

3 rd Semester	RBT3C001	Biochemistry and Microbiology	L-T-P 3-0-0	3 CREDITS
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Module-I: (10 Hrs.)

Structure and Function of Carbohydrates: Monosaccharide, Oligosaccharides, Polysaccharides (Starch, Glycogen, Cellulose), Optical Isomerism. Structure and Function of Lipids: Saturated and Unsaturated Fatty Acids, Triacylglycerols, Phosphoglycerides, Sphingolipids, Waxes and Sterol. Structure and Function of Proteins: 20 Amino acids, Peptide bond, Hierarchy of protein architecture, Ramachandran Plot. Structure and Function of Nucleic Acids: DNA, RNA, Double Helix Model of DNA, Denaturation and Renaturation DNA; Structure and function of Hormones, Minerals and Vitamins.

Module-II: (09 Hrs.)

Principle of Bioenergetics: Bioenergetics and Thermodynamics, Phosphoryl group transfer and energy currency-ATP; Biological Oxidation and reduction reactions. Metabolism-I: Introduction to metabolic processes; Metabolism of Carbohydrates: Glycolysis, TCA Cycle, ETS and Oxidative Phosphorylation, Gluconeogenesis, Metabolism of Lipids: Anabolism (Saturated), Catabolism (α -Oxidation, β -Oxidation) and Energetics of lipid metabolism; Metabolism Of Nucleic Acids: Catabolism and anabolism of purine and pyrimidine nucleotides. Photosynthesis: Light reaction and dark reaction.

Module-III: (09 Hrs.)

Introduction to Microbial Kingdom- Bacteria, Viruses, Fungi and Yeast; Classical and Modern approaches of microbial taxonomy; Classification of bacteria, fungi and Viruses; Methods of Microbiology- Culture media, Sterilization, Establishment of pure culture, Staining of bacteria (Gram's, Acid Fast, Capsule), Micrometry and Microscopy(Bright Field, Fluorescence, Phase Contrast and Electron).

Module-IV: (09 Hrs.)

Microbial growth and metabolism: Pattern of bacterial growth, Growth kinetics, Monod's Equation, Synchronous Growth and its Kinetics, Continuous culture and its growth kinetics, Growth inhibitory substances. Metabolism of carbohydrate in bacteria, Enderdoudorf,s pathway and glyoxalate pathway, Energy transduction mechanism in bacteria, Cyanobacteria and nitrogen fixation, Anaerobic respiration. Microbial genetics: Organization of bacterial and viral genome, Plasmids and Episomes, Genetic recombination in bacteria (Transformation, Conjugation and Transduction), Genetic analysis in bacteria, DNA repair mechanisms in bacteria, Transposons, Mutation in Microorganisms.

Module-V: (08 Hrs.)

Plant & Microbial Biochemistry: Photosynthesis, differences in respiratory mechanisms and anaerobes, Fixation: Role of Various Enzymes in Nitrogen Cycle.

Books:

- G. Zubay: Biochemistry, W.C. Brown Publishers, Oxford, England (2002).
- Voet and Voet , Biochemistry Wiley New York (2001)
- Principle of Bio-Chemistry – Lehinger, Nelson and Cox
- Biochemistry of Biochemistry by L. Stryer
- Text book of Microbiology by Stanier.
- Microbiology by Pelczar
- Fundamentals of Biochemistry – Voet & Voet
- Biochemistry by Zubay.
- Brock Biology of micro-organisms
- Microbiology by Prescott.


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