

BTS 454 BIOANALYTICAL TECHNIQUES (SOFT CORE COURSE) Hours: 40

Course outcome

Students will be able to:

- CO 1. apply the principle, instrumentation of bio analytical techniques such as chromatography and electrophoresis for the separation of different biomolecules
- CO 2. learn the principle and application of different spectroscopic methods for the structural analysis of biomolecules.
- CO 3. demonstrate the application of radioisotope techniques for the quantification of biomolecules based on isotope labelling.
- CO 4. understand the types and properties of different nanostructures and nanoparticles for the future application of nanotechnology in different fields of science.

UNIT I (13 hrs)

Principle, instrumentation and applications of separation techniques for different biomolecules and applications: Chromatography classification – Planar and columnar, Classification based on scale – analytical, semi preparative and preparative. Chromatography – paper, TLC, Gel filtration, ion exchange, affinity, HPLC and GC. Electrophoresis - gel, agarose-gel, PAGE, SDS-PAGE, Iso-electric focusing.

UNIT II (13 hrs)

Physical techniques in structural analysis of biomolecules and applications: Spectroscopy: Interaction of different electromagnetic radiations with matter, principle, instrumentation and application of UV-visible, fluorescent, CD, NMR, ESR spectroscopy, Atomic absorption spectroscopy, Plasma emission spectroscopy, X-ray diffraction, Mass spectroscopy.

UNIT III (14hrs)

Principle, instrumentation and applications of Centrifugation and ultracentrifugation. Radioisotope techniques - nature of radiation sources, radioactive decay, units of radiation, detection and measurement of radioactivity, GM and scintillation counters and autoradiography. Principles of nanotechnology - Nanostructures, nanoparticles and their properties. Applications. Green synthesis of nanoparticles.

References

- 1) Principles of instrumental analysis. Skooge DA., Holler FJ., Crouch SR., Thompson Brooks Publ., 1988
- 2) Basic concepts of analytical chemistry. Khopkar SM. New Age International Publ. New Delhi, 1998
- 3) Principles and Techniques of Biochemistry and Molecular Biology, K. Wilson and J. Walker (Eds.) 6th Ed., Cambridge Univ. Press, 2005