

Semester	I
Course ^{*1}	Major-1
Paper Code	C1BT230111T
Paper Title	Biological Macromolecules and Bioenergetics
No. of Credits ^{*2}	4
Theory / Practical / Composite	Theory
Minimum No. of preparatory hours per week a student has to devote	4
Number of Modules	2
Syllabus	<p>Module A:</p> <p>UNIT I: Amino acids & Proteins: Structure & Function. Structure and properties of Amino acids, Types of proteins and their classification, Forces stabilizing protein structure and shape. Different Level of structural organization of proteins, Structure of Fibrous and globular proteins: Keratin, Collagen, Hemoglobin.</p> <p>UNIT II: Carbohydrates: Structure, Function and properties of Monosaccharides, Disaccharides and Polysaccharides. Homo & Hetero Polysaccharides, Mucopolysaccharides, Bacterial cell wall polysaccharides, Glycoproteins and their biological functions.</p> <p>UNIT III: Lipids: Structure and functions –Classification, nomenclature and properties of fatty acids, essential fatty acids. Phospholipids, sphingolipids, glycolipids, cholesterol.</p> <p>Module B:</p> <p>UNIT IV: Nucleic acids: Structure and functions - Physical & chemical properties of nucleic acids - Purines & pyrimidines, nucleosides & nucleotides, biologically important nucleotides, double helical model of DNA structure and forces responsible for A, B & Z – DNA, denaturation and renaturation of DNA. RNA - folding of RNA into higher order structures; types of RNAs - mRNA, tRNA, rRNA in ribosome; modified nucleotides in tRNA and their importance.</p> <p>UNIT V: Enzymes: Nomenclature and classification of enzymes, holoenzyme, apoenzyme, cofactors, coenzyme, prosthetic groups, metalloenzymes, activation energy and transition state, enzyme activity, specific activity, common</p>

	features of active sites, enzyme specificity - types & theories; Role of coenzymes: NAD ⁺ , NADP ⁺ , FMN/FAD. UNIT VI: Bioenergetics of Carbohydrate Metabolism.	
Learning Outcomes * ³	<ol style="list-style-type: none"> 1. Students will be introduced to the biological macromolecules – protein, lipids, carbohydrates and nucleic acids - the key players in a living system. 2. Students are expected to understand the structure-function relationship of the bio-molecules. 3. Gaining realisations that biological systems indeed abide by the physico-chemical laws through lessons on bioenergetics. 4. Getting introduced to enzymes, the wonder molecules, and the magnificent roles they play in the isothermal and isobaric biological systems. 5. Students will gain an overview of carbohydrate and lipid metabolism. 6. Students will develop insights on the complex regulation of metabolic processes is elucidated by in- depth carbohydrate metabolism. <p>.....</p>	
Reading/Reference Lists * ⁴		
Evaluation	Theory CIA: 30 Semester Exam: 70	Practical (if applicable) CA: Semester Exam:
Paper Structure for Theory Semester Exam	Module A (35 marks) Q.1. Compulsory – 10 marks Any two from three questions (Q.2.-Q.4.) – each 12.5 marks [No sub-part will be less than 1 mark and more than 5 marks]	
	Module B (35 marks) Q.5. Compulsory – 10 marks Any two from three questions (Q.6.-Q.8.) – each 12.5 marks [No sub-part will be less than 1 mark and more than 5 marks]	