Faculty of Science ***General Chemistry (1)***
Department of Chemistry ***(30206101)***

Course Lecturers: Staff Members of the Chemistry Department

Credit Hours:
3 hours

Prerequisites:

Course Objectives
This course is aiming at giving the basic fundamentals of chemistry. It explains the principles of the chemical calculations used in chemistry. And also it provides an introduction to gases, thermochemistry, the atomic structure, the bonding theories and the molecular structure.

Textbook
Steven Zumdahl, Susan Zumdahl, **Chemistry**, 9th Edition, (Brooks Cole, a part of Cengage Learning, USA, 2014)

Grading System

Midterm Exam: 40%
Participation Mark: 10%
Final Exam: 50%

Course Outline

Chemical Foundations (chapter 1) (2 lectures)
1.1 Chemistry: An Overview, 1.2 The Scientific method 1.3 Units of measurement. 1.4 Uncertainty in Measurement. 1.5 Significant Figures and Calculations. 1.7 Dimensional Analysis .1.8 Temperature. 1.9 Density.

Atoms, Molecules and Ions (chapter 2) (2 lectures)
2.5 The Modern View of Atomic Structure 2.6 Molecules and ions. 2.7 An introduction to the periodic table. 2.8 Naming Simple Compounds.

Stoichiometry (chapter 3) (5 lectures)
3.2 Atomic masses 3.3 The Mole. 3.4 Molar Mass 3.6 Percent Composition of Compounds. 3.7 Determining the Formula of a Compound. 3.8 Chemical Equations. 3.9 Balancing Chemical Equations. 3.10 Stoichiometric Calculations: Amounts of Reactants and Products. 3.11 The Concept of Limiting Reactant.

Types of Chemical Reaction and Solution Stoichiometry (chapter 4) (7 lectures)
4.1 Water, the Common Solvent. 4.2 The Nature of Aqueous Solutions: Strong and Weak Electrolytes. 4.3 The Composition of Solutions. 4.4 Types of Chemical Reactions. 4.5 Precipitation Reactions. 4.6 Describing Reactions in Solution. 4.7 Stoichiometry of Precipitation Reactions. 4.8 Acid-Base Reactions. 4.9 Oxidation-Reduction Reactions. 4.10 Balancing Oxidation-Reduction Equations.

Gases (chapter 5) (5 lectures)
5.1 Pressure. 5.2 The Gas Laws of Boyle, Charles, and Avogadro. 5.3 The Ideal Gas Law. 5.4 Gas Stoichiometry. 5.5 Dalton's Law of Partial Pressures. 5.6 The Kinetic Molecular Theory of Gases

Thermochemistry (chapter 6) (6 lectures)
6.1 The Nature of Energy. 6.2 Enthalpy and Calorimetry. 6.3 Hess's Law. 6.4 Standard Enthalpies of Formation.

Atomic Structure and Periodicity (chapter 7) (7 lectures)
7.1 Electromagnetic Radiation. 7.2 The nature of matter. 7.3 The Atomic Spectrum of Hydrogen. 7.4 The Bohr Model. 7.5 The Quantum Mechanical Model of the Atom. 7.6 Quantum Numbers. 7.7 Orbital Shapes and Energies. 7.8 Electron Spin and the Pauli Principle. 7.9 Polyelectronic Atoms. 7.11 The Aufbau Principle and the Periodic Table. 7.12 Periodic Trends in Atomic Properties. 7.13 The Properties of a Group: The Alkali Metals.

Bonding: General Concepts (chapter 8) (6 lectures)
8.1 Types of Chemical Bonds. 8.2 Electronegativity. 8.3 Bond Polarity and Dipole Moments 8.4 Ions: Electron Configurations and Sizes. 8.5 Energy Effects in Binary Ionic Compounds. 8.6 Partial Ionic Character of Covalent Bonds. 8.7 The Covalent Chemical Bond: A Model. 8.8 Covalent Bond Energies and Chemical Reactions. 8.9 The localized Electron Bonding Model. 8.10 Lewis Structures. 8.11 Exceptions to the Octet Rule. 8.12 Resonance. 8.13 Molecular Structure: The VSEPR Model.

Covalent Bonding: Orbitals (chapter 9) (6 lectures)
9.1 Hybridization and the Localized Electron Model. 9.2 The Molecular Orbital Model. 9.3 Bonding in Homonuclear Diatomic Molecules. 9.4 Bonding in Heteronuclear Diatomic Molecules. 9.5 Combining the Localized Electron and Molecular Orbital Models