NOC:Application of Spectroscopic Methods in Molecular Structure Determination - Video course

COURSE OUTLINE

Chemists are molecule makers. Whenever a new molecule is synthesized it is essential to determine its structure using spectroscopic techniques. This course is all about practical applications of spectroscopic methods for the determination of organic molecules.

COURSE DETAIL

Week .No	Topic
1	Introduction to spectroscopic methods – Nuclear magnetic resonance spectroscopy (NMR), spin ½ nuclei, 1H and 13C-NMR spectroscopy, FT-NMR method. Chemical shifts, spin spin coupling, spin-spin splitting pattern recognition for structure elucidation, coupling constants.
2	1H NMR spectroscopy, Second order effects in NMR spectrum, AB and AA'BB', ABC spin systems. Solving simple structure elucidation problems with 1H and 13C NMR spectroscopy
3	Stereochemistry determination using NMR techniques. Study of dynamic processes by NMR spectroscopy – examples from organic and organometallic chemistry
4	Mass Spectrometry – various ionization methods – EI, CI, ESI and MALDI methods, fragmentation patterns of simple organic molecules, Use of HRMS.
5	Mass spectrometry – fragmentation patterns of simple organic molecules (continued), solving structure elucidation problems using mass spectrometry.
6	Infra-red spectroscopy – basic concepts, experimental methods, functional group analysis and identification using IR spectroscopy, structural effects on vibrational frequency
7	UV-Vis spectroscopy, electronic transitions in organic molecules, selection rules, application of Beer Lambert law, qualitative and quantitative analysis by UV-Vis spectroscopy.
8	Solving structure elucidation problems using multiple spectroscopic data (NMR, MS, IR and UV-Vis).

NP-TEL

NPTEL

http://nptel.ac.in

Chemistry and Biochemistry

Pre-requisites:

A good background knowledge in organic chemistry/stereochemistry necessary

Additional Reading:

1. Spectroscopy, D. L. Pavia, G. M. Lampman, G. S. Kriz, J. R. Vyvyan, Cengage Learning (Indian Edition), 2007.
2. Organic Spectroscopy, William Kemp, 3rd Edition, 1991, Macmillan (Indian Edition).
3. NMR Spectroscopy, H. G¸nther, second edition, John Wiley and sons, 1998

Coordinators:

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