

Syllabus for First year Intermediate from Academic Year 2025-26

Chemistry (1st Year)

Unit 1 Some Basic Concepts of Chemistry

- 1.1 Importance of Chemistry
- 1.2 Nature of Matter
- 1.3 Properties of Matter and their Measurement
- 1.4 Uncertainty in Measurement
- 1.5 Laws of Chemical Combinations
- 1.6 Dalton's Atomic Theory
- 1.7 Atomic and Molecular Masses
- 1.8 Mole Concept and Molar Masses
- 1.9 Percentage Composition
- 1.10 Stoichiometry and Stoichiometric Calculations

Unit 2 Structure of Atom

- 2.1 Discovery of Sub-atomic Particles
- 2.2 Atomic Models
- 2.3 Developments Leading to the Bohr's Model of Atom
- 2.4 Bohr's Model for Hydrogen Atom
- 2.5 Towards Quantum Mechanical Model of the Atom
- 2.6 Quantum Mechanical Model of Atom

Unit 3 Classification of Elements and Periodicity in Properties

- 3.1 Why do we Need to Classify Elements?
- 3.2 Genesis of Periodic Classification
- 3.3 Modern Periodic Law and the Present Form of the Periodic Table
- 3.4 Nomenclature of Elements with Atomic Numbers > 100
- 3.5 Electronic Configurations of Elements and the Periodic Table
- 3.6 Electronic Configurations and Types of Elements: s-, p-, d-, f- Blocks
- 3.7 Periodic Trends in Properties of Elements

Unit 4 Chemical Bonding and Molecular Structure

- 4.1 Kössel-Lewis Approach to Chemical Bonding
- 4.2 Ionic or Electrovalent Bond 106 4.3 Bond Parameters
- 4.4 The Valence Shell Electron Pair Repulsion (VSEPR) Theory
- 4.5 Valence Bond Theory
- 4.6 Hybridisation
- 4.7 Molecular Orbital Theory
- 4.8 Bonding in Some Homonuclear Diatomic Molecules
- 4.9 Hydrogen Bonding

Unit 5 Thermodynamics

- 5.1 Thermodynamic Terms
- 5.2 Applications
- 5.3 Measurement of ΔU and ΔH : Calorimetry
- 5.4 Enthalpy Change, $\Delta_r H$ of a Reaction – Reaction Enthalpy
- 5.5 Enthalpies for Different Types of Reactions
- 5.6 Spontaneity
- 5.7 Gibbs Energy Change and Equilibrium

Unit 6 Equilibrium

- 6.1 Equilibrium in Physical Processes
- 6.2 Equilibrium in Chemical Processes – Dynamic Equilibrium
- 6.3 Law of Chemical Equilibrium and Equilibrium Constant
- 6.4 Homogeneous Equilibria
- 6.5 Heterogeneous Equilibria
- 6.6 Applications of Equilibrium Constants
- 6.7 Relationship between Equilibrium Constant K, Reaction Quotient Q and Gibbs Energy G
- 6.8 Factors Affecting Equilibria
- 6.9 Ionic Equilibrium in Solution
- 6.10 Acids, Bases and Salts
- 6.11 Ionization of Acids and Bases
- 6.12 Buffer Solutions
- 6.13 Solubility Equilibria of Sparingly Soluble Salts

Unit 7 Redox Reactions

- 7.1 Classical Idea of Redox Reactions-Oxidation and Reduction Reactions
- 7.2 Redox Reactions in Terms of Electron Transfer Reactions
- 7.3 Oxidation Number
- 7.4 Redox Reactions and Electrode Processes

Unit 8 Organic Chemistry – Some Basic Principles and Techniques

- 8.1 General Introduction
- 8.2 Tetravalence of Carbon: Shapes of Organic Compounds
- 8.3 Structural Representations of Organic Compounds
- 8.4 Classification of Organic Compounds
- 8.5 Nomenclature of Organic Compounds
- 8.6 Isomerism
- 8.7 Fundamental Concepts in Organic Reaction Mechanism
- 8.8 Methods of Purification of Organic Compounds
- 8.9 Qualitative Analysis of Organic Compounds
- 8.10 Quantitative Analysis

Unit 9 Hydrocarbons

- 9.1 Classification
- 9.2 Alkanes
- 9.3 Alkenes
- 9.4 Alkynes
- 9.5 Aromatic Hydrocarbon
- 9.6 Carcinogenicity and Toxicity

Syllabus for Second Year Intermediate from Academic Year 2026-27

Chemistry (2nd Year)

1. Solutions

- 1.1 Types of Solutions
- 1.2 Expressing Concentration of Solutions
- 1.3 Solubility
- 1.4 Vapour Pressure of Liquid Solutions
- 1.5 Ideal and Non-ideal Solutions
- 1.6 Colligative Properties and Determination of Molar Mass
- 1.7 Abnormal Molar Masses

2. Electrochemistry

- 2.1 Electrochemical Cells
- 2.2 Galvanic Cells
- 2.3 Nernst Equation
- 2.4 Conductance of Electrolytic Solutions
- 2.5 Electrolytic Cells and Electrolysis
- 2.6 Batteries
- 2.7 Fuel Cells
- 2.8 Corrosion

3. Chemical Kinetics

- 3.1 Rate of a Chemical Reaction
- 3.2 Factors Influencing Rate of a Reaction
- 3.3 Integrated Rate Equations
- 3.4 Temperature Dependence of the Rate of a Reaction
- 3.5 Collision Theory of Chemical Reactions

4. The d-and f-Block Elements

- 4.1 Position in the Periodic Table
- 4.2 Electronic Configurations of the d-Block Elements
- 4.3 General Properties of the Transition Elements (d-Block)
- 4.4 Some Important Compounds of Transition Elements
- 4.5 The Lanthanoids
- 4.6 The Actinoids
- 4.7 Some Applications of d- and f-Block Elements

5. Coordination Compounds

- 5.1 Werner's Theory of Coordination Compounds
- 5.2 Definitions of Some Important Terms Pertaining to Coordination Compounds
- 5.3 Nomenclature of Coordination Compounds
- 5.4 Isomerism in Coordination Compounds
- 5.5 Bonding in Coordination Compounds
- 5.6 Bonding in Metal Carbonyls
- 5.7 Importance and Applications of Coordination Compounds

6. Haloalkanes and Haloarenes

- 6.1 Classification
- 6.2 Nomenclature
- 6.3 Nature of C–X Bond
- 6.4 Methods of Preparation of Haloalkanes

6.5 Preparation of Haloarenes

6.6 Physical Properties

6.7 Chemical Reactions

6.8 Polyhalogen Compounds

7. Alcohols, Phenols and Ethers

7.1 Classification

7.2 Nomenclature

7.3 Structures of Functional Groups

7.4 Alcohols and Phenols

7.5 Some Commercially Important Alcohols

7.6 Ethers

8. Aldehydes, Ketones and Carboxylic Acids

8.1 Nomenclature and Structure of Carbonyl Group

8.2 Preparation of Aldehydes and Ketones

8.3 Physical Properties

8.4 Chemical Reactions

8.5 Uses of Aldehydes and Ketones

8.6 Nomenclature and Structure of Carboxyl Group

8.7 Methods of Preparation of Carboxylic Acids

8.8 Physical Properties

8.9 Chemical Reactions

8.10 Uses of Carboxylic Acids

9. Amines

9.1 Structure of Amines

9.2 Classification

9.3 Nomenclature

9.4 Preparation of Amines

9.5 Physical Properties

9.6 Chemical Reactions

9.7 Method of Preparation of Diazonium Salts

9.8 Physical Properties

9.9 Chemical Reactions

9.10 Importance of Diazonium Salts in Synthesis of Aromatic Compounds

10. Biomolecules

10.1 Carbohydrates

10.2 Proteins

10.3 Enzymes

10.4 Vitamins

10.5 Nucleic Acids

10.6 Hormones