SEMESTER 1st

MAJOR COURSE

BTG122J: 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, P-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.