

OBJECTIVES: To enable the students to –

- Develop familiarity with important biochemical & Biophysical techniques employed in biotechnological work.

COURSE:

UNIT I: SPECTROPHOTOMETRY

1. Concept of electromagnetic radiations, spectrum of light, absorption of electromagnetic radiation, absorption spectrum and its uses, Beer – Lambert's law.
2. Colorimeter: Instrumentation of U.V & visible spectrophotometry, double beam spectrophotometer.
3. Applications of U.V & visible spectrophotometry

UNIT II: CHROMATOGRAPHY

Chromatography: Principle, methodology and applications of

1. Paper Chromatography
2. Thin – layer Chromatography
3. Gel – filtration Chromatography
4. Ion – Exchange Chromatography
5. Affinity Chromatography

UNIT III: ELECTROPHORESIS

1. Migration of ions in electric field, factors affecting electrophoretic mobility.
2. Paper electrophoresis: electrophoresis run, detection techniques, cellulose acetate electrophoresis
3. Gel electrophoresis: Types of gels, procedure, column and slab gels, detection, recovery and estimation of macromolecules.
4. SDS PAGE: Applications, determination of molecular weight of proteins, molecular biology applications.
5. Iso-electric focusing: Principle, establishing P^H , procedure and applications.

UNIT IV: ISOTOPIC TRACER TECHNIQUES

1. Radioactive and stable isotopes, rate of radioactive decay, units of radioactivity.
2. Measurement of radioactivity: Ionization chamber, proportional counter, Geiger – Muller counter, Solid and Liquid scintillation counter (basic principle, instrumentation and technique)
3. Applications of Isotopes in Biotechnology (Distribution studies, Metabolic studies, Isotopic dilution techniques, Clinical applications in Autoradiography)

UNIT V: CENTRIFUGATION

1. Basic principles, concept of RCF, Ultra centrifuge – types
2. Preparative centrifugation: Differential and density gradient centrifugation, Applications (Isolation of cell components).
3. Analytical centrifugation: Light absorption system, Alternative schlieren system, Rayleigh interference system.
4. Dialysis and Lyophilization.

REFERENCES:

1. Plummer – DT (1988) An introduction to practical Biochemistry. Tata McGraw Hill Co, New Delhi.
2. Wilson, K & Goulding K.M.(1986) A Biologist Guide to Principles & Techniques of Practical Biochemistry ELBS Publication, New Delhi.
3. Stryer L (2000) Biochemistry – Freeman Toppan Delhi.
4. Lehninger, AI (2000), Biochemistry Wortlo – Delhi
5. Upadhyay, Upadhyay (2002), Biophysical and Chemical Techniques, Himalayas Publications, New Delhi.

