

Name of the Programme: M.Sc. Zoology

Course Code: ZOO-507

Title of the Course: Animal Biochemistry

Number of Credits: 03

Effective from AY: 2023-24

Pre-requisites for the Course:	Elementary knowledge on structural biochemistry of Protein, Carbohydrate and Lipids	
Course Objectives:	<ol style="list-style-type: none">1. To perceive enzymes in the context of kinetics, structure, regulation and importance2. To determine the biochemical integrity of various metabolic pathways3. To outline metabolic pathways, their regulation, and importance in animals	
Content:	Module 1 Water as biological solvent; Ionization of water and buffering in biological systems. Enzyme Kinetics and enzyme inhibition; Catalytic and Regulatory strategies of Enzymes, Allosteric proteins and enzymes and its importance Concept of metabolism; Concept of free energy; Coupled reaction; Review of ATP and ATPase. Role and mechanism of action of NAD ⁺ /NADP ⁺ , FAD, lipoic acid, thiamine pyrophosphate, tetrahydrofolate, biotin, pyridoxal phosphate, B12 coenzymes and metal ions with specific examples, ascorbic acid, thiamine, pantothenic acid and folic acid.	15 hours
	Module 2 Review on Regulation of Glycolysis & Gluconeogenesis, Glycogenolysis & Glycogenesis. TCA cycle; Electron transport system; Oxidative phosphorylation Integration of fatty acid synthesis & β Oxidation of fatty acid; Importance of cholesterol and lipoprotein in health management Synthesis of steroid hormones; Eicosanoids: types, outline of biosynthesis and their physiological importance. Biological Membranes and transport: Lipid bilayer, membrane dynamics, solute transport across membranes.	15 hours
	Module 3	

	Nomenclature and classification of amino acids; Protein and peptide chains; Primary-, Secondary-, Tertiary and Quaternary structures of protein; Separation and Purification of proteins. Protein turn-over and amino acid catabolism; Nitrogen excretory pathways; Oxidation of amino acids; Biosynthesis of amino acids in animal. Biochemistry of Electrophoretic separation techniques; Structures of Membrane receptors (Lipoproteins and glycoproteins); G Protein coupled receptors, receptor tyrosine kinase, adaptor proteins and gated ion channels.	15 hours
Pedagogy:	Lectures/ tutorials/ online teaching mode/self-study	
References/ Readings:	<ol style="list-style-type: none"> 1. T.M. Devlin, Text book of Biochemistry with Clinical Correlations. Willey, Oxford, 2010. 2. R.K. Murray, D. Granner, P. Mayes, and V.W. Rodwell, Harper's Illustrated Biochemistry. USA: McGraw-Hill, Companies, 2000. 3. A. Blanco, and G. Blanco, Medical Biochemistry. Academic press, 2017. 4. J. Berg, J. Tymoczko, and L. Stryer, Biochemistry. New York: W. H. Freeman and Company, 2002. 5. D.L. Nelson, and M.M. Cox, Lehninger's Principles of Biochemistry, USA: Freeman WH and Co, USA, 2010. 6. J. Pelley, Elsevier's Integrated Biochemistry. Amsterdam: Elsevier, 2012. 	
Course Outcomes:	<p>The learner will</p> <ol style="list-style-type: none"> 1. Explain the importance of enzymes in various metabolic processes 2. Illustrate the key pathways involved in cellular metabolism 3. Determine the medical significance of various metabolic processes 4. Integrate the concepts of biochemistry with animal sciences. 	