CHEM 107
Fundamentals of Chemistry
3 Credits

Community College of Baltimore County
Common Course Outline

Description

CHEM 107 – Fundamentals of Chemistry: serves as an introductory chemistry course in which students survey the concepts of general chemistry. Topics include states of matter, atomic structure, the periodic table, bonding, nomenclature, chemical reactions, chemical equations, and quantitative relationships. For students needing a lab, CHEM 108: Fundamentals of Chemistry Laboratory, serves as the accompanying lab.

Pre-requisites: (ESOL 052 and ESOL 054) and MATH 082
Co-requisites: ACLT 053

Overall Course Objectives

Upon completion of this course, students will be able to:

1. apply chemical principles and scientific concepts required for the health sciences, or for continuation in a higher-level chemistry course;
2. apply the principles of the scientific method to the critical analysis and evaluation of new information;
3. explain the effect of chemistry on individuals, diverse societies, and on the world around us;
4. find, evaluate, use, and cite appropriate academic resources;
5. explain basic concepts of atomic theory, atomic structure, and the structure of matter;
6. apply basic knowledge of chemical and physical properties and periodic relationships to predict characteristics of specific elements;
7. perform dimensional analysis, unit conversions (within the metric system as well as from the U.S. Customary System of measurement), and use significant figures in calculations;
8. correctly name and write symbols/formulas for elements, ions, and compounds;
9. apply concepts of electronic structure of the atom to explain molecular geometry, polarity, and chemical properties of matter;
10. explain the principles behind chemical bonding;
11. apply concepts of the main types of chemical reactions to become more familiar with their relevance in many processes that occur around us;
12. perform stoichiometry calculations, including writing and balancing equations, for different types of chemical reactions;
13. apply solubility rules to predict outcome of reactions, calculate solution concentrations, and determine pH (integer values only);
14. use appropriate technology in the collection, analysis, and reporting of chemistry information;

15. evaluate professional behavior within the scientific community including standards of academic and scientific integrity and the ramifications of misconduct; and
16. describe the universal applicability of the laws of chemistry, making them the intellectual property of all humankind.

Major Topics

I. Science vs. Technology
II. Measurements, Metric System, and Chemical Calculations
III. Chemical Nomenclature
IV. Atomic and Molecular Weights, Moles, and Stoichiometry
V. Chemical Reactions
VI. Properties of Gases, Liquids and Solids, and Changes in State
VII. Atomic Structure and the Nucleus
VIII. Atomic Structure: Electrons and Energy Levels
IX. Periodic Properties
X. Chemical Bonding, Molecular Shapes, and Molecular Polarity
XI. Solutions: Properties and Calculations
XII. Thermochemistry
XIII. pH scale
XIV. Global Developments in Chemistry

Course Requirements

Grading will be determined by the individual faculty member, but shall include the following, at minimum:

- four quizzes
- three unit exams
- a cumulative final exam
- ten electronic homework assignments
- two written assignments (including problem sets) one of which will evaluate General Education Outcomes
- a maximum of 3% of the final grade for extra credit points

Written assignments and research projects: Students are required to use appropriate academic resources in their research and cite sources according to the style selected by their professor.

Other Course Information

This course is an approved 3–credit General Education course in the Biological and Physical Sciences but does not fulfill the laboratory requirement.
One or more assignments will infuse CCBC General Education Program outcomes and will account for a minimum of 10% of the total course grade. The assignment(s) will allow students to demonstrate at least 5 of the 7 General Education program outcomes.
This course along with CHEM 108 may be used to fulfill 4 credits of the General Education requirement in Biological and Physical Sciences. Students not planning to enroll in a higher-level chemistry course are recommended to take CHEM 100 instead of CHEM 107. The lab associated with CHEM 100 (3 credits) is CHEM 102 (1 credit).

Individual faculty members may include additional course objectives, major topics and other requirements to the minimum expectations stated in this Course Outline.

Date Revised: 2/7/2023