

FIRE-1500: FIRE BEHAVIOR AND COMBUSTION

Cuyahoga Community College

Viewing: FIRE-1500 : Fire Behavior and Combustion

Board of Trustees:

2012-03-22

Academic Term:

Spring 2020

Subject Code

FIRE - Fire Technology

Course Number:

1500

Title:

Fire Behavior and Combustion

Catalog Description:

Explores the theories and fundamentals of how and why fires start, spread, and how they are controlled.

Credit Hour(s):

2

Lecture Hour(s):

2

Requisites

Prerequisite and Corequisite

Departmental approval: Admission to or completion of Fire Academy.

Outcomes

Course Outcome(s):

Apply fundamental knowledge of the properties, behavior, and dynamics of fire.

Objective(s):

1. Identify physical properties of the three states of matter.
2. Categorize the components of fire.
3. Explain the physical and chemical properties of fire.
4. Describe and apply the process of burning.
5. Define and use basic terms and concepts associated with the chemistry and dynamics of fire.
6. Discuss various materials and their relationship to fires as fuel.

Course Outcome(s):

Apply knowledge of how to control and extinguish fires.

Objective(s):

1. Demonstrate knowledge of the characteristics of water as a fire suppression agent.
2. Articulate other suppression agents and strategies.
3. Compare other methods and techniques of fire extinguishments.

Methods of Evaluation:

1. Objective examinations
2. Practical hands-on exercises

Course Content Outline:

1. 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
2. Units of Measurements
 - a. International (SI) Systems of Measurement
 - b. English Units of Measurement
3. Chemical Reactions
 - a. Physical States of Matter
 - b. Compounds and Mixtures
 - c. Solutions and Solvents
 - d. Process of Reactions
4. Fire and the Physical World
 - a. Characteristics of Fire
 - b. Characteristics of Solids
 - c. Characteristics of Liquids
 - d. Characteristics of Gases
5. Heat and its Effects
 - a. Production and Measurement of Heat
 - b. Different Kinds of Heat
6. Properties of Solids Materials
 - a. Common Combustible Solids
 - b. Plastic and Polymers
 - c. Combustible Metals
 - d. Combustible Dust
7. Common Flammable Liquids and Gases
 - a. General Properties of Gases
 - b. The Gas Laws
 - c. Classification of Gases
 - d. Compressed Gases
 - e. Hazards of Corrosives
8. Fire Behavior
 - a. Stages of Fire
 - b. Fire Phenomena
 - i. Flashover
 - ii. Backdraft
 - iii. Rollover
 - iv. Flameover
 - c. Fire Plumes
9. Fire Extinguishment
 - a. The Combustion Process
 - b. The Character of Flame
 - c. Fire Extinguishment
10. Extinguishing Agents
 - a. Water
 - b. Foams and Wetting Agents
 - c. Inert Gas Extinguishing Agents
 - d. Halogenated Extinguishing Agents
 - e. Dry Chemical Extinguishing Agents
 - f. Dry Powder Extinguishing Agents
11. Hazards By Classification Types

- a. Hazards of Explosives
- b. Hazards of Compressed and Liquefied 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

Resources

Shackelford, Raymond. *Fire Behavior Combustion Processes*. Delmar, 2008.

Mahoney, Eugene. *Fire Suppression Practices Procedures*. Upper Saddle River, NH: Prentice Hall, 2010.

Gorbett, Gregory. *Fire Dynamics*. Upper Saddle River, NJ: Prentice Hall, 2010.

IFSTA. *Introduction to Fire Origin Cause*. 3rd ed. Huntington, CA: IFSTA, 2008.

Katnermann, Ronald. *Managing Fireworks Displays*. Clifton Park, NY: Delmar Cengage Learning, 2008.

Instructional Services

OAN Number:

Transfer Assurance Guide OFS003 and Career Technical Assurance Guide CTFF002 (3 of 3 courses, all must be taken) and CTFF003 (3 of 5 courses, all must be taken)

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Key: 1966