

CEM 151 General and Descriptive Chemistry

Description: Atomic structure, chemical bonding and molecular structure; solid state; main group chemistry; acids and bases; transition metal chemistry; coordination chemistry and theories of bonding. (Note: this description does not reflect the current content, which is accurately described by the lecture topics below.)

Credit: 4 credits (3 hours of lecture and 1 hour of recitation)

Prerequisite: ((MTH 116 or concurrently) or (MTH 124 or concurrently) or (MTH 132 or concurrently) or (MTH 152H or concurrently) or (LBS 117 or concurrently) or (LBS 118 or concurrently) OR designated score on Mathematics placement test.) Not open to students with credit in CEM 141 or CEM 181H or LBS 171.

Lecture Topics:

1. Uncertainty in Measurement and Dimensional Analysis
2. Stoichiometry (The Mole, Atomic and Molecular Weights, Empirical Formulas, Chemical Equations, Limiting Reagents)
3. Solutions (Concentration, Strong and Weak Electrolytes, Acids and Bases, Reaction Stoichiometry)
4. Oxidation-Reduction Reactions
5. Thermochemistry (First Law of Thermodynamics, Enthalpy, Calorimetry)
6. Quantum Mechanics (Shortcomings of Classical Physics, Fundamental Concepts)
7. Atomic Structure (Orbitals, Quantum Numbers, Electron Configurations, and Periodic Table)
8. Chemical Bonding (Covalent vs. Ionic, Electronegativity, Dipole Moments)
9. Lewis Structures (Formal Charge, Resonance Structures, Valence-Shell Expansion, Octet-Deficient Molecules, Lewis Acids and Bases)
10. VSEPR (Geometry and Polarity)
11. Valence Bond Theory and Hybridization
12. Molecular Orbital Theory
13. Coordination Chemistry
14. Introduction to Organic Molecules and Functional Groups