

Common Course Outline

CHEM 121

General Chemistry I

3 Credits

The Community College of Baltimore County

Course Description

CHEM 121 – 3 credits – General Chemistry I includes the study of atomic structure, nomenclature, chemical reactions and equations, stoichiometry, thermochemistry, chemical bonds and structures; typically taken by science, health professional and engineering majors. For students needing a lab, CHEM 122: General Chemistry I Laboratory, serves as the accompanying lab.

3 Credits: 3 lecture hours

Prerequisite: a) CHEM 107 and CHEM 108 with a grade of C or better ; OR
b) a passing grade on the chemistry placement test and (ENGL 052 and RDNG 052) or ACLT 052; and MATH 083; OR
c) permission of department chair.

Overall Course Objectives

Upon completion of this course students will be able to:

1. describe the process of science including the scientific method;
2. find, evaluate, use and cite appropriate academic resources to present chemistry information using effective written and/or oral communications;
3. apply the rules of nomenclature to the formulas of inorganic compounds and ions;
4. apply formulas and nomenclature to construct and balance chemical equations;
5. solve quantitative mass-to-mass conversion problems;
6. use the mole concept to solve problems involving stoichiometry;
7. solve problems including concentration and dilution of aqueous solutions;
8. solve problems involving precipitation, acid-base, and oxidation-reduction reactions;
9. describe the physical behavior of gases, the gas laws and the kinetic molecular theory of gases;
10. mathematically illustrate the first law of thermodynamics, Hess's law of summation, and enthalpies of formation and reaction;
11. describe the electronic structure of atoms;
12. describe the organization of the periodic table;
13. determine the structure of simple covalent molecules and polyatomic ions using Lewis structures;

14. apply the Valence Shell Electron Pair Repulsion (VSEPR) theory and the valence bond theory (orbital hybridization) to determine molecular geometry of simple molecular compounds and polyatomic ions;
15. describe the impact of chemistry on individuals, societies and the environment using specific examples, and
16. evaluate professional behavior within the scientific community and explain the ramifications of misconduct.

Major Topics

- I. Nomenclature – Atoms, Ions, Compounds
- II. Stoichiometry
- III. Reactions in Solution: Classification including Oxidation-Reduction
- IV. Physical Behavior of Gases and the Kinetic Molecular Theory
- V. Thermochemistry
- VI. The Periodic Table
- VII. Atomic and Electronic Structure
- VIII. Bonding Theories: VSEPR, Valence Bond, and Molecular Orbital
- IX. Chemical Bonding – Ionic, Covalent, Metallic, and Coordinate-Covalent Bonds
- X. Molecular Geometry
- XI. Universality of application of chemical principles

Course Requirements

Grading procedures will be determined by the individual faculty member but will include the following:

Grading/examinations

- minimum of three examinations including a comprehensive final examination
- minimum of four quizzes (at least 10% of the course grade)
- electronic homework (at least 10% of the course grade)
- minimum of three written assignments (including problem sets)

Written Assignments: Multiple assignments will infuse CCBC General Education Program objectives; at least one assignment worth a minimum 10% of the total course grade will allow students to demonstrate at least 5 of the 7 General Education Program outcomes. Students will utilize appropriate academic resources.

Other Course Information

This course is an approved 3-credit General Education course in the Biological and Physical Sciences Category that **does not fulfill** the laboratory requirement. Please refer to the current CCBC Catalog for General Education course criteria and outcomes.