Syllabus-Chemistry

Organic Chemistry: Carbonium ions, carbanions, carbenes, nitrenes, radicals and arynes, Reactive intermediates, Nucleophilic, Electrophilic, Radical substitution, Addition and Elimination reactions. Barton,Baeyer-villigier, Birch, Chichibabin, Clemmensen Diels-alder, Friedel crafts, Hoffmann, Hofmann- Loffler-Freytag, Hydroboration, Lossen, Mannich, Michael addition, Meerwein Ponndorf-Verley, Perkin, Grignard, Reimer-Tiemann, Reformatsky, Storkenamine, Wittig, Wolff Kishner. Oppenaur oxidations, Robinson annulations, Routine functional group transformations and inter-conversions of simple functionalities, Aldol, Clasien, Stobbe and Dieckmann, Schmidt, Condensations, Beckmann and Fries, Favorski, Curtius Rearrangements. Stereochemistry and Conformational Analysis: Pericyclic Reactions, Photochemistry, Dyes.

Physical Chemistry: Basic principles and applications of quantum mechanics, Variational and perturbational methods. Basics of atomic structure, electronic configuration, shape of orbitals, hydrogen atom spectra. Theoretical treatment of atomic structures and chemical bonding. Chemical applications of group theory. Basic principles and application of spectroscopy – rotational, vibrational, electronic, Raman, ESR, NMR.

Chemical thermodynamics: Phase equilibria. Statistical thermodynamics. Chemical equilibria. Electrochemistry, Chemical kinetics, Polymer chemistry, Solid State Chemistry, Collids and surface phenomena, Non-ideal systems, Inorganic Chemistry Chemical periodicity. Structure and bonding, Concepts of acids and bases, Chemistry of the main group elements and their compounds. Allotropy, synthesis, bonding and structure, Chemistry of transition elements and coordination compounds, Inner transition elements, organometallic compounds, Cages and metal clusters, Analytical chemistry separation techniques. Spectroscopic electro- and thermo analytical methods, Bioinorganic chemistry, Physical characterisation of inorganic compounds by IR, Raman, NMR, EPR, Mössbauer, UV-, NQR, MS, electron spectroscopy and microscopic techniques. Nuclear chemistry.