Master of Science (Zoology)
M.Sc. Zoology Semester II

Course Code	PS02CZOO51	Title of the Course	Bioanalytical Techniques
Total Credits of the Course	04	Hours per Week	04

Course Objectives:	1. To get familiarise with various microscopy and separation techniques like electrophoresis, centrifugation and chromatographic techniques 2. To learn various applications of spectroscopic methods 3. To get acquainted with radiation measurements in isotopes and effects of radiation on biological systems 4. To gain knowledge about types of biosensors and their applications

Course Content		
Unit	Description	Weightage* (%)
1.	Electrophoresis: Support media: Agarose gels and polyacrylamide gels. Electrophoresis of proteins: SDS PAGE, Native gels, Gradient gels, Isoelectric focusing gels, 2-D PAGE, Continuous flow electrophoresis, and Protein blotting. Electrophoresis of nucleic acids: Agarose gel electrophoresis and pulsed field electrophoresis. Capillary electrophoresis and its applications Biosensors: Principle, types and applications	25
2.	Basic principle and application of Differential, density and ultracentrifugation. Principle, methodology and applications of gel – filtration, ion –exchange and affinity chromatography; Thin layer and High Performance Thin Layer Chromatography. Gas chromatography, High performance liquid chromatography and FPLC.	25
3.	Spectropscopy Principle, instrumentation and applications of UV, Visible, IR (including FTIR and ATR), AAS, NMR, fluorescence and CD spectroscopy.	25
4.	Principle and applications of tracer technique in biology: Radioactive Isotopes and half-life of isotopes; Effect of radiation on biological system; autoradiography; cerenkov radiation; radiation dosimetry; ionization and scintillation based detection and quantification of	25

	radioactivity. Principle of biophysical methods used for analysis of biopolymer structure: X ray diffraction and mass spectrometry	

Teaching-Learning Methodology	Topics will be taught and discussed in interactive sessions using conventional black board and chalk as well as ICT tools such as power point presentations and videos. Practical sessions will be conducted in a suitably equipped laboratory either individually or in groups depending on the nature of exercise as well as availability of infrastructure. Course materials will be provided from primary and secondary sources of information.

Evaluation Pattern		
Sr. No.	Details of the Evaluation	Weightage
1.	Internal Written / Practical Examination (As per CBCS R.6.8.3)	15%
2.	Internal Continuous Assessment in the form of Practical, Viva-voce, Quizzes, Seminars, Assignments, Attendance (As per CBCS R.6.8.3)	15%
3.	University Examination	70%

Course Outcomes: Having completed this course, the learner will be able to	
1.	Understand microscopic and separation techniques for their further studies
2.	Gain knowledge of various spectroscopy and their applications in structural determination of bio-chemicals
3.	Learn applications of radioisotopes and biosensors in biological sciences

Suggested References:	
Sr. No.	References
1.	Sharma, B. K. (1981). Instrumental methods of chemical analysis. Krishna Prakashan Media, Meerut.
2.	Skoog, D. A., Holler, F. J., & Crouch, S. R. (2017). Principles of instrumental

	analysis. Cengage learning, Australia
3.	Mu, P., & Plummer, D. T. (2001). Introduction to practical biochemistry. Tata McGraw-Hill Education, United States

On-line resources to be used if available as reference material
On-line Resources
Relevant review articles/research papers/handouts of latest development in the subject