Course Title– **DSC:** Organic Chemistry and Related Techniques of Analysis**,** ***w.e.f. the session 2025-26 and onwards***	
Class: B.Sc. Pt.-IV / Semester-VIII	Course code: BCH-C802
Lecture: 60	Credits: 04
MM : 70	Exam.Hrs.: 03

NOTE: The question paper shall consist of Two sections (Sec.-A and Sec.-B). Sec.-A shall contain 10 short answer (about 150 words) type questions of SIX marks each and student shall be required to attempt any five questions. Sec.-B shall contain 08 descriptive type questions of TEN marks each and student shall be required to attempt any four questions. Both sections shall have questions from the entire syllabus. The previous year paper/model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Course Contents:

UV-Vis Spectroscopy: Electromagnetic spectrum, electronic band spectra (UV and Vis region), laws of absorption (Beer's-Lambert law), molar extinction coefficient. Types of electronic transitions, Elementary idea of chromophores, auxochromes, bathochromic and hypsochromic shifts, hyperchromic and hypochromic effects, Instrumentations and technique of UV-VIS Spectroscopy, Woodward-Fieser rules, solvent effects on π-π^* and n- π^* transitions, Applications of UV-VIS spectroscopy. Problems pertaining to the structure elucidation of organic compounds using UV spectroscopic techniques. (Lectures: 10)

IR spectroscopy: Vibrational rotational spectra- Principle, absorption of infrared radiation & molecular vibration-rotations. Fundamental vibration, overtones and combination tones. finger print region, infrared vibration - active and forbidden (selection rules). Instrumentation, factors affecting vibrational frequencies, spectral study of different functional groups. Idea of rotational spectrum. Problems pertaining to the structure elucidation of organic compounds using IR spectroscopic techniques. (Lectures: 10)

NMR spectroscopy: H^1-NMR;Basic concept,instrumentation, FTNMR, chemical shift, shielding & deshielding, homotopic and diasteriotopic protons, spin-spin coupling, coupling constant, AX and AX_2 type spectra, spin decoupling, lanthanide shift reagents. C^{13}-NMR spectroscopy. Problems pertaining to the structure elucidation of organic compounds using NMR spectroscopic techniques. (Lectures: 10)

Mass spectrometry: Basic principle, fragmentation pattern of major functional groups, instrumentation, Mclafferty rearrangement, metastable ions, retro Diels-Alder reaction, general applications. Problems pertaining to the structure elucidation of organic compounds using Mass spectroscopic techniques. (Lectures: 10)

Suggested Readings:

1. Spectroscopy by: C. J. Benwell
2. Spectroscopic Identification of Organic Compounds by: Silverstein, Bassler, Morrill
3. Organic Chemistry by: Kapoor, Singh , and Mukherjee
4. Organic Chemistry by: Boyd and Morrison
5. Organic Spectroscopy by: W. Kemp
6. Organic Spectroscopy by: Jagmohan

Course Objectives

1. To learn the basic principle and characteristics of UV-Vis, IR, H^1-NMR and C^{13}-NMR techniques.
2. To apply the above techniques for structure elucidation of unknown compounds.

Course Outcomes (Cos)

After the completion of this course, a student should be able to:

CO 1. Learn the technique of UV-Visible spectroscopy.

CO:2 Understand the basics of IR spectroscopy, factors affecting the vibrational frequencies.

CO 3. Explain the basic principle of NMR spectroscopy, deshielding, anisotropic effect, off-resonance etc.

CO 4. Examine the UV-Vis, IR, H^1-NMR and C^{13}-NMR spectra of unknown compounds.

CO 5. Understand the basic principle and applications of Mass spectrometry, Fragmantation pattern of different class of compounds.

Course Outcomes (Cos) / Program Outcomes (Pos)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
CO:1	×	×					×	
CO:2		×		×				×
CO:3		×	×					
CO:4		×	×					
CO:5	×	×			×			