Course Code: ZOO 410 **Course Title: Biological Techniques**
Number of Credits: 2
Effective from AY: 2020 -21

Prerequisite for the Course:	Elementary knowledge of Physics, Chemistry besides Lifescience.	
Objectives:	1. To provide knowledge on physical and chemical principles involved in the laboratory instruments used for preparative and analytical biological methods. 2. To provide general overview of different biochemical experimental approaches to understand the structure and functions of cell and its components.	
Content	**Module 1** Spectrophotometry techniques: Laws of radiant energy absorption, Radiant energy resources, Wavelength selectors, Sample containers, Detection devices, amplification and readout, Qualitative and quantitative applications. Molecular biology techniques: PCR and RT-PCR, working principles, data analysis, applications. Microscopic techniques: Visualization of cells and subcellular components by light microscopy, resolving powers of different microscopes, microscopy of living cells, scanning and transmission microscopes, Freeze-etch and Freeze-fracture methods for EM, image processing methods in microscopy. Radiolabeling techniques: Detection and measurement of different types of radioisotopes normally used in biology, incorporation of radioisotopes in biological tissues and cells, molecular imaging of radioactive material, safety guidelines. **Module 2** Chromatography techniques: Principle of chromatographic separations, Types of chromatographic techniques, Planar, Column, Thin layer, Displacement, Ion-exchange, Size exclusion, Gas and Liquid Chromatography (their working and application). Electrophoresis techniques: Concepts of Electrophoresis and Electro-osmosis; Slab Gel and Vertical gel assemblies, Agarose gel electrophoresis, PAGE, SDS-PAGE, Isoelectric focusing, 2D Gel electrophoresis, Recovery of materials from Electrophoretic gels. Centrifugation techniques: Types by rotor designs, Types by intended use, Centrifugal techniques (Differential, Density gradient, Rate Zonal, Isopycnic centrifugation.	03Hrs 03 Hrs 03 Hrs 03 Hrs 05 Hrs 04Hrs 03Hrs
Pedagogy:	Lectures/ tutorials/Group discussions/PBL/self-study	
Learning Outcome:	1. Understanding the basic knowledge of some advance techniques and their uses and its potential application in animal biology.	
References /Reading	1. Cooper TG (1977), The Tools of Biochemistry, John Wiley publication, India.	

	2. Dryer R and G. Lata G (1989), Experimental Biochemistry, Oxford University Press, Oxford. 3. Ewing GW(2006), Instrumental Methods for Chemical Analysis, Mc Graw Hill Book Co., London Freifelder D (1982), Physical Biochemistry, W. H. Freeman & Co., New York. 4. Holme D and Peck H (1998), Analytical Biochemistry, Longman Scientific & Technical Publication, England.