Course	**Discipline Specific Core**
Semester	I
Paper Number	**MBTCR1011T**
Paper Title	**BIOCHEMISTRY & METABOLISM**
No. of Credits	6
Theory/Composite	Theory
No. of periods assigned	5 Theory + 1Tutorial
Course description/objective	1. Students are introduced to the biological macromolecules – protein,lipids, carbohydrates and nucleic acids - the key players in a living system. 2. Focus is on structure-function relationship of the bio-molecules. 3. Lessons on bioenergetics will lead to the realisation that biological systems indeed abide by the physico-chemical laws. 4. Students are introduced to enzymes, the wonder molecules, and the magnificent roles they play in the isothermal and isobaric biological systems. 5. Students are provided with an overview of carbohydrate and lipid metabolism. 6. The complex regulation of metabolic processes is elucidated by in- depth carbohydrate metabolism.
Syllabus	**Module A: (40 Marks)** **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, Protein Purification. Denaturation and renaturation of proteins. Structure of Fibrous and globular proteins: Keratin, Collagen, Hemoglobin **UNIT II: Carbohydrates:** Structure, Function and properties of Monosaccharides, Disaccharides and Polysaccharides. Homo & Hetero Polysaccharides, Mucopolysaccharides, Bacterial cell wall polysaccharides, Glycoprotein's and their biological functions. **UNIT III: Lipids:** Structure and functions –Classification, nomenclature and properties of fatty acids, essential fatty acids. Phospholipids, sphingolipids, glycolipids, cholesterol. **No. of Classes:** 3 / week **Module B: (40 Marks)** **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. **UNIT V:** Enzymes: Nomenclature and classification of enzymes, holoenzyme, apoenzyme, cofactors, coenzyme, prosthetic groups, metalloenzymes, monomeric & oligomeric enzymes, activation energy and transition state, enzyme activity, specific activity, common features of active sites, enzyme specificity - types & theories; Role of: NAD^+, $NADP^+$, FMN/FAD.

	UNIT VI: Carbohydrate Metabolism: Bioenergetics; Glycolysis - fate of pyruvate under aerobic and anaerobic conditions; Pentose Phosphate Pathway and its significance; Gluconeogenesis, Glycogenolysis and Glycogen Synthesis; TCA cycle; Role of coenzymes A, thiamine pyrophosphate, pyridoxal phosphate, lipoic-acid, biotin, tetrahydrofolate and metallic ions. **No. of Classes:** 3 / week

Readings	1. Biochemistry - Voet & Voet. 2. Lehninger Principles of Biochemistry - Cox & Nelson. 3. Biochemistry Berg – Tymoczko & Stryer.
Evaluation	Continuous Internal Assessment: 20 marks End- Semester Theory Examination: 80 marks
Paper Structure for End SemTheory	Module A (40 marks) Q.1. Compulsory – 10 marks Any two from four (Q.2.-Q.5.) – each 15 marks No sub-part will be less than 1 mark and more than 5 marks.Module B (40 marks) Q.6. Compulsory – 10 marks Any two from four (Q.7.-Q.10.) – each 15 marks No sub-part will be less than 1 mark and more than 5 marks.