

BTY501:BIOMOLECULES AND METABOLISM

L:3 T:0 P:0 Credits:3

Course Outcomes: Through this course students should be able to

CO1 :: memorize the fundamental principles of thermodynamics as their involvement in biological systems

CO2 :: explain the structural and functional aspects of biomolecules

CO3 :: examine the role of biocatalysis in biological processes

CO4 :: illustrate the metabolic significance of carbohydrates for its bioenergetics and physiological role

CO5 :: analyze the metabolic role of fat for its bioenergetics and physiological role

CO6 :: evaluate the role of antimetabolites in the metabolic disorders

Unit I

Principles of biophysical chemistry : chemical bonds and stabilizing interactions, pH and buffer, bioenergetics, reaction kinetics, free energy, group transfer and coupled reaction, biological energy transducers

Carbohydrates : stereoisomerism in sugars, classification of carbohydrates, monosaccharides, disaccharides, polysaccharides

Unit II

Lipids : fatty acids and their properties, classification of lipids, triacylglycerol, waxes, phospholipids and glycolipids, cholesterol and its significance

Amino acids : stereochemistry of amino acids, un-common amino acids, titration curve of amino acids, structure and classification of amino acids

Unit III

Proteins : structural classification of proteins, function of proteins, Ramachandran plot, stability of proteins and denaturation

Enzymes : classification of enzymes, overview of enzyme kinetics, factors affecting activity of enzymes, mechanism of enzyme catalysis

Unit IV

Metabolism I : ATP and electron carriers, glycolysis, fermentation, gluconeogenesis, pentose phosphate pathway, glycogen breakdown, glycogen synthesis

Unit V

Metabolism II : Citric acid cycle, glyoxylate cycle, electron transport chain, oxidative phosphorylation, fatty acid oxidation and biosynthesis, ketone bodies

Unit VI

Metabolism III : Transamination reactions, oxidative deamination reaction, glucogenic amino acids, ketogenic amino acids, urea cycle and its significance, biosynthesis of nucleotides, degradation of nucleotides

References:

1. LEHNINGER'S PRINCIPLES OF BIOCHEMISTRY by D.L. NELSON AND M.M. COX, MACMILLAN
2. VOET'S PRINCIPLES OF BIOCHEMISTRY by DONALD VOET, JUDITH G. VOET, CHARLOTTE W. PRATT, WILEY

