



## COURSE OUTLINE FALL 2008

<u>FIR 104</u>	<u>Building Construction</u>
<b>Course Number</b>	<b>Course Title</b>
<u>3</u>	<u>3 Lecture Hours</u>
<b>Credits</b>	<b>Hours: lecture/laboratory/other (specify)</b>

### **Catalog description:**

This course provides an examination of building design and construction with emphasis on fire protection and life safety. The elements of construction and design of structures are shown to be key factors when inspecting buildings, preplanning fire operations, and operating at emergencies.

**Prerequisites:** None

**Corequisites:** None

**Is course New or Modified?** No

### **Required texts/other materials:**

*Brannigan's Building Construction for the Fire Service, 4<sup>th</sup> edition*; Francis Brannigan and Glenn Corbett, Jones and Bartlett Publishers, 2008. ISBN-13: 978-0-7637-4494-6

-and/or-

*Building Construction Related to the Fire Service, 2<sup>nd</sup> edition*: IFSTA, Fire Protection Publications, 1999. ISBN- 10: 0-87939-162-6

-and/or-

*Collapse of Burning Building*; Vincent Dunn, Pennwell Publications, 1998. ISBN- 978-0-87814-902-5 (optional)

**Last revised:** N/a

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

### **Information resources:**

#### **U.S. Fire Administration**

- *Building Construction, Combustible & Non-Combustible*, U. S. Fire Administration
- Publications: <http://www.usfa.fema.gov/applications/publications> See Arson, Fire Data, Fire Protection, Fire Service Operations, Hazardous Materials, Health and Safety, Wildfire
- Applied Research: <http://www.usfa.fema.gov>
- Research Reports: <http://www.usfa.fema.gov>
- Technical Reports: <http://www.usfa.fema.gov/applications/publications>
- Lessons Learned Information Sharing: <http://www.llis.dhs.gov/member/secure/index.cfm>
- Topical Fire Research Series: <http://www.usfa.fema.gov/research>

## **National Institute for Standards and Technology**

- <http://www.fire.nist.gov>: See Publications, FIREDOC (under Publications)
- Lessons Learned Information Sharing: <http://www.llis.dhs.gov/member/secure/index.cfm> and <http://www.usfa.fema.gov/applications/publications/techreps.cfm>

**Other learning resources:** (Describe any other student learning resources that are specific to this course, including any special tutoring or study group support, learning system software, etc.)

- FEMA Learning Resource Center: <http://www.lrc.fema.gov>
- Current Events/News
  - <http://www.firehouse.com>
  - <http://www.fireengineering.com>
  - <http://www.withthecommand.com>
  - <http://www.firefighterclosecalls.com>
- Society of Fire Protection Engineers: <http://www.pentoncmg.com/sfpe/index.html>

## **Course goals:**

### ***The student will be able to:***

- Demonstrate an understanding of building construction as it relates to firefighter safety, buildings codes, fire prevention, code inspection and firefighting strategy and tactics.
- Classify major types of building construction.
- Analyze the hazards and tactical considerations associated with the various types of building construction.
- Explain the different loads and stresses that are placed on a building and their interrelationships.
- Identify the principle structural components of buildings and demonstrate an understanding of the functions of each.
- Differentiate between fire resistance and flame spread, and describe the testing procedures used to establish ratings for each.
- Classify occupancy designations of the building code.
- Identify the indicators of potential structural failure as they relate to firefighter safety.
- Identify and analyze the causes involved in the line of duty firefighter deaths related to structural firefighting, training and research and the reduction of emergency risks and accidents.

## **Course-specific General Education Core Competencies and Goals.**

### **General Education Knowledge Goals**

**History.** Students will understand historical events and the significance that these events played in the development of modern building construction with relation to fire protection.

**Ethical Reasoning and Action.** Students will understand ethical issues and situations as related to fire safety and fire protection.

### **MCCC Core Skills**

**Critical Thinking and Problem-solving.** Students will use critical thinking and problem-solving skills in analyzing building construction information and its impact on fire behavior.

**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**

- understand the history of building construction
- identify governmental functions, building and fire codes
- correlate fire risks and the need for fire protection
- understand fire loss management and life safety
- identify pre-fire planning and fire suppression strategies

### **II. Principles of Construction**

- understand terminology and definitions
- identify building and occupancy classifications
- identify characteristics of building materials
- understand types and characteristics of fire loads
- correlate the effects of energy conservation

### **III. Building Construction**

- identify structural members
- understand definitions, descriptions and carrying capacities
- understand the effects of loads
- identify structural design and construction methods
- predict system failures

### **IV. Principles of Fire Resistance**

- identify standards of construction
- correlate fire intensity and duration
- understand theory vs. reality

### **V. Fire Behavior vs. Building Construction**

- understand flame spread
- identify methods of smoke and fire containment
- correlate construction types and installed suppression systems
- understand HVAC Systems
- identify the challenges of rack storage

### **VI. Combustible Construction**

- Wood Construction
  - understand definition and elements
  - identify types of construction
  - identify fire stopping and fire retardants
  - understand modifications and code compliance
- Ordinary Construction
  - understand definition and elements
  - understand structural stability and fire barriers
  - understand modifications and code compliance
- Collapse
- Ventilation

### **VII. Non-Combustible Construction**

- Steel Construction
  - understand definitions and elements of construction
  - correlate structural stability, fire resistance and fire protection of elements

- understand modifications and code compliance
- Concrete Construction
  - understand definitions and elements of construction
  - correlate structural stability and fire resistance
  - understand modifications and code compliance
- High Rise Construction
  - understand early vs. modern construction
  - understand vertical and horizontal extension of fire and smoke
  - identify fire protection and suppression needs
  - understand the design and installation of elevators
  - understand the design of atriums and lobbies
  - understand modifications and code compliance
- Collapse
- Ventilation

**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.

(Example of the final grade calculation – calculation will be at the discretion of the course instructor)

Presentation	20%
Quizzes	10%
Tests	50%
<u>Final Exam</u>	<u>20%</u>
Final Grade	100%

**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.