J. Sargeant Reynolds Community College
Course Content Summary

Course Prefix and Number: ENV 195 **Credits:** 4

Course Title: Topics in Environmental Science: The Environment and Its Chemistry

Course Description:
Introduces chemical principles and applies them to environmental issues. Covers the fundamental principles, concepts, and language of general, organic, inorganic, and biochemistry. Addresses topics associated with matter/energy, nuclear chemistry, air and water quality, and wastes. Laboratories will include sampling, analysis, and generation of statistically-valid data while preparing students to think like environmental scientists. Prerequisite: MTE 4 or equivalent. Lecture 3 hours. Laboratory 3 hours. Total 6 hours per week.

General Course Purpose:
The Environment and Its Chemistry is designed to introduce general chemistry concepts and principles as they pertain to topics related to the environment.

Course Objectives:
Upon completing the course, the student will be able to
1. Explain why chemistry is the central science, particularly with regard to the biological and physical sciences relative to the environment.
2. Recite the fundamentals of chemical composition in terms of matter and energy, atoms and elements, and chemical bonding.
3. Explain principles pertaining to atmospheric pressure, air composition, and air pollution.
4. Explain greenhouse gases and their effects on the environment.
5. Describe the effects of chlorofluorocarbon on the ozone layer.
6. Explain the concepts of chemical reactivity including acid-base reactions and effects of corrosive chemicals on the environment.
7. Describe the properties of water and the effects of pollution on water quality.
8. Identify sources of energy through learning the nature of hydrocarbons and nuclear chemistry.
9. Discuss conductivity impact on water chemistry.

Major Topics to be Included:
1. General Chemistry Concepts
   a. Matter and energy
   b. Scientific measurements
   c. Elements, atoms, and radioactive nuclides
   d. Laws of thermodynamics
   e. Compounds – ionic, covalent, molecular geometry, and shapes
   f. Chemical equations and quantities – stoichiometry
   g. Gases and solutions
   h. Organic nomenclature
2. Pollution
   a. Water
   b. Waste water
   c. Solid and HAZMAT wastes
3. Emerging Issues
   a. Climate change
   b. Green energy
   c. Disasters

Effective Date of Course Content Summary: January 9, 2013