

7th Semester	RBT7D006	Analytical Techniques in Biotechnology	L-T-P 3-0-0	3 Credits
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Module-I:**(10 hours)**

Microscopy- Dark-field, Phase contrast, Fluorescence, Confocal, Polarization microscopy; Electron microscopy: TEM & SEM. Radioisotope techniques- Basic concepts, GM and scintillation counter, autoradiography, RIA, Applications in biological science.

Module-II:**(8 hours)**

Chromatographic methods- General principles, Ion exchange, Gel filtration, Affinity and Gas chromatography techniques. UV-Vis Spectroscopy: Parameters of absorption spectra; molecular basis of light absorption by molecules like DNA, RNA, protein and other biomolecules; working principle of UV-Vis absorption spectrophotometer; application of UV-visible spectroscopy in bio-world. Spectroscopic Techniques Electromagnetic radiations; fluorescence, CD, NMR, X-ray, Atomic absorption and Flame emission spectroscopic techniques, Mass spectrometry, Differential scanning calorimetry

Module-III:**(10 hours)**

Electrophoresis- General principles, Horizontal & Vertical Gel electrophoresis, SDS PAGE, Native PAGE Isoelectric focusing, 2D, Pulse field and immune, electrophoresis., Centrifugation techniques- Basic principles types of centrifuges and centrifugation, Determination of relative molecular mass by centrifugation.

Module-IV:**(10 hours)**

Polymerase Chain Reaction DNA sequencing, ELISA, Ouchterlony double diffusion, Radial immunodiffusion, counter current immunoelectrophoretic, Electrophoresis mobility shift assay, DNase footprinting assay, Flow cytometer, Blotting techniques, Fluorescence resonance energy transfer (FRET).

Books:

- [1] Wilson K and Walker J "Principles and Techniques of Biochemistry and Molecular Biology" 6th Ed. Cambridge University Press, 2005.
- [2] Tinoco. I. et al. (2014) Physical Chemistry: Principles and Applications in Biological Sciences. Pearson Education.
- [3] Willard, H.H., Merritt L.L. Dean J.A. and Settle F.A., "Instrumental Methods of Analysis", 7th Ed., Wadsworth Publishing Co., 1986
- [4] Van Holde, K E, Johnson, W. and Ho, P.S., "Principles of Physical Biochemistry", Prentice Hall, 1981.
- [5] Cantor, C. R. and Schimmel, W.H., "Biophysical Chemistry Part-II", Freeman & Co., 1981.