

Syllabus for Biotechnology
Course for B.Sc. programme under CBCS system

Semester-II

Course title: Enzymology & Metabolism

Unit-I

Nature of Enzymes, Holoenzyme, Apoenzyme, Prosthetic Group, Cofactors, Coenzymes, Enzyme Activity, Units of measurement, Nomenclature and Classification of Enzymes, Nature of Active Site. Activation energy, Enzyme Substrate Complex, Enzyme Kinetics, Michealis-Menten Equation, K_m , V_{max} , K_{cat} ; Factors effecting enzyme reactions, Enzyme inhibition (Competitive, Non- Competitive, Un-competitive).

Unit-II

Carbohydrate Metabolism: Glycolysis, Gluconeogenesis, TCA cycle, Electron Transport Chain, Oxidative Phosphorylation, Pentose Phosphate Pathway, Glyoxylate cycle and their regulation.

Unit-III

Lipid Metabolism, Transport of Fatty Acids across the Mitochondrial Membrane, Beta Oxidation of Saturated, Unsaturated Fatty Acids, Biosynthesis of Fatty Acids and Triglycerides. Prostaglandins and their synthesis.

Unit-IV

Digestion & absorption of protein in Gastrointestinal tract. Transamination and Deamination reactions involved in Amino Acid metabolism, Urea Cycle and its Regulation. Metabolic disorders of Amino Acid Metabolism.

Practicals

1. Determination of pK_a value of P-nitro phenol and amino acid.
2. Enzyme activity assay: Acid/Alkaline phosphatase.
3. Effect of temperature on enzyme activity.
4. Effect of pH on enzyme activity.
5. Estimation of DNA by DPA method.
6. Estimation of DNA by spectrophotometry.

Books Recommended:

1. Lehninger Principles of Biochemistry by David L. Nelson, Michael M. Cox .
2. Biochemistry by Jeremy M. Berg, John L. Tymoczko and Lubert Stryer.
3. Enzymology by T. Devasena.
4. Enzymes: Biochemistry, Biotechnology and Clinical Chemistry by Trevor Palmer.