

Common Course Outline

CHEM 107

Fundamentals of Chemistry

3 Credits

Community College of Baltimore County

Description

CHEM 107 – 3 credits – Fundamentals of Chemistry serves as a prerequisite course for allied health, engineering, and science majors. It surveys the concepts of general chemistry. Topics include states of matter, atomic structure, the periodic table, bonding, nomenclature, chemical reactions, chemical equations, and quantitative relationships. This course is mainly meant for students intending to enroll in higher-level chemistry courses. For students needing a lab, CHEM 108: Fundamentals of Chemistry Laboratory, serves as the accompanying lab.

3 Credits

Pre-requisites: ACLT 052 or ACLT 053; and MATH 082

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 and diverse societies and on the world around us;
4. find, evaluate, and cite appropriate academic resources and technology, including print and digital media, to gather physical and chemical data;
5. perform dimensional analysis and use significant figures in calculations;
6. perform unit conversions within the metric system as well as from the English/US Customary System of measurement;
7. explain the structure of matter;
8. explain basic concepts of atomic theory and atomic structure;
9. apply basic knowledge of chemical and physical properties and periodic relationships to predict characteristics of specific elements;
10. perform mole and mass calculations;
11. perform reaction stoichiometry calculations;
12. correctly name and write symbols/formulas for elements, ions, and compounds;
13. explain the physical properties of gases, liquids and solids in terms of the Kinetic Molecular Theory;
14. explain the principles behind chemical bonding;
15. write and balance different types of chemical equations;

16. apply concepts of the main types of chemical reactions to become more familiar with their relevance in many processes that occur around us;
17. apply solubility rules to predict outcome of reactions;
18. determine the concentrations of solutions;
19. apply concepts of electronic structure of the atom in order to explain chemical properties of matter;
20. determine the molecular geometry and polarity of substances;
21. demonstrate basic concepts of heat change in a chemical reaction,
22. determine pH (integer values only) and hydrogen ion concentrations and;
23. evaluate professional behavior within the scientific community and explain the ramifications of misconduct and apply western standards of academic and scientific integrity to chemistry;
24. describe the universal applicability of the laws of chemistry, making them the intellectual property of all cultures and segments of humankind.

Major Topics

- I. Science vs. Technology
- II. Measurements, Metric System & Chemical Calculations
- III. Chemical Nomenclature
- IV. Atomic and Molecular Weights, Moles & Stoichiometry
- V. Chemical Reactions
- VI. Properties of Gases, Liquids and Solids & 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

Students are required to utilize appropriate academic resources.

Grading/exams:

- A minimum of 4 quizzes and a minimum of 3 exams
- A cumulative final exam
- Electronic homework assignments
- Minimum of two written assignments (including problem sets)
- A maximum of 3% of the final grade for extra credit points

Writing: Multiple assessments will infuse CCBC General Education Program objectives; at least one assignment worth a minimum 5% 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 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: 05/15/19