BT 639 NMR Spectroscopy: Principles and Applications (3-0-0-6)

Course contents:

Overview, history and development of NMR; Basics of NMR: Nuclear spin angular momentum, magnetic moment, spin precession, Zeeman splitting, spin - ½ nuclei, spin states, and energy levels; Vector model of NMR: laboratory and rotating frames of references, phenomenon of resonance using radiofrequency pulses, FT-NMR; Chemical shift, J-Coupling and spin-spin splitting; Spin relaxation: Longitudinal relaxation, Transverse relaxation, measuring T1and T2, mechanisms of relaxation; NMR instrumentation; Data acquisition and processing; Spectral analysis of 1D NMR data for weakly and strongly coupled systems; Product Operator Formalism and 2D NMR; Molecular identification; Structure determination.

Texts/References:

1. Keeler, J., Understanding NMR Spectroscopy, 2nd Edn., Wiley, 2010.
2. T.D. W. Claridge (Ed.), High-Resolution NMR Techniques in Organic Chemistry, Tetrahedron Organic Chemistry Series, 3rdEdn., 2009.|
3. Silverstein, R.M., Webster, F. X. and Kiemle, D. J., Spectrometric Identification of Organic Compounds, 7th Edn., Wiley, 2005
4. Slichter , C. P., Principles of Magnetic Resonance(Springer Series in Solid-State Sciences, Vol. 1), 3rd Enlarged and Updated Edn., Springer,1996
5. Levitt, M. H., Spin Dynamics: Basics of Nuclear Magnetic Resonance, 2ndEdn., Wiley, 2008.
6. Freeman, R.,Spin Choreography: Basic Steps in High Resolution NMR, Oxford University Press, 2011 reprint
7. Jacobsen, N. E., NMR Spectroscopy Explained: Simplified Theory, Applications and Examples for Organic Chemistry and Structural Biology, 1stEdn., Wiley-Interscience, 2007