

**SEMESTER 1<sup>st</sup>**  
**MAJOR / MINOR COURSE**  
**BTG122M BIO-TECHNOLOGY (BIOMOLECULES STRUCTURE AND FUNCTION)**  
**CREDITS: THEORY: 04, PRACTICALS: 02**  
**THEORY (04 CREDITS)**

**UNIT-1; AMINO ACIDS AND PROTEINS**

Physicochemical properties of water; Concept of pH, pK, pI & buffers; Structure and classification of amino acids; Levels of protein structure- primary, secondary, tertiary and quaternary; Types of proteins - fibrous and globular proteins; Forces stabilizing protein structure.

**UNIT-2; ENZYMES**

Nomenclature and classification of enzymes; Basic principles of enzyme catalysis; Concept of active site; Enzyme activity and its measurement, factors affecting enzyme activity; Michaelis-Menten kinetics; Lineweaver- Burk plot; Enzyme inhibition (competitive, non-competitive and uncompetitive)

**UNIT-3; CARBOHYDRATES**

General structure, classification and function of carbohydrates; Stereoisomerism in monosaccharides with special reference to the concepts of configuration and conformation; Breakdown of carbohydrates- glycolysis, TCA cycle, electron transport chain, oxidative phosphorylation.

**UNIT-4; LIPIDS AND NUCLEIC ACIDS**

Nomenclature and properties of fatty acids, Structure and functions of major types of lipids -triglycerides, phospholipids, sphingolipids, sterols,  $\beta$ -oxidation of saturated and unsaturated fatty acids. Structure and classification of nitrogenous bases, composition and bonding in nucleotides and polynucleotides. Types of DNA (A, B and Z) and their structure, Types of RNA (mRNA, tRNA and rRNA) and their structure.

**PRACTICAL (02 CREDITS)**

1. Preparation of molar, molal, normal solution and buffers.
2. Qualitative and quantitative estimation of carbohydrates in a given solution.
3. Qualitative and quantitative estimation of carbohydrates in a given solution.
4. Enzyme activity assay: Acid / Alkaline Phosphatase.
5. Quantification of DNA in a given solution.

**BOOKS RECOMMENDED**

1. *Lehninger Principles of Biochemistry*: Nelson, D. L. and Cox, M. M. Worth Publishers, New York.
2. *Biochemistry (Latest Edition)*: Stryer, L., -W. H. Freeman and Company, New York.
3. *Biochemistry (Latest Edition)*: Voet, D and Voet, J. G. -John Wiley and Sons Inc. New York.
4. *Understanding Enzymes*: Palmer, T. -Ellis Horwood Limited.
5. *Enzymology*: Devasena, T. -Oxford University Press.
6. *Introductory Practical Biochemistry*, S. K. Sawhney, R. Singh, Narosa Publishing House.