

J. Sargeant Reynolds Community College
Course Content Summary

Course Prefix and Number: FST 112

Credits: 3

Course Title: Hazardous Materials Chemistry

Course Description: Provides basic fire chemistry relating to the categories of hazardous materials, including problems of recognition, reactivity, and health encountered by firefighters. (Usually offered in spring only.) Lecture 3 hours per week.

General Course Purpose:

Course Prerequisites and Co-requisites:

None

Student Learning Outcomes:

Upon completing the course, the student will be able to

- a. Identify the common elements by their atomic symbols on the Periodic Table and demonstrate an understanding of why the table is organized into columns and groups;
- b. Differentiate between elements, compounds, and mixtures, and give examples of each;
- c. Explain the difference between ionic and covalent bonding and be able to predict when each will occur;
- d. Identify, name, and understand the basic chemistry involved with common hydrocarbon derivatives;
- e. Comprehend the basic chemical and physical properties of gases, liquids, and solids, and predict the behavior of a substance under adverse conditions;
- f. Identify, name, and understand the basic chemistry and hazards involved with the nine U.S. Department of Transportation hazard classes and their divisions;
- g. Analyze facility occupancy, transportation documents, shape and size of containers, and Material Safety Data Sheets (MSDS) to recognize the physical state and potential hazards of reactivity related to firefighter health and safety;
- h. Demonstrate the ability to utilize guidebooks to determine an initial course of action for emergency responders; and
- i. Identify and analyze the causes involved in the line of duty firefighter deaths related to structural and wild land firefighting, training, and research, and the reduction of emergency risks and accidents;

Major Topics to Be Included:

- a. Common elements by their atomic symbols on the Periodic Table
- b. Differences between elements, compounds, and mixtures
- c. Ionic and covalent bonding
- d. Chemistry involved with common hydrocarbon derivatives

- e. Chemical and physical properties of gases, liquids, and solids, and the behavior of a substance under adverse conditions
- f. Chemistry and hazards involved with the nine U.S. Department of Transportation hazard classes and their divisions
- g. Facility occupancy, transportation documents, shape and size of containers, and Material Safety Data Sheets (MSDS) as they apply to the physical state and potential hazards of reactivity related to firefighter health and safety
- h. Guidebooks to determine an initial course of action for emergency responders
- i. Causes involved in the line of duty firefighter deaths related to structural and wild land firefighting, training, and research, and the reduction of emergency risks and accidents

Date Created/Updated (Month, Day, Year): March 12, 2019