CHEM C185: GENERAL CHEMISTRY B

Item	Value
Top Code	190500 - Chemistry, General
Units	4 Total Units
Hours	72 Total Hours (Lecture Hours 72)
Total Outside of Class Hours	0
Course Credit Status	Credit: Degree Applicable (D)
Material Fee	No
Basic Skills	Not Basic Skills (N)
Repeatable	No
Grading Policy	Standard Letter (S)
Local General Education (GE)	• CL Option 1 Natural Sciences (CB1)
California General Education Transfer Curriculum (Cal-GETC)	• Cal-GETC 5A Physical Science (5A)
Intersegmental General Education Transfer Curriculum (IGETC)	• IGETC 5A Physical Science (5A)
California State University General Education Breadth (CSU GE-Breadth)	• CSU B1 Physical Science (B1)

Course Description

This course is the second semester of a two-semester sequence which continues the examination of the basic principles of inorganic chemistry with a special emphasis on reaction kinetics, chemical equilibrium, acid/base and solubility equilibria, enthalpy, entropy and Gibbs free energy, electrochemistry, coordination chemistry, and nuclear chemistry. PREREQUISITE: CHEM C180 and C180L. COREQUISITE: CHEM C185L. Transfer Credit: CSU; UC. C-ID: CHEM 120 S.**C-ID:** CHEM 120 S.

Course Level Student Learning Outcome(s)

1. Define reaction rate; describe the factors and mechanism that affect it; and determine the rate, rate constant, and rate law of a reaction.
2. Define equilibrium, describe the factors and mechanism that affect it and the various types of equilibrium reactions, and determine the equilibrium constant and equilibrium concentrations of reagents.
3. Explain the phenomenon governing the laws of thermodynamics, spontaneity, free energy, and entropy.
4. Define acids and bases using the applications of aqueous equilibria and use the oxidation reduction reactions to explain electrochemistry.
5. Describe the nuclear stability and nuclear decay through the laws of nuclear chemistry.
6. Use the periodic table to explain reactions of the representative elements.

Course Objectives

- 1. Analyze factors that affect the rate of chemical reactions and match mechanisms with reaction rates;
- 2. Determine the extent of acid-base, precipitation and complex equilibria;
- 3. Interpret reactions in terms of Arrhenius, Bronsted-Lowry, and Lewis acid-base theory;
- 4. Predict the outcome of oxidation-reduction reactions and assemble voltaic and electrolytic cells;
- 5. Describe models for the bonding of coordination compounds;
- 6. Describe changes that occur in atomic nuclei and predict the extent of radioactive decay;
- 7. Identify organic compounds and simple isomers;

Lecture Content

Chemical Kinetics Determination of Rate Laws Reaction Mechanisms The role of Catalysts Activation Energy Chemical Equilibrium Evaluating the equilibrium constant Le Chateliers principle Acid/Base Equilibrium Acid Dissociation Constants Titrations Complex equilibria Buffers Solubility Equilibrium The Common Ion Effect Thermodynamics Enthalpy and entropy Spontaneous processes Gibbs Free Energy and the equilibrium constant Electrochemistry Electrolytic and Galvanic cells Oxidation and Reduction Standard cell potentials Application of the Nernst equation Coordination Chemistry Structure and nomenclature of transition metal complexes Isomerism Ligand Field Theory Nuclear Chemistry The composition of the modern atom Radioactivity Balancing Nuclear Equations Radioactive decay Organic Chemistry Review of Lewis Structures, Isomerism Functional Groups

Method(s) of Instruction

- Lecture (02)
- DE Live Online Lecture (02S)
- DE Online Lecture (02X)

Instructional Techniques

Lecture, Demonstration, problem assignments, and discussion

Reading Assignments

Problem solving analysis; written explanations of reaction mechanism and/or stereochemistry

Out-of-class Assignments

Problem solving analysis; written explanations of reaction mechanism and/or stereochemistry

Demonstration of Critical Thinking

Analysis of rate laws and possible mechanistic explanations Determination of extent of equilibrium systems Construction of models of coordination compounds

Required Writing, Problem Solving, Skills Demonstration

Completion of mathematical problems in kinetics, thermodynamics, acids and bases, and other topics.Solving problems related to kinetics and thermodynamics, drawing and interpreting graphs.

Eligible Disciplines

Chemistry: Masters degree in chemistry OR bachelors degree in chemistry or biochemistry AND masters degree in biochemistry, chemical engineering, chemical physics, physics, molecular biology, or geochemistry OR the equivalent. Masters degree required.

Textbooks Resources

1. Required Zumdahl, Steven S.; Zumdahl, Susan A. Chemistry, 10th ed. Cengage Learning, 2018 Rationale: -

Other Resources

1. Coastline Library