

Course Title: Organic Spectroscopy-II

Semester: VIII  
Course Code: CH-474  
Credit Hours: 3-0  
Prerequisite: Nil

Course Objectives

1. Students will acquire an adequate knowledge about fundamental and instrumental aspects of different spectroscopic techniques and will be able to perform structural elucidation of organic compounds using spectral data.

Course Outcomes

2. After successful completion of this course, students will have ability to perform more detail, structural elucidation of organic compounds by using spectroscopic techniques like UV, IR, one dimensional  $^1\text{H-NMR}$ ,  $^{13}\text{C-NMR}$  and finally through mass spectrometry.

Course Contents

3.  $^1\text{H-NMR}$  and  $^{13}\text{C-NMR}$ : Nuclear magnetic resonance: Basic principles, theory, spin flipping, basic instrumentation. Chemical shift and integration, factors affecting chemical shift, chemical shift equivalence and magnetic equivalence; spin relaxation, spin-spin coupling, coupling constants, Shift reagents; Dynamic NMR; nuclear overhauser effect, 2-D NMR, COSY and HETCOR.  
4. Mass Spectrometry: Basic concepts; mass spectrometers, ionization techniques, different fragmentation patterns and structure elucidation, combined usage of IR, UV, NMR and Mass spectrometric data for structure elucidation of organic compounds having medium complexity.

Text book:

5. Pavia, D. L., Lampman, G. M., Kriz, G. S. and Vyvyan, J. R., Introduction to Spectroscopy, 4th ed., Brooks/Cole Cengage Learning, (2009).

6. Recommended Books:

- a. Kalsi, P. S., Spectroscopy of Organic Compounds, 6th ed., New Age International, New Delhi, India, (2007).
- b. Yadav, L. D. S., Organic Spectroscopy, Springer, UK, (2005).
- c. Younas, M., Organic Spectroscopy, Ilmi Kitab Khana, Urdu Bazar Lahore, Pakistan, (2006).
- d. Hollas, J. M., Modern Spectroscopy, 4th ed., John-Wiley & Sons, Inc., (2004).45
- e. Silverstein, R. M., Webster, F. X. and Kiemle, D., Spectrometric Identification of Organic Compounds, 7th ed., John-Wiley & Sons, Inc., (2005).
- f. Williams, D. H. and Fleming, I., Spectroscopic Methods in Organic Chemistry, 6th ed., McGraw-Hill Higher Education, (2008).