FIRE 0003 - FIRE BEHAVIOR AND COMBUSTION

Catalog Description

Advisory: Completion with grade of "C" or better or concurrent enrollment in FIRE 1
Hours: 54 lecture
Description: Theory and fundamentals of how and why fires start, spread, and are controlled; an in-depth study of fire chemistry and physics, fire characteristics of materials, extinguishing agents, and fire control techniques. (C-ID FIRE 140X) (CSU-with unit limitation)

Course Student Learning Outcomes

- CSLO #1: Compare, differentiate and explain terminology, definitions, and phenomena of fire chemistry and dynamics.
- CSLO #2: Assess and justify various methods and techniques to use in fire extinguishment.
- CSLO #3: Compare and contrast desirable and undesirable characteristics of water, and recommend its most appropriate application, given a structural fire scenario.

Effective Term

Fall 2018

Course Type

Credit - Degree-applicable

Contact Hours

54

Outside of Class Hours

108

Total Student Learning Hours

162

Course Objectives

1. Identify the fundamental theories of fire behavior and combustion;
2. Differentiate the various types of extinguishing agents;
3. Identify Physical properties of the three states of matter;
4. Categorize the components of fire;
5. Explain the physical and chemical properties of fire;
6. Describe and apply the process of burning;
7. Define and use basic terms and concepts associated with the chemistry and dynamics of fire;
8. Discuss various materials and their relationship to fires as fuel;
9. Demonstrate knowledge of the characteristics of water as a fire suppression agent;
10. Articulate other suppression agents and strategies;
11. Compare other methods and techniques of fire extinguishments.

General Education Information

- Approved College Associate Degree GE Applicability
- CSU GE Applicability (Recommended-requires CSU approval)
- Cal-GETC Applicability (Recommended - Requires External Approval)
- IGETC Applicability (Recommended-requires CSU/UC approval)

Articulation Information

- CSU Transferable

Methods of Evaluation

- Classroom Discussions
  - Example: Following a lecture and through an instructor lead discussion, students are list the four main classes of fire extinguishers and give an example of what type of fire each would be properly used for. Students will be evaluated on the correct responses based on industry standards.
- Objective Examinations
  - Example: Students will take a multiple choice test on the phases of fire. Standard grading. Example: What is the first phase of fire?
- Problem Solving Examinations
  - Example: Following a lecture, students will work in groups and explain the spontaneous ignition process. Students will be evaluated based on logical reasoning and the ability to properly explain how spontaneous ignition occurs. Example Question: How does a rag saturated with a flammable liquid spontaneously ignite?
- Reports
  - Example: Students will write a report on why backdraft occurs and the effects it has on fire behavior and spread. Reports will be evaluated by an instructor provided rubric.

Repeatable

No

Methods of Instruction

- Lecture/Discussion
- Distance Learning

Lecture:

1. The instructor will explain how to use the periodic table of elements and students will then answer questions on a handout pertaining to atomic weight, number or symbol of a given element.
2. The instructor will give demonstrations of reactions such as oxidation/reduction, combustion, exothermic/endothermic reactions and students will identify the circumstance where they may encounter these reactions.

Distance Learning

1. Following a brief introduction video and reading assignment of how to identify the proper extinguishing agent for a specific product, the students will research the proper extinguishing agent for two combustible products of their choice as part of their term paper.
2. Following a brief intro video and reading assignment describing the difference between a "bi-directional flow path" and a "uni-directional flow path"; the students shall discuss this subject in a discussion board both with the instructor and other students with in the class.

Typical Out of Class Assignments
Reading Assignments

1. The student will read the material on classification of fire and extinguishing agents and then complete a worksheet identifying the correct extinguishing agent to be used on a particular class of fire. 2. The student will read the material on the Department of Transportation hazard classes and then complete a worksheet identifying the nine hazard classes.

Writing, Problem Solving or Performance

1. Write an essay outlining the characteristics of the classes of hazardous materials, how they impact responders and what resources are available to assist responders. 2. Determine the atomic number, symbol and atomic weight of a given element using a periodic table of elements.

Other (Term projects, research papers, portfolios, etc.)
Required Materials

- Principles of Fire Behavior and Combustion
  - Author: Robert G. Gann
  - Publisher: Jones & Bartlett
  - Publication Date: 2015
  - Text Edition: 4th
  - Classic Textbook?:
  - OER Link:
  - OER:
- Strategic and Tactical Firefighting
  - Author: IAFC, NIST, UL, NFPA
  - Publisher: Jones & Bartlett
  - Publication Date: 2016
  - Text Edition: 1st
  - Classic Textbook?:
  - OER Link:
  - OER:

Other materials and-or supplies required of students that contribute to the cost of the course.