



COURSE OUTLINE FALL 2008

<u>FIR 203</u>	<u>Fire Protection Systems</u>
Course Number	Course Title
<u>3</u>	<u>3 Lecture Hours</u>
Credits	Hours: lecture/laboratory/other (specify)

Catalog description:

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

Prerequisites: None

Corequisites: None

Is course New or Modified? No

Required texts/other materials:

Design of Special Hazard and Fire Alarm Systems, Robert Ganon, Delmar Cengage Learning

Last revised: n/a

Course coordinator: Scott Loh, 799-3245 (Dempster Center), lohs@mccc.edu

Information resources:

U.S. Fire Administration

Publications: <http://www.usfa.fema.gov/applications/publications>

See Fire Protection, Fire Service Operations

Applied Research:

<http://www.usfa.fema.gov>

Research Reports:

<http://www.usfa.fema.gov/research>

Technical Reports:

<http://www.usfa.fema.gov/applications/publications/browse.cfm?mc=29>

Topical Fire Research Series:

<http://www.usfa.fema.gov>

Learning Resource Center:

<http://www.lrc.fema.gov>

National Institute for Standards and Technology

<http://www.fire.nist.gov>: Fire Tests/Data, Software/Models, Publications, FIREDOC (under Publications)

References

Automatic Sprinkler and Standpipe Systems; John L. Bryan, NFPA 1990
Fire Detection and Suppression Systems, Fire Protection Publications
Design of Water Based Fire Protection Systems; Robert Gagnon, Thomson 1996
Fire Protection Handbook, NFPA
Fire Suppression and Detection Systems; John Bryan, MacMillan Publishing
Operation of Fire Protection Systems; NFPA 1981
Private Fire Protection and Detection; Fire Protection Publication 2001

Other learning resources:

Lessons Learned Information Sharing:

<http://www.llis.dhs.gov/member/secure/index.cfm>

<http://www.homefiresprinkler.org>

Society of Fire Protection Engineers: <http://www.pentoncmg.com/sfpe/index.html>

Current Events/News

<http://www.firehouse.com>

<http://www.fireengineering.com>

<http://www.withthecommand.com>

Course goals:

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.

The student will be able to:

- Explain the benefits of fire protection systems in various types of structures.
- Describe the basic elements of a public water supply system including sources, distribution networks, piping and hydrants.
- Explain why water is a widely used extinguishing agent and describe how water extinguishes fires.
- Identify the different types and components of sprinkler, standpipe and foam systems.
- Define the benefits of residential sprinkler legislation.
- Identify five different types of non-water based fire suppression systems and describe how these systems extinguish fire.
- Describe the basic components of a fire alarm system.
- Identify three different types of detectors and explain how they detect fire.
- Describe the hazards of smoke and list the four factors that can influence smoke movement in a building.

- Recognize the appropriate application of the different types of sprinklers.
- Explain the operation and appropriate application for the different types of portable fire extinguishing systems.

Course-specific General Education Core Competencies and Goals.

General Education Knowledge Goals

Mathematics. Students will use appropriate mathematical and statistical concepts and operations to interpret data and to solve problems.

Science. Students will use the scientific method of inquiry, through the acquisition of scientific knowledge.

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

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.

MCCC Core Skills

Critical Thinking and Problem-solving. Students will use critical thinking and problem solving skills in analyzing information.

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 and continuing into the fire protection industry.

Collaboration and cooperation. Students will develop the interpersonal skills required for effective performance in group situations through required course work.

Units of study in detail.

- I. Introduction to Fire Protection Systems
 - 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
 - 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
 - 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
 1. Types & applications
 2. Fire department operations in buildings with standpipes

- E. Foam systems
 - F. Water mist systems
 - G. Fire pumps
 - 1. Types
 - 2. Components
 - 3. Operation
 - 4. Fire pump curves
- IV. Non-water-based fire suppression systems
- 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
- 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
- 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
- A. Types & applications
 - B. Selection
 - C. Placement
 - D. Maintenance
 - E. Portable fire extinguisher operations

- VIII. Fire streams
 - 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 cavitations

- IX. Friction loss
 - 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
 - A. Factors affecting engine pressure

- XI. Standpipe and sprinkler systems
 - 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 or group projects are encouraged.

Academic Integrity Statement: Mercer County Community College and the Fire Science program are committed to Academic Integrity -- the honest, fair and continuing pursuit of knowledge, free from fraud or deception. This implies that students are expected to be responsible for their own work and that faculty and academic support services staff members will take reasonable precautions to prevent the opportunity for academic dishonesty. The Fire Science program affirms its support of the Academic Integrity Policy as printed in the Student handbook and approved by the College Board of Trustees March 18, 2004.