

Module-I

Spectroscopic methods to study physicochemical properties of Biomolecules: UV-Vis, IR, CD & ORD, DSC, FTIR Fluorescence & phosphorescence. Electrophoresis: General principle of electrophoresis, support media (agarose and polyacrylamide gels), electrophoresis of proteins by SDS-PAGE, native PAGE, gradient gels, isoelectric focusing, two dimensional PAGE, Blotting Techniques: Western, Southern, Northern blot analysis, visualization of proteins in gels, electrophoresis of nucleic acids using agarose gel.

Module-II

Brief introduction to NMR spectroscopy, hydrogen-deuterium exchange Mass spectroscopy and X-ray crystallography and their application. Hydrodynamic properties–viscosity. Principles of electron microscopy, preparation of samples, TEM, SEM Radioisotope Techniques: Radioactivity activity detection methods based on ionization (GeigerMuller monitor), excitation (solid and liquid scintillation counting), Cerenkov counting, autoradiography, safety aspects of handling radioactive material

Module-III

Chromatography: Principles of chromatography, distribution coefficient, retention time, capacity factor, plate height and resolution, peak broadening and van Deemter plot, TLC and column chromatography, matrix materials, LPLC, HPLC, normal phase and reversed phase chromatography, ion exchange chromatography, gel exclusion chromatography, affinity chromatography, Gas Chromatography

Biosensors: Immobilization key to biosensor construction, Types of Biosensor, whole cell biosensors. Applications and uses of biosensors, Clinical chemistry, medicine and health care, Veterinary, Agriculture and Food production, Environmental control and pollution monitoring.

Books:

1. Principles and Techniques of Biochemistry and Molecular Biology, Wilson K. and Walker J., Cambridge University Press (2005) 6th ed.
2. Biochemical Method-A Concise guide for students and researchers, Pingoud A., Urbanke C., Hoggett J. and Jeltsch A. Wiley-VCH Publishers
3. Bioseparations: Science and Engineering, Harrison, R.G., Todd, P., Rudge, S.R. and Petrides, B.B. Oxford University Press (2006).
4. Molecular Spectroscopy, McHale, J.L., Prentice Hall (1998).
5. Microscopy and Microtechniques. Marimuthu, R., MJP Publishers (2008).
6. Instrument Methods of Analysis, Willard H.W., Merritt L.L., Dean J.A. & Settle F.A. 6th ed. East West Publishers,
7. Turner, A.P.F., Karube.I.,and Wilson, G.S. Biosensors Fundamentals and applications, Oxford Univ.Press.