ACADEMIC PLANNER & UNITIZATION OF SYLLABUS

Department: Chemistry

Core T10 - Organic Chemistry IV

Subject Teacher: Dr.MridulaAcharyya

AY:2023-24

SYLLABUS UNITIZATION:

MONTH	WEEK	TOPICS to be TAUGHT
March	2	UV Spectroscopy: introduction;
March	3	Types of electronic transitions, end absorption; transition dipole moment and allowed/forbidden transitions; chromophores and auxochromes;
March	4	Bathochromic and Hypsochromic shifts; intensity of absorptions (Hyper-/Hypochromic
April	1	Amines: Aliphatic & Aromatic: preparation, separation
April	2	Application of Woodward's Rules for calculation of λmax for the following systems: conjugated diene, α,β-unsaturated aldehydes and ketones (alicyclic, homoannular and heteroannular)
April	3	Extended conjugated systems (dienes, aldehydes and ketones); relative positions of λmax considering conjugative effect, steric effect, solvent effect, effect of pH
April	4	Effective chromophore concentration: keto-enol systems; benzenoid transitions
May	1	Nitro compounds (aliphatic and aromatic): preparation and reaction
May	2	IR Spectroscopy: introduction; modes of molecular vibrations (fundamental and nonfundamental); IR active molecules; application of Hooke's law, force constant; fingerprint region and its significance; effect of deuteration; overtone bands; vibrational coupling in IR;
May	3	Factors affecting stretching frequencies: effect of conjugation, electronic effects, mass effect, bond multiplicity, ring size, solvent effect, H-bonding on IR absorptions; application in functional group analysis.

May	4	Characteristic and diagnostic stretching frequencies of C-H, N-H, O-H, C-O, C-N, C-X, C=C (including skeletal vibrations of aromatic compounds), C=O, C=N, N=O, C≡C, C≡N;
June	1	NMR Spectroscopy: introduction; nuclear spin; NMR active molecules; basic principles of Proton Magnetic Resonance; equivalent and non-equivalent protons; chemical shift and factors influencing it; ring current effect; significance of the terms: up-/downfield, shielded and
June	2	Deshielded protons; spin coupling and coupling constant (1st order spectra); relative intensities of first-order multiplets: Pascal's triangle; chemical and magnetic equivalence in NMR
June	3	Elementary idea about non-first-order splitting; anisotropic effects in alkene, alkyne, aldehydes and aromatics; NMR peak area, integration; relative peak positions with coupling patterns of common organic compounds (both aliphatic and benzenoid-aromatic); rapid proton exchange; interpretation of NMR spectra of simple compounds
June	4	Applications of IR, UV and NMR spectroscopy

REFERENCES

1. Kemp, W. Organic Spectroscopy, Palgrave.
2. Pavia, D. L. et al. Introduction to Spectroscopy, 5th Ed. Cengage Learning India Ed. (2015).
3. Dyer, J. Application of Absorption Spectroscopy of Organic Compounds, PHI Private
4. Limited
5. Warren, S., Designing Organic Synthesis, Wiley India, 2009.
6. Carruthers, W. Modern methods of Organic Synthesis, Cambridge University Press.
7. Willis, C. A., Wills, M., Organic Synthesis, Oxford Chemistry Primer, Oxford University