

Syllabus of Chemistry (Major & Minor) for 3-Year and 4-Year B.Sc. Course

Chemistry Minor

Semester I/II

Paper Code: CHEMMN-1T (Minor A/B)

(Credit:03)

Total Lecture: 45

(Inorganic Chemistry – I + Organic Chemistry I)

Inorganic Chemistry – I

1. Atomic Structure

(7L)

Bohr's theory for hydrogen atom (simple mathematical treatment); Atomic spectra of hydrogen and Bohr's model; Sommerfeld's model; Quantum numbers and their significance; Pauli's exclusion principle; Hund's rule; Electronic configuration of many-electron atoms, Aufbau principle and its limitations.

2. Chemical Periodicity

(7L)

Classification of elements based on electronic configuration; General characteristics of s-, p-, d- and f-block elements. Positions of hydrogen and noble gases in the periodic table. Atomic and ionic radii, ionization potential, electron affinity, and electronegativity; periodic and group-wise variation of above properties in respect of s- and p- block elements.

3. Acids and Bases

(5L)

Acid-Base Theories and Concepts, conjugate acids and bases, relative strengths of acids and bases. Lewis acid-base concept, classification of Lewis acids and bases. Hard and soft acids and bases (HSAB concept)

4. Redox Reactions

(3L)

Balancing of equations by oxidation number and ion-electron method, Standard electrode potential, formal potential, redox indicator, and redox titrations.

Organic Chemistry I

1. Fundamentals of Organic Chemistry

(3L)

Electronic displacements: Inductive effect, resonance and hyperconjugation; cleavage of bonds: homolytic and heterolytic; structure of organic molecules based on VBT; nucleophiles and electrophiles; reactive intermediates: carbocations, carbanions and free radicals.

2. Stereochemistry

(5L)

Different types of isomerism; geometrical and optical isomerism; concept of chirality and optical activity (up to two carbon atoms); asymmetric carbon atom; elements of symmetry (plane and centre); interconversion of Fischer and Newman representations; enantiomerism and diastereomerism,

Paper Code: CHEMMN-1P (Minor A/B) Sem I/II

(Credit:01)

(Inorganic Chemistry I + Organic Chemistry I)

Inorganic Chemistry

1. Estimation of sodium hydroxide and sodium carbonate present in a mixture.
2. Estimation of oxalic acid by titrating it with KMnO_4 .
3. Estimation of Fe (II) ions by titrating it with $\text{K}_2\text{Cr}_2\text{O}_7$

Organic Chemistry

1. Detection of special elements (N, Cl, and S) in organic compounds.
2. Detection of functional groups: Aromatic- NO_2 , Aromatic- NH_2 , -COOH, carbonyl (no distinction of –CHO and $>\text{C}=\text{O}$ needed), -OH (phenolic) in solid organic compounds.

Reference Books:

1. Chemistry in Laboratory (New Revised Edition), S. Ghosh, M. Das Sarma, D. Majumdar, S. Manna; Santra Publication Pvt. Ltd.
2. A. K. Nad, B. Mahapatra & A. Ghosal, An Advanced Course in Practical Chemistry, New Central Book Agency (P) Ltd.
3. Advanced Practical Chemistry (3rd Edition), S.C. Das.

