

Prepared by the Department of Social Sciences, Behavioral Sciences, and Human Services

Date of Departmental Approval: February 12, 2013

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Effective: Fall 2013

1. **Course Number:** FSC155  
**Course Title:** Fire Behavior and Combustion
2. **Description:** This course explores the theories and fundamentals of how and why fires start, spread, and are controlled.
3. **Student Learning Outcomes:** (instructional objectives, intellectual skills)  
Upon successful completion of this course, students are able to do the following.
  - Identify physical properties of the three states of matter
  - Identify the fundamental theories of fire behavior and combustion
  - Categorize the components of fire
  - Explain the physical and chemical properties of fire
  - Describe and apply the process of burning
  - Define and use basic terms and concepts associated with the chemistry and dynamics of fire
  - Discuss various materials and their relationships to fires as fuel
  - Demonstrate knowledge of characteristics of water as a fire suppression agent
  - Articulate other suppression agents and strategies
  - Compare methods and techniques of fire extinguishment
  - Compare the various types of extinguishing agents
4. **Credits:** 3 credits
5. **Satisfies General Education Requirement:** No
6. **Co-requisite:** FSC150/FSC100
7. **Semester Offered:** Varies
8. **Suggested General Guidelines for Evaluation:** Exams, quizzes, and class projects
9. **General Topical Outline:**
  - I. Introduction
    - A. Matter and Energy
    - B. The Atom and its Parts
    - C. Chemical Symbols
    - D. Molecules
    - E. Energy and Work
    - F. Forms of Energy
    - G. Transformation of Energy
    - H. Laws of Energy
  - II. Units of Measurements
    - A. International (SI) Systems of Measurement
    - B. English Units of Measurement
  - III. Chemical Reactions
    - A. Physical States of Matter
    - B. Components and Mixtures
    - C. Solutions and Solvents
    - D. Process of Reactions

- IV. Fire and the Physical World
  - A. Characteristics of Fire
  - B. Characteristics of Solids
  - C. Characteristics of Liquids
  - D. Characteristics of Gases
  
- V. Heat and its Effects
  - A. Production and Measurement of Heat
  - B. Different Kinds of Heat
  
- VI. Properties of Solid Materials
  - A. Common Combustible Solids
  - B. Plastics and Polymers
  - C. Combustible Metals
  - D. Combustible Dust
  
- VII. Common Flammable Liquids and Gases
  - A. General Properties of Gases
  - B. The Gas Laws
  - C. Classification of Gases
  - D. Compressed Gases
  
- VIII. Fire Behavior
  - A. Stages of Fire
  - B. Fire Phenomena
    - 1. Flashover
    - 2. Backdraft
    - 3. Rollover
    - 4. Flame over
  - C. Fire Plumes
  
- IX. Fire Extinguishment
  - A. Water
  - B. Foams and Wetting Agents
  - C. Inert Gas Extinguishment Agents
  - D. Halogenated Extinguishing Agents
  - E. Dry Chemical Extinguishing Agents
  - F. Dry Powder Extinguishing Agents
  
- X. Hazards by Classifications
  - A. Hazards of Explosives
  - B. Hazards of Compressed Gases
  - C. Hazards of Flammable and Combustible Liquids
  - D. Hazards of Flammable Solids
  - E. Hazards of Oxidizing Agents
  - F. Hazards of Poisons
  - G. Hazards of Radioactive Substances
  - H. Hazards of Corrosives