

Common Course Outline

CHEM 123

General Chemistry II

3 Semester Hours

The Community College of Baltimore County

Description

CHEM 123--3 Credits--General Chemistry II serves as a continuation of CHEM 121; includes the study of liquids & solids, reactions & properties of solutions; discusses equilibrium, chemical kinetics, acid-base theory, thermodynamics, oxidation & reduction, & electrochemistry.

3 lecture hours & 1 recitation hour per week

Prerequisites: Minimum grades of C in CHEM 121 and CHEM 122

Concurrent enrollment in CHEM 124 is highly recommended.

Overall Course Objectives

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

1. describe the models for the solid, liquid, and gas phases using kinetic molecular theory;
2. interpret phase diagrams;
3. demonstrate mastery of the concepts of molality and mole-fraction;
4. demonstrate ability to interconvert concentration units;
5. describe colligative properties and work problems associated with gases, liquids and solids;
6. give a general expression for the chemical equilibrium of gases, of ions in solution, weak acids and weak bases and solve problems associated with Le Chatelier's Principle;
7. determine the rate expression of a chemical reaction given kinetic data and other experimental results;
8. determine the activation energy of a chemical reaction given temperature and kinetic data;
9. balance oxidation /reduction equations via the method of half reactions or oxidation number;
10. determine the equilibrium constant from thermodynamic data;
11. determine the free energy of a chemical reaction from thermodynamic data. (enthalpies and entropies of reaction);
12. determine the standard voltage of a given electrochemical reaction given a table of reduction potentials;

13. work equilibrium problems using the Nernst equation; and
14. calculate nonstandard voltages using the Nernst equation.

Major Topics

- I. Gases, Liquids, Solids and Changes in State
- II. Phase Diagrams
- III. Colligative Properties
- IV. Chemical equilibrium of Gas Liquids, and Solids
- V. Chemical Kinetics
- VI. Redox Reactions
- VII. Thermodynamics (Gibbs' Free Energy, Entropy, Enthalpy and Equilibrium)
- VIII. Electrochemistry

Course Requirements

Grading/exams: Grading procedures will be determined by the individual faculty member but will include a mix of evaluation instruments (homework, quizzes, exams, or written assignments). A significant portion of the grade will be determined by proctored evaluation.

Writing: The individual faculty member will determine specific writing assignments.

Other Course Information

This course may be used to fulfill 3 credits of General Education requirements in Physical and Biological Sciences.

While it is expected that these topics will be covered, faculty members may include additional topics consistent with department practices.

Date Revised: 6/11/08