Course Outline

2026-2027 Catalog

CHEM 51 - Elementary Inorganic Chemistry

Catalog Description

Transfer Status: CSU/UC

Prerequisite: Beginning Algebra or equivalent

Unit(s): 5.00

Lecture: 51.00 Contact hours/102.00 Out of class hours/153.00 Total hours/3.00 Unit(s)
Lab: 102.00 Contact hours/0.00 Out of class hours/102.00 Total hours/2.00 Unit(s)
Total: 153.00 Contact hours/102.00 Out of class hours/255.00 Total hours/5.00 Unit(s)

Course Description: This is a survey course in the principles of inorganic chemistry, including atomic theory and periodic properties, nuclear chemistry, electronic structure, chemical bonding, stoichiometry, gas behavior, solution chemistry, kinetics and equilibrium, acids and bases, oxidation and reduction, and elementary thermodynamics. It is recommended for allied health or applied science majors. Graded only. (C-ID CHEM 101).

Objectives

Upon successful completion of this course, the student should be able to:

1. demonstrate ability to perform calculations associated with chemistry using appropriate units and precision; this includes calculations required for properties of matter, heat transfer, chemical reactions (includes theoretical yield), equilibrium, gas/liquid/solid phase changes, solution concentrations/dilutions, etc.
2. explain, analyze or predict physical and chemical properties of matter in terms of microscopic structure and vice versa; this includes qualitative and quantitative aspects of atomic structure, ionic and molecular compounds and bonding, chemical reactions, equilibrium, gas/liquid/solid/solution properties, acid/base behavior, etc.
3. communicate using appropriate chemistry terms, symbols and conventions; this includes naming and writing chemical formulas for elements, compounds, and ions; chemical equations; units, etc.

Course Content

Topic Titles / Suggested Time Topic

Lecture

Topics	Lec Hrs
Significant Figures/Dimensional Analysis	4.00
Matter and Energy	2.00
Atoms	5.00
Chemical Bonds	5.00
Moles/Stoichiometry	4.00
Chemical Reactions	4.00
Gases, Liquids, and Solids	4.00
Solutions, Colloids, Electrolytes	4.00
Enthalpy, Entropy, and Free Energy	4.00
Reaction Rates	4.00
Equilibrium	4.00
Acids and Bases	5.00
Nuclear Chemistry	2.00
Total Hours:	**51.00**

Lab

Topics	Lab Hrs
Labortatory Safety, Orientation, and Administration	3.00
Measurements and Calculations	12.00
Atoms and Electrons	6.00
Ionic Compounds	6.00
Molecular Compounds	6.00
Chemical Reactions: Classification	12.00
Chemical Reactions: Stoichiometry	6.00
Chemical Reactions: Energy, Rates and Equilibrium	12.00

Topics	Lab Hrs
Solids and Liquids: Particle Behavior and Physical Properties	9.00
Gases: Particle Behavior and Physical Properties	3.00
Solutions: Properties and Stoichiometry	9.00
Acids, Bases and Buffers	12.00
Nuclear Chemistry	6.00
Total Hours:	**102.00**

Methods of Instruction

A. Class Activities
B. Collaborative Group Work
C. Homework: Students are required to complete two hours of outside-of-class homework for each hour of lecture
D. Instructor Demonstrations
E. Laboratory Experiments
F. Lecture
G. Problem-Solving Sessions

Methods of Evaluation

A. Exams/Tests
B. Quizzes
C. Homework
D. Class participation
E. Final Examination
F. Laboratory Reports, online, interactive quizzes (Pearson Mastering Chemistry Dynamic Study Modules)

Examples of Assignments

Reading Assignments

1. Read the appropriate sections in the textbook to prepare for a molecular geometry group activity in lab.
2. Read the introduction in the laboratory manual to prepare for an experiment associated with chemical vs. physical changes.

Writing Assignments

1. For a pure substance, why is the enthalpy of vaporization almost always much greater than the heat of fusion?
2. Increasing concentrations of reactants generally increases the rate of a reaction, but increasing the temperature usually increases the reaction rate by a much greater amount. Briefly explain.

Out-of-Class Assignments

1. Complete the end-of-chapter assigned problems/questions from the textbook regarding molecular compounds. (Algorithmic and multiple-choice questions will be graded by an online system, Mastering Chemistry.)
2. Complete the end-of-chapter assigned problems/questions from the textbook regarding atomic structure and the periodic table of the elements. (Algorithmic and multiple-choice questions will be graded by an online system, Mastering Chemistry.)

Recommended Materials of Instruction

McMurry, J., Ballantine, D., Hoeger, C., & Peterson, V. (2017). Fundamentals of General, Organic and Biological Chemistry. *Prentice-Hall, Upper Saddle River NJ, 8th.*
Butte College Chemistry Faculty. (2022). Chem 51 Laboratory Manual. *Butte College, Current.* n/a.

Minimum Qualifications

Chemistry (Masters Required)

Created/Revised by: Lodewyk, Michael
Date: 05/02/2022