

COURSE SYLLABUS

LAST REVIEW	Spring 2021
COURSE TITLE	Fire Behavior and Combustion
COURSE NUMBER	FRSC 0114
DIVISION	Health Professions
DEPARTMENT	Fire Science
CIP CODE	43.0203
CREDIT HOURS	3
CONTACT HOURS/WEEK	Class: 3
PREREQUISITES	None
COURSE PLACEMENT	Students must meet the correct placement measure for this course. Information may be found at: https://www.kckcc.edu/admissions/information/mandatory-evaluation-placement.html

COURSE DESCRIPTION

An introduction to the broad range of phenomena that, together make up a fire. It covers the fundamentals of fire chemistry and physics, ignition, fire growth and spread, smoke generation and movement, safety hazards, fire suppression, and computer modeling of fires.

PROGRAM LEARNING OUTCOMES

1. Demonstrate physical skills needed for employment as a firefighter.
2. Explain fire behavior.
3. Apply emergency management skills to provide basic emergency medicine in the field.
4. Evaluate strategy and tactics related to fire safety, survival techniques, and fire management.
5. Explain legal issues related to fire services administration.
6. Demonstrate employability skills necessary for completing the job search process.

TEXTBOOKS

<http://kckccbookstore.com/>

METHODS OF INSTRUCTION

A variety of instructional methods may be used depending on content area. These include but are not limited to: lecture, multimedia, cooperative/collaborative learning, labs and demonstrations, projects and presentations, speeches, debates, panels, conferencing, performances, and learning experiences outside the classroom. Methodology will be selected to best meet student needs.

COURSE 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. Compounds 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. Plastic 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. Flameover
 - 5. Heat Flow
- C. Fire Plumes

IX. Fire Extinguishment

- A. The Combustion Process
- B. The Character of Flame
- C. Fire Extinguishment

X. 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

XI. 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
- H. Hazards of Corrosives

COURSE LEARNING OUTCOMES

Upon successful completion of this course, the student will:

- A. Identify physical properties of the three states of matter.
- B. Categorize the components of fire.
- C. Explain the physical and chemical properties of fire.
- D. Describe and apply the process of burning.
- E. Define and use basic terms and concepts associated with the chemistry and dynamics of fire.
- F. Explain the effect and dangers of air movement on the combustion process.
- G. Discuss various materials and their relationship to fires as fuel.
- H. Demonstrate knowledge of the characteristics of water as a fire suppression agent.
- I. Articulate other suppression agents and strategies.
- J. Compare other methods and techniques of fire extinguishments.

ASSESSMENT OF COURSE LEARNING OUTCOMES

Student progress is evaluated through both formative and summative assessment methods. Specific details may be found in the instructor's course information document.

COLLEGE POLICIES AND PROCEDURES

Student Handbook

<https://www.kckcc.edu/files/docs/student-resources/student-handbook-and-code-of-conduct.pdf>

College Catalog

<https://www.kckcc.edu/academics/catalog/index.html>

College Policies and Statements

<https://www.kckcc.edu/about/policies-statements/index.html>

Accessibility and Accommodations

<https://www.kckcc.edu/academics/resources/student-accessibility-support-services/index.html>.