

# FIRE 005: FIRE BEHAVIOR & COMBUSTION

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Date Submitted: Thu, 04 Jun 2020 17:55:14 GMT

**Originator**

asventura

**Justification / Rationale**

Textbook update

CIM updates that didn't cross over from CNet.

**Effective Term**

Spring 2020

**Credit Status**

Credit - Degree Applicable

**Subject**

FIRE - Fire Technology

**Course Number**

005

**Full Course Title**

Fire Behavior & Combustion

**Short Title**

FIRE BHAVOR/COMBUSTN

**Discipline****Disciplines List**

Fire Technology

**Modality**

Face-to-Face

100% Online

**Catalog Description**

This course explores the theories and fundamentals of how and why fires start, spread, and are controlled. This course is designated Fire 5 by the California State Board of Fire Services and the State Fire Marshal and is part of the designated core curriculum. This course meets the Fire and Emergency Service Higher Education (FESHE) model curriculum for an Associate Degree as recognized by the National Fire Academy.

**Schedule Description**

This course explores the theories and fundamentals of how and why fires start, spread, and are controlled. Advisory: ENG 061

**Lecture Units**

3

**Lecture Semester Hours**

54

**Lab Units**

0

**In-class Hours**

54

**Out-of-class Hours**

108

**Total Course Units**

3

**Total Semester Hours**

162

**Prerequisite Course(s)**

Advisory: ENG 061

**Required Text and Other Instructional Materials****Resource Type**

Book

**Open Educational Resource**

Yes

**Author**

Richard G. Gann; Raymond Friedman

**Title**

Principles of Fire Behavior and Combustion

**Edition**

Fourth

**City**

Burlington, MA 01803 USA

**Publisher**

Jones and Bartlett Learning

**Year**

2015

**College Level**

Yes

**Flesch-Kincaid Level**

12th

**ISBN #**

9780763757175

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**Class Size Maximum**

30

**Entrance Skills**

Write organized summaries and responses to readings.

**Requisite Course Objectives**

ENG 061-Use theses to organize paragraphs into coherent analyses.

ENG 061-Demonstrate the ability to think critically and express ideas using various patterns of development.

ENG 061-Demonstrate the ability to use research skills including library resources such as books, periodicals, electronic databases and online resources such as the internet.

ENG 061-Utilize a handbook to properly cite and document source material in MLA format.

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**Course Content**

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. American Fire Services: The Past, Present, and Future
3. Units of Measurements
  - a. International (SI) Systems of Measurement
  - b. English Units of Measurement
4. Chemical Reactions
  - a. Physical States of Matter
  - b. Compounds and Mixtures
  - c. Solutions and Solvents
  - d. Process of Reactions
5. Fire and the Physical World
  - a. Characteristics of Fire
  - b. Characteristics of Solids
  - c. Characteristics of Liquids
  - d. Characteristics of Gases
6. Heat and its Effects
  - a. Production and Measurement of Heat
  - b. Different Kinds of Heat
7. Properties of Solid Materials
  - a. Common Combustible Solids
  - b. Plastic and Polymers
  - c. Combustible Metals
  - d. Combustible Dust
8. Common Flammable Liquids and Gases
  - a. General Properties of Gases
  - b. The Gas Laws
  - c. Classification of Gases
  - d. Compressed Gases
9. Fire Behavior
  - a. Stages of Fire
    - i. Fire Phenomena
    - ii. Flashover
    - iii. Backdraft
    - iv. Rollover
    - v. Flameover
  - b. Fire Plumes
10. Fire Extinguishment
  - a. The Combustion Process
  - b. The Character of Flame
  - c. Fire Extinguishment
11. 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
12. Foundation of Firefighting Tactics and Strategies

13. Special Concerns in Firefighting
  - a. Highrise Building Fires
  - b. Wildland Fires
  - c. Transportation Fires and Related Safety Issues
14. Hazardous Materials and Warning Systems
  - 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 Objectives

Objectives	
Objective 1	Identify the basic chemical symbols used in chemical formula writing.
Objective 2	Identify physical properties of the three states of matter.
Objective 3	Categorize the components of fire.
Objective 4	Explain the physical and chemical properties of fire.
Objective 5	Describe and apply the process of burning.
Objective 6	Define and use basic terms and concepts associated with the chemistry and dynamics of fire.
Objective 7	Discuss various materials and their relationship to fires as fuel.
Objective 8	Demonstrate knowledge of the characteristics of water as a fire suppression agent.
Objective 9	List various types and mediums of extinguishing agents
Objective 10	Articulate other suppression agents and strategies.
Objective 11	Compare other methods and techniques of fire extinguishment.

### Student Learning Outcomes

Upon satisfactory completion of this course, students will be able to:	
Outcome 1	Identify the fundamentals and scientific principles of fire behavior and combustible material.
Outcome 2	Differentiate various types of extinguishing agents and suppression techniques for products of combustion.
Outcome 3	Describe hazardous and toxic materials that are present during fire combustion.

### Methods of Instruction

Method	Please provide a description or examples of how each instructional method will be used in this course.
Discussion	Analyze building construction failures during firefighting operations
Technology-based instruction	Analyze video scenarios of fire behavior and combustion
Role Playing	Group activities
Participation	Participate in classroom/online posting discussion.
Lecture	Classroom lectures pertaining to each chapter
Individualized Study	Read case study scenarios of building collapses that led to firefighter injuries or deaths
Technology-based instruction	Online discussion posts and peer reviews

### Methods of Evaluation

Method	Please provide a description or examples of how each evaluation method will be used in this course.	Type of Assignment
College level or pre-collegiate essays	Complete 5-page term paper using MLA formatting.	Out of Class Only
Oral and practical examination	In class and online video presentations	In and Out of Class

Student participation/contribution	Subject Matter Expert panel participation includes student groups reviewing their assigned chapters and then presenting it to the class. Students will then continue with an hour long Q&A session facilitated by faculty.	In Class Only
Tests/Quizzes/Examinations	Chapter quizzes covering 14 chapters from the textbook. Pre-Assessments, quizzes, and final exam.	In and Out of Class
Tests/Quizzes/Examinations	Proctored Final Exam Online	Out of Class Only
Self/peer assessment and portfolio evaluation	Peer assessments and required postings during discussions. Minimum of 250 word posts each week including minimum of two peer reviews.	Out of Class Only
Presentations/student demonstration observations	Student presentations using audio visual aids. Students may use PowerPoints and or videos to enhance their presentations.	In Class Only
Self-paced testing	Read assigned chapter text (20-25 pages) and review case study scenarios. Case scenarios for each chapter are part of the online assignments and discussions.	Out of Class Only
Reading reports	Review building collapses for individual building construction types	Out of Class Only
Written homework	Workbook assignments and extra credit assignments	Out of Class Only
Self-paced testing	Study for weekly chapter quizzes and final examination	Out of Class Only

## Assignments

### Other In-class Assignments

1. Participation
2. Observation
3. Group discussion/required postings
4. Class presentation/Video Presentation
5. Reading of handouts and student manual
6. Reading textbook and case studies

### Other Out-of-class Assignments

1. Read 20-25 pages in text weekly and complete handout assignments
2. Review and prepare to discuss weekly case study scenarios from the text book
3. Library assignments for research
4. Prepare oral/video presentation of projects
5. Prepare 5-page term paper project
  - a. research, online and library
  - b. complete draft term paper
  - c. TASC visit for proper formatting
6. Complete workbook assignments for 14 chapters during semester
7. Complete review question assignments for 14 chapters during semester
8. Study and complete 14 chapters of Pre-Assessment assignments
9. Study for weekly chapter quizzes
10. Study for final examination

### Grade Methods

Letter Grade Only

## Distance Education Checklist

### Instructional Materials and Resources

### Effective Student/Faculty Contact

Which of the following methods of regular, timely, and effective student/faculty contact will be used in this course?

#### Within Course Management System:

Timely feedback and return of student work as specified in the syllabus  
Discussion forums with substantive instructor participation  
Regular virtual office hours  
Online quizzes and examinations  
Video or audio feedback  
Weekly announcements

#### External to Course Management System:

Direct e-mail  
Posted audio/video (including YouTube, 3cm mediasolutions, etc.)  
Telephone contact/voicemail

**Briefly discuss how the selected strategies above will be used to maintain Regular Effective Contact in the course.**

Student contact and regular effective contact will be maintained through phone calls, video conferences, emails, grading comments and discussion posts.

### Other Information

#### Comparable Transfer Course Information

##### University System

CSU

##### Campus

CSU Los Angeles

##### Course Title

Fire Behavior and Control

##### Catalog Year

2013-14

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### MIS Course Data

#### CIP Code

43.0201 - Fire Prevention and Safety Technology/Technician.

#### TOP Code

213300 - Fire Technology

#### SAM Code

D - Possibly Occupational

#### Basic Skills Status

Not Basic Skills

#### Prior College Level

Not applicable

#### Cooperative Work Experience

Not a Coop Course

**Course Classification Status**

Credit Course

**Approved Special Class**

Not special class

**Noncredit Category**

Not Applicable, Credit Course

**Funding Agency Category**

Not Applicable

**Program Status**

Program Applicable

**Transfer Status**

Transferable to CSU only

**General Education Status**

Not applicable

**Support Course Status**

Course is not a support course

**C-ID**

FIRE 140 X

**Allow Audit**

No

**Repeatability**

No

**Materials Fee**

No

**Additional Fees?**

No

**Approvals****Curriculum Committee Approval Date**

10/01/2019

**Academic Senate Approval Date**

10/10/2019

**Board of Trustees Approval Date**

11/13/2019

**Chancellor's Office Approval Date**

6/4/2020

**Course Control Number**

CCC000245600

**Programs referencing this course**

Fire Technology Certificate of Achievement (<http://catalog.collegeofthedesert.eduundefined?key=146/>)