

**J. Sargeant Reynolds Community College  
Course Content Summary**

**Course Prefix and Number:** FST 112

**Credits:** 3

**Course Title:** Hazardous Materials Chemistry

**Course Description (including lecture hours, lab hours, total contacts)**

This course provides basic fire chemistry relating to the categories of hazardous materials including problems of recognition, reactivity, and health encountered by firefighters. Lecture 3 hours per week.

**Course Prerequisites/Corequisites** (*Entry-level competencies **required** for enrollment*)

None

**Course Objectives** (Each item should complete the following sentence.)

Upon completing the course, the student will be able to:

1. 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.
2. Differentiate between elements, compounds and mixtures, and give examples of each.
3. Explain the difference between ionic and covalent bonding and be able to predict when each will occur.
4. Identify, name, and understand the basic chemistry involved with common hydrocarbon derivatives.
5. Comprehend the basic chemical and physical properties of gases, liquids and solids, and predict the behavior of a substance under adverse conditions.
6. Identify, name, and understand the basic chemistry and hazards involved with the nine U.S. Department of Transportation hazard classes and their divisions.
7. 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.
8. Demonstrate the ability to utilize guidebooks to determine an initial course of action for emergency responders.
9. Identify and analyze the causes involved in the line of duty firefighter deaths related to structural and wildland firefighting, training and research and the reduction of emergency risks and accidents.

**Major Topics to be Included**

1. Common elements by their atomic symbols on the Periodic Table
2. Differences between elements, compounds and mixtures
3. Ionic and covalent bonding
4. Chemistry involved with common hydrocarbon derivatives
5. Chemical and physical properties of gases, liquids and solids, and the behavior of a substance under adverse conditions.
6. Chemistry and hazards involved with the nine U.S. Department of Transportation hazard classes and their divisions.

7. 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.
8. Guidebooks to determine an initial course of action for emergency responders.
9. 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.

**Effective Date of Course Content Summary (Month, Date Year):** September 11, 2008