**BBT3702**

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**Learning Objectives:**

* Students will learn the basic concept of pH and buffers
* To ensure students to have strong foundation in structure, composition and function of various biomolecules and their metabolism
* To apply these fundamentals in biotechnology

**Learning Outcomes:**

* Students will be able to explain the concept of pH and biological buffer system
* Students will be able to understand the structure and function of biomolecules
* By understanding the biomolecules, they obtain knowledge to continue other advanced courses including metabolism and bioenergetics, Molecular Biology, Enzyme Engineering, Genetic Engineering.

**UNIT I: Water, pH and Buffer system**

Water: Structure; Properties; Non-covalent interactions; Role in biological processes, Ionization of water, pH scale, Weak acids and bases, Buffers and buffering mechanism, Henderson Hasselbalch equation.

**UNIT II: Carbohydrate and its Metabolism**

Carbohydrates: Classification; Structure; Ring structure and mutarotation, Stereo isomers, Structural isomers and Anomers, General idea of central metabolic pathways like Glycolysis; HMP and TCA cycle.

**UNIT III: Fats, Lipids and their Metabolism**

Fats and lipids: Classification; Structure; Function, Simple, Compound and Derived lipids, Essential fatty acids, Activation and transport of fatty acid from cytosol to mitochondria for oxidation, Oxidation of fatty acids (β-oxidation).

**UNIT IV: Amino Acids and their Metabolism**

Classification and structure of amino acids, Essential amino acids, Peptide bond formation, Ramachandran plot, Structure of proteins, General idea about Deamination; transamination of amino acids and Urea Cycle.

**UNIT V: Nucleic acids**

DNA and RNA: Purines and pyrimidines: Structure and properties, Metabolism of Nucleotides: Purines and Pyrimidines synthesis, *de Novo* and salvage pathway, Formation of deoxyribonucleotides, Catabolism and salvage of Purine and Pyrimidine.

***TEXT BOOKS***

1. Nelson D.L., Lehninger A.L and Cox M.M. 2008. Lehninger, Principles of Biochemistry. 5th Edition. W. H. Freeman.
2. Berg J.M., Tymoczko J.L and Stryer L. 2012. Biochemistry. 7th Edition. W H Freeman.

***REFERENCE BOOKS***

* 1. Voet D., Voet J.G and Pratt C.W. 2016. Fundamentals of Biochemistry: Life at the Molecular Level. 5th Edition. Wiley.
  2. Rastogi S.C. 2003. Biochemistry. 3rd Edition. Tata McGraw Hill Education Pvt Ltd.