COURSE OUTLINE

CHEM-103

Fundamentals of General Chemistry

4 Credits

Science Core Course

HOWARD COMMUNITY COLLEGE

Description

This one semester course is designed mainly for students who are interested in the allied health field. This course will provide the student with an introduction to inorganic chemistry and general chemical principles. The student will be able to answer questions and solve problems involving measurement, atomic structure, chemical bonding, molecular structure, chemical reactions, stoichiometry, gas laws, solutions, kinetics, equilibrium and nuclear reactions. Laboratory experiments will provide the student with opportunities to collect and analyze data and identify unknown chemical substances from their properties. Prerequisite: Eligible to enroll in MATH-070. (3 hours lecture, 3 hours lab)

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. Describe the nature of scientific inquiry.
2. State chemical facts and principles.
3. Apply problem solving techniques such as dimensional analysis, GOV, and visualization to chemical problems.
4. Apply chemical principles to solve problems.
5. Apply chemical principles to practical applications in the allied health field.
6. Collect and record data in the laboratory.
7. Analyze laboratory data and identify unknown substances.
8. Observe all safety regulations in the laboratory.
9. Write a formal lab report.
10. Discuss the fundamental role of chemistry in the allied health field.

Major Topics

I. Measurement and Matter

- A. Measurement and the Metric System
- B. Problem Solving by Dimensional Analysis
- C. Classification of Matter
- D. The Periodic Table

II. Atomic Structure
   A. Subatomic particles
   B. Atomic Mass and Isotopes
   C. The Hydrogen Atom
   D. Electron Configurations
   E. Periodic Trends in Atomic Properties

III. Chemical Bonding and Molecular Structure
   A. Ionic Bonding
   B. Formulas for Ionic Compounds
   C. Covalent Bonding
   D. Molecular Shapes

IV. Compounds, Chemical Reactions, and Stoichiometry
   A. The Mole Concept
   B. Molar Mass
   C. Determination of the Formula for a Compound
   D. Types of Chemical Reactions
   E. Balancing Chemical Equations
   F. Stoichiometry

V. States of Matter and Solutions
   A. Gases
   B. Liquids and Solids
   C. Solutions
   D. Acids, Bases and Salts

VI. Chemical Kinetics and Equilibrium
   A. Rates of Reactions
   B. Reversible Reactions and Equilibrium
   C. Equilibrium Constants

VII. Nuclear Reactions
   A. Radioactivity
   B. Nuclear Fission and Fusion
   C. Biological Effects of Radiation

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will be calculated on the basis of exams, lab quizzes, lab experiments, and lab reports.

Writing: Specific writing assignments will be determined by the individual faculty member but will include lab reports.

Other Course Information

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