

FIRST ALLIED COURSE III - BIOPHYSICS AND INSTRUMENTATION

UNIT - I

Scope and methods in Biophysics, Levels of molecular organization, Thermodynamics, Atomic structure of molecules - Conformational analysis and forces; Physical properties of Biomolecules; Molecular interaction of Biopolymers; Biophotonic and its application; Structure of ion channels – Biophysical, Biochemical aspects of ion channels; Voltage depended membrane permeability.

UNIT - II

Introduction to spectroscopy and laws of light; Microscopy – Principle and application of phase contrast, Fluorescence and Electron microscopy; Microtomy – types of microtome, material preparation and fixation – Embedding – block making; Steps involved in sectioning, staining and mounting; Cytophotometry; cryostat.

UNIT – III

Biophysical method for the determination of biopolymer structure; principles, components and application of X- Ray diffraction; UV – Visible, NMR and ESR Spectroscopy; Calorimeter, Spectrophotometer, pH meter, Principle, Design and applications; LASER – principle and application .

UNIT – IV

Tracer techniques: Radioactive isotope – Half life, GM counter, Liquid scintillation counter, Autoradiography; Fractionation techniques – Ultra centrifugation, Density gradient centrifugation.

UNIT – V

Electrophoresis –SDS – PAGE; Agarose gel, Immunoelectrophoresis; Chromatography – principle, instrumentation and application of column Chromatography, ion exchange chromatography, Thin layer Chromatography and HPLC.

Reference books

1. Advance biophysics by S.K. Agarwal, APH Publishing Corporation
2. Biophysics by Vatsala Piramal, Dominant Publishers and Distributors
3. A Biologist guide to principles and techniques of practical biochemistry by Wilson and Walkar, 5th edition, Cambridge University press (2000).
4. Modern Experimental Biochemistry by Boyer. R, 3rd edition Addison Wesley Longman, (2000)
5. Biochemical Chemistry Principles and Techniques by Upadhyay, and Nath, Himalaya Publication (1997)
6. Physical Biochemistry – Application to Biochemistry and Molecular Biology by Friefelder, WH Freeman & Co. (1994)
7. Introduction to Spectroscopy by Pavia *et al.*, 3rd edition, Brooks / Cole Pub Co., (2000)