Electrochemistry: Migration of ions, Transference number, Determination of transference number by Hittorf’s method, Diffusion and ionic mobility, Conductometric titrations, Debye Huckel theory of strong electrolytes; Types of electrodes, Concentration cells with and without transference, Liquid junction potential, Potentiometric titrations.

Phase Rule: Definitions of terms, Derivation of phase rule, One component and two component systems.

Polymers: Condensation and addition polymerization, Copolymerization, Stereochemistry of polymers, conducting polymers Mn, Mw, Mv, Physical properties of polymers, Structure property relationship.

Coordination and Organometallic Chemistry: Crystal field theory, Crystal field splitting in octahedral, tetrahedral and square planar complexes, Jahn-Teller distortion.

Spectroscopic Techniques: Law of absorption of light, Limitations/deviations and applications of Beer’s law, Grothus-Draper Law, Jablonski diagram, Stark Einstein Law; Types of molecular spectra, Introduction to atomic spectroscopy, Principle and applications of atomic absorption spectroscopy, UV/VIS spectrophotometry, Infra-red spectrometry.

Reaction Mechanism: Aliphatic nucleophilic substitution reactions ($S_N^1$ and $S_N^2$). Elimination reactions of a and b type, Electrophilic, Nucleophilic and free radical addition reactions.

Application of catalysis in organic reactions: Willikinson catalyst, Grubbs catalyst, Hydroformylation, Walker process.

Nanochemistry: Introduction to nanochemistry.

Laboratory work: Volumetric titrations, Conductometric, Potentiometric and pH metric titrations; Colorimetry, Adsorption and blueprinting.

Text Books:

Reference Books: