. Sprinkler Systems
 1. Types of systems & applications
 2. Types of sprinklers & applications
 3. Piping, valves, hangers & alarm devices
 4. Fire department operations in buildings with sprinkler systems
- C. Residential sprinkler systems
- D. Standpipe systems
- E. Fire department operations in buildings with standpipes
- F. Foam systems

- G. Water mist systems
- H. Fire pumps
 - 1. Types
 - 2. Components
 - 3. Operation
 - 4. Fire pump curves

IV. Non-water-based fire suppression systems (Supports SLO 1, 6)

Understand and describe each of the following:

- A. Carbon dioxide systems
 - 1. Applications
 - 2. Extinguishing properties
 - 3. System components
- B. Halogenated systems
 - 1. Halon 1301 and the environment
 - 2. Halon alternatives
 - 3. Extinguishing properties
 - 4. System components
- C. Dry/Wet Chemical Extinguishing systems
 - 1. Extinguishing properties
 - 2. Applications
 - 3. UL 300

V. Fire alarm systems (Supports SLO 7, 8)

Understand and describe each of the following:

- A. Components
- B. Types of fire alarm systems
- C. Detectors
 - 1. Smoke
 - 2. Heat
 - 3. Flame
- D. Audible/visual devices
- E. Alarm monitoring
- F. Testing & maintenance of fire alarm systems

VI. Smoke management systems (SLO 9)

Understand and describe each of the following:

- A. Hazards of smoke
- B. Smoke movement in buildings
- C. Types of smoke management systems
- D. Firefighter operations in buildings with smoke management systems

VII. Portable fire extinguishers (Supports SLO 11)

Understand and describe each of the following:

- A. Types & applications
- B. Selection
- C. Placement
- D. Maintenance
- E. Portable fire extinguisher operations

VIII. Fire streams (Supports SLO 2, 3)

Understand and describe each of the following:

- A. Calculating fire flow requirements
- B. Effective horizontal and vertical reach
- C. Appliances for nozzles
- D. Performance of smooth-bore and combination nozzles
- E. Hand-held lines
- F. Master streams
- G. Nozzle pressures and reaction
- H. Water hammer and cavitation

IX. Friction loss (Supports 2, 3)

Understand and describe each of the following:

- A. Factors affecting friction loss
- B. Maximum efficient flow in fire hose
- C. Calculating friction loss in fire hose
- D. Friction loss in appliances
- E. Reducing friction loss

X. Engine pressures (Supports 2, 3)

Understand and describe each of the following:

- A. Factors affecting engine pressure

XI. Standpipe and sprinkler systems (2, 3, 4, 5)

Understand and describe each of the following:

- A. Standpipe systems
 - 1. Classifications
 - 2. Components
 - 3. Supplying Standpipe Systems
- B. Sprinkler systems
 - 1. Classifications
 - 2. Components
 - 3. Supplying sprinkler systems

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.