COURSE OUTLINE

CHEM-135

Chemistry for Engineers

3 Credits

Science Core Course

HOWARD COMMUNITY COLLEGE

Description

Designed mainly for engineering students intending to transfer to the University of Maryland, College Park, this course will enable the student to solve problems and answer questions involving atomic structure, electron arrangement, the mole concept, stoichiometry and chemical reactions, solutions, gas laws and kinetic theory, chemical equilibrium, electrochemistry, and reaction rates. Prerequisite: MATH-143. (3 hours lecture)

Statement on General Education and Liberal Learning

A liberal education prepares students to lead ethical, productive, and creative lives and to understand how the pursuit of lifelong learning and critical thinking fosters good citizenship. General education courses form the core of a liberal education within the higher education curriculum and provide a coherent intellectual experience for all students by introducing the fundamental concepts and methods of inquiry in the areas of mathematics, the physical and natural sciences, the social sciences, the arts and the humanities, and composition. This course is part of the general education core experience at Howard Community College.

Overall Course Objectives

Upon completion of this course, the student will be able to:

1. Explain the scientific method of inquiry.
2. Interpret chemical facts and principles.
3. Define and use the terminology of chemistry.
4. Apply techniques such as dimensional analysis to problem solving.
5. Apply chemical principles to solve quantitative and qualitative problems.
6. Apply chemical principles to explain practical chemical applications.
7. Explain the interrelationship of chemistry, the other sciences and engineering.

Major Topics

I. Introductory Concepts of Science
   - A. Units of Measurement
   - B. Significant Figures
   - C. Use of Dimensional Analysis in Problem Solving

II. Atoms, Molecules and Compounds
   A. Atomic Structure
   B. Isotopes
   C. The Periodic Table
   D. Determining Chemical Formulas
   E. Nomenclature

III. Chemical Reactions
   A. The Mole Concept
   B. Chemical Equations
   C. Stoichiometry
   D. Reactions in Aqueous Solution
   E. Concentration of Solutions

IV. Atomic and Molecular Structure
   A. Quantum Numbers
   B. Electronic Structure of Atoms
   C. Electron Configurations
   D. Covalent Bonding
   E. Molecular Geometry
   F. Organic Compounds

V. Gases and Solutions
   A. Gases
   B. Intermolecular forces
   C. Properties of Solutions

VI. Chemical Equilibrium
   A. Equilibrium Constants
   B. Acids and Bases

VII. Chemical Kinetics

VIII. Electrochemistry

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member, but grades will be calculated from the results of exams, quizzes, and assignments.

Writing: Specific writing assignments will be determined by the individual faculty member.

Other Course Information

This course is a Science core course, Science elective, and an Arts and Sciences elective.