

conditions. Suprafacial and Antrafacial shift of H, [1,3] [1,5] [1,7] and [3,3]-sigmatropic shifts. Walk, Claisen, Cope, Oxy-Cope and Aza-Cope rearrangements.

References:

1. Organic Photochemistry- Vol I & II- O.L. Chapman (Marcel Decker).
2. Organic Chemistry- Vol 1-3 - Mukherji Singh and Kapoor (Wiley Eastern).
3. Organic Reaction Mechanisms-V.K.Ahluwalia & R.K.Parashar (Narosa) 2006.
4. Advanced Organic Chemistry-Reaction Mechanisms, Reinhard Bruckner (Academic), 2005.
5. Pericyclic reactions, S.M Mukherji (McMillan) 1979.
6. J. A. Joule and G. F. Smith: Heterocyclic Chemistry, Cambridge University press (1972).
7. A. R. Katritzky and C. J. Rees: Comprehensive Heterocyclic Chemistry, Pergamon (1984)
8. D. H.R. Barton and W. D. Ollis: Comprehensive Organic Chemistry, Vol 14, Heterocyclic Compounds, Pergamon (1979).
9. A. R. Katritzky: Advances in Heterocyclic Chemistry, Vol 15-25, Academic (1971-81).

OC S 505 : Bioorganic Chemistry

COURSE OUTCOME:

Students will be able to:

- Understand the configuration and conformation of monosaccharides, chemistry of important derivatives of monosaccharides, structure and synthesis of disaccharides, general methods of determination of polysaccharide structures, structure and industrial applications of polysaccharides.
- Explain the peptide bond formation, synthetic protocol for peptides, solution and solid phase peptide synthesis, Methods of peptide structure determination, different types protein structures, non-steroidal hormones, nucleosides, nucleotides, synthesis of nucleosides, nucleotides and polynucleotides, structure and functions of nucleic acids.
- Learn the classification, nomenclature, sources, deficiency diseases, biological functions and chemistry of Vitamin A₁, B₃, B₅, C and K₁.
- Know the classification and chemistry of antibiotics like Penicillin V, Streptomycin, chloramphenicol and tetracyclins.

UNIT I

[12 Hours]

Carbohydrates Configuration and conformation of monosaccharides, Hudsons rule, Mutarotation. Chemistry of important derivatives of monosaccharides-ethers, esters, acetals, ketals, deoxysugars, aminosugars, Structure of disaccharides-maltose, cellobiose and sucrose. General methods of structural degradation of polysaccharides- methylation & partial hydrolysis, Smith degradation and alkaline degradation techniques. Structures of cellulose, chitin, starch and glycogen.

UNIT II

[12 Hours]

Peptides & Proteins: Peptide bond formation and synthesis of polypeptides, Amino and carboxy protecting groups in peptide synthesis, Solid phase peptide synthesis-Merrifield method, Peptide structure determination-Sequence and End group analysis (N-Terminus and C-Terminus), Secondary, Tertiary and Quaternary structure of proteins.

Nucleic acids: Nucleosides and Nucleotides, Chemical synthesis of nucleosides and nucleotides. Poly nucleotides- Structure and functions of DNA and RNA.

Non steroidal hormones: Study of the Oxytocin, Vasopressin and synthetic analogs, General study of ACTH, Growth hormones, Somotropin and Insulin.

UNIT III

[12 Hours]

Vitamins: Classification and Nomenclature. Source, deficiency diseases and biological functions of Vitamins. Study of Vitamin A₁, Vitamin B₃, Vitamin B₅, Vitamin C and Vitamin K₁.

Antibiotics: Introduction, Classification, Chemistry of Penicillin V, Streptomycin, Chloramphenicol and Tetracycline.

References:

1. Organic Chemistry-P. Y. Bruice (Pearson Education Pvt. Ltd., New Delhi), 2002.
2. Organic Chemistry 4th Edn.-S. H. Pine et al (McGraw-Hill, London) 1987.
3. Advanced Organic Chemistry- R. A. Carey and R. J. Sundberg (Plenum, New York) 1990.
4. Organic Chemistry, Vol I & II, I. L. Finar (Longman ELBS, London), 1973.
5. Natural Products Chemistry, Vol-I & II- G. R. Chatwal (Himalaya), 1990.

OC E 506 : ANALYTICAL AND GREEN CHEMISTRY

COURSE OUTCOME:

Enable the students:

- To understand the basic principles and theory of UV-Visible, Electronic, Infra Red, Nuclear Magnetic Resonance and Mass Spectroscopy.
- To study the utility of these techniques in structure elucidation of simple organic molecules.
- To know about water cycle, water sources, water quality, significant measurements of water parameters and treatment of water for drinking and industrial purposes.
- To learn about principles and use of green chemistry in laboratory synthesis.
- To understand the basic principles and utility of sonochemistry and Microwave induced organic synthesis.

UNIT- I:

[12 Hours]

UV/Electronic Spectroscopy: Basic principles, Beer-Lambert law, types of absorption bands, Factors affecting the positions of UV bands. Theoretical prediction of λ_{max} for polyenes, α,β -unsaturated aldehydes, ketones (Woodward-Fieser rules) and substituted benzenes.

IR Spectroscopy: Basic principles, Application of infrared spectroscopy in the structural study-identity by finger printing and identification of functional groups. Characteristic vibrational frequencies of alkanes, alkenes, alkynes, aromatic compounds, alcohols, ethers, phenols and amines). Study of vibrational frequencies of carbonyl compounds (ketones, aldehydes, esters, amides and acids). Factors affecting band positions and intensities

Nuclear Magnetic Resonance Spectroscopy: Basic principles, Solvents used, chemical shift and its measurements, factors affecting chemical shift. Integration of NMR signals, spin-spin coupling, coupling constant. Shielding and deshielding. High resolution ¹H NMR.

Applications of NMR spectroscopy in structure elucidation of simple organic molecules.

Mass Spectrometry: Basic principles, molecular ions, meta-stable ions and isotope ions. Fragmentation processes, McLafferty rearrangement. retro Diels-Alder fragmentations. Nitrogen rule.