

GUJARAT TECHNOLOGICAL UNIVERSITY

B.E Semester: 3

Bio-Technology

Subject Code 130403

Subject Name BASIC BIOCHEMISTRY

Sr.No	Course content
1.	UNIT I: Water and Carbohydrates : Structure, Properties and Metabolism: Water: Properties of water and Ionization of water, weak acids, weak bases. Overview of metabolism. Cellular energy requirement for vital functions, Structure: Monosaccharides – classification, structure and properties Disaccharies – Classification, structures and properties Polysaccharides – Classification, structure and properties Glycoconjugates – Proteioglycans, glycoproteins and glycolipids, Lectins as carbohydrate binding proteins, Metabolism: Glycolysis – Location, Function, Equations and ATP yields TCA Cycle – Location, Function, Equations and ATP yields Electron transport and oxidative phosphorylation – Location, Function, P/O ratios and ATP yields. Gluconeogenesis – Function, Location, Equations and ATP yields Glycogen synthesis: Function, Location, Equations and ATP yields Glycogen Breakdown: Function, Location, Equations and ATP yields Pentose phosphate pathway - Function, Location, Equations and ATP yields Cori cycle - Function, Location, Equations and ATP yields Glyoxalate pathway - Function, Location, Equations and ATP yields
2.	UNIT II - Amino Acid and Protein Structure and Metabolism : Amino acids: Structure, Physical and Chemical properties, classification Proteins: Structure, classification and Forces involved in stability of proteins Metabolism: Amino Acid Biosynthesis and Degradation Urea cycle
3.	UNIT III – Lipids and its metabolism : Lipids – Biological significance, Structure and classification (simple, compound, derived and lipid associated compounds) Metabolism – Transport and digestion of fats Beta oxidation of saturated fatty acids Beta oxidation of unsaturated (mono – and poly -) fatty acids Beta oxidation of odd number fatty acids Lipid biosynthesis

4.	UNIT IV – Nucleic acids structure and metabolism : Nucleic acid – basic components, structure and types (DNA and RNA) Metabolism – Denovo and salvage pathway Purine location, synthesis and salvage Purine degradation Pyrimidine location, synthesis and salvage Pyrimidine degradation
5.	UNIT V – Vitamins, Hormones and Minerals : Vitamins – Fat soluble and Water soluble Hormones – Plant and animal hormones Minerals – Macro and micro elements

BIOCHEMISTRY LABORATORY

1. Preparation of standard solutions and buffers.
2. Qualitative tests for carbohydrates.
3. Estimation of monosaccharide by Cole's method.
4. Estimation of disaccharides by Cole's method
5. Estimation of reducing sugar by DNSA method
6. Estimation of reducing sugar by Nelson Somogii's method
7. Estimation of ketose sugar by Roe's method.
8. Estimation of starch by Anthrone method.
9. Qualitative tests for amino acids.
10. Estimation of Protein by Biuret method.
11. Estimation of Protein by Lowry's method.
12. Estimation of Protein by Bradford method.
13. Estimation of Iodine number of lipid
14. Estimation of Free fatty acid content of lipid.
15. Saponification value of lipids.

Reference Books:

1. Lehninger's Principles of Biochemistry by David L. Nelson and Michael M Cox, Macmillan Worth Publisher
2. Lubert Stryer, Biochemistry, 4th Edition, WH Freeman & Co., 2000.
3. Voet and Voet, Biochemistry, 2nd Edition, John Wiley & Sons Inc., 1995.
4. Murray, R.K., Granner, B.K., Mayes, P.A., Rodwell. V.W., Harper's Biochemistry, Prentice Hall International.
5. Creighton. T.E., Proteins, Structure and Molecular Properties, 2nd Edition, W.H. Freeman and Co., 1993