

MANGALORE UNIVERSITY
DEPARTMENT OF BIOSCIENCES
MSc BIOTECHNOLOGY

BTS 454 BIOANALYTICAL TECHNIQUES (SOFT CORE COURSE)

Hours: 40

Course outcome

Students will be able to:

- apply the principle, instrumentation of bio analytical techniques such as chromatography and electrophoresis for the separation of different biomolecules
- learn the principle and application of different spectroscopic methods for the structural analysis of biomolecules.
- demonstrate the application of radioisotope techniques for the quantification of biomolecules based on isotope labelling.
- 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 – 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: 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

