**BIOCHEMISTRY-I CREDIT HOURS2+1**

**LEARNING OUTCOMES:**

**The students will be able to:**

1. Importance of elements, water and other biological entities.
2. The core principles and topics of Biochemistry and their experimental basis.
3. Structure and interactions of nucleic acid, protein and carbohydrates.

**COURSE CONTENTS:**

A general introduction to the science of biochemistry; importance and the scope of biochemistry; structure, physical properties and importance of water; unique properties of carbon and other elements found in biological molecules; nature of organic matter; isomerism; biologically important organic compounds/solvents; Buffer and pH. overview of biological molecule and their structures; Amino Acids; Peptides and Protein; Enzymes: Nature and Function of enzyme, Classification and Nomenclature. Mechanism of enzyme action. Carbohydrates: Monosaccharides, Oligosaccharides, Polysaccharides, Glycoconjugates, Glycosaminoglycans, Proteoglycans, Glycoproteins; Carbohydrates as informational molecules; Nucleic Acids: Nucleosides and nucleotides, Structure and function of DNA and RNA; Lipids: Storage Lipids, Fatty acids and their types, Triacylglycerols, Structural Lipids, Phospholipids, Sphingolipid, Glycolipid, Sterols and Isoprenoids.

**PRACTICALS:**

1. Solutions.
2. Acid and Bases.
3. Electrolytes and Non Electrolytes.
4. Buffers and pH.
5. Study of hydrolysis of starch by using mineral acids.
6. Various qualitative tests for Monosaccharide, oligosaccharides and polysaccharides
7. Detection of reducing sugars in the presence of non-reducing sugars
8. Qualitative tests for different lipids.
9. Paper and thin-layer chromatography of sugars and amino acids.
10. Determination of pK values of amino acids (Glycine, Alanine) by preparation of titration curves.
11. Qualitative and quantitative analysis of proteins by colorimetric methods (Biuret and Lowry’s)

**RECOMMENDED BOOKS:**

1. [Berg](http://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&text=Jeremy+M.+Berg&search-alias=books&field-author=Jeremy+M.+Berg&sort=relevancerank), J. M., [Tymoczko](http://www.amazon.com/s/ref=dp_byline_sr_book_2?ie=UTF8&text=John+L.+Tymoczko&search-alias=books&field-author=John+L.+Tymoczko&sort=relevancerank), J. L., [Gatto](http://www.amazon.com/s/ref=dp_byline_sr_book_3?ie=UTF8&text=Gregory+J.+Gatto&search-alias=books&field-author=Gregory+J.+Gatto&sort=relevancerank). G. J., [Stryer](http://www.amazon.com/s/ref=dp_byline_sr_book_4?ie=UTF8&text=Lubert+Stryer&search-alias=books&field-author=Lubert+Stryer&sort=relevancerank), L., 2015.Biochemistry 8th Edition. W. H. Freeman.
2. Cox, M. and Nelson, D. L., 2005. Lehninger Principles of Biochemistry 4thEdition, Palgrave Macmillan.
3. Denniston, S., 2006. General, Organic and Biochemistry, 5thEdition. McGraw-Hill.
4. Devlin, T. M., 2002. Textbook of Biochemistry with Clinical Correlations 5th Edition. .John Wiley and Sons. Inc., New York,
5. [Dharmapalan](http://www.amazon.com/s/ref=dp_byline_sr_book_1?ie=UTF8&text=Biju+Dharmapalan&search-alias=books&field-author=Biju+Dharmapalan&sort=relevancerank), B., 2015. Plant Biochemistry: An Introduction Alpha Science International Ltd.
6. Garrett R. H., Grisham, C. M., 2012; Biochemistry 5th Brooks/Cole Cengage Learning, USA
7. Harvey, R. A., Ferrier D. A., 2011; Lippincott’s Illustrated reviews: Biochemistry, 5thEdition Lippincott Williams & Wilkins, NY
8. Lehninger A. L., Nelson D. L., Cox M. M., 2013; Lehninger Principles of Biochemistry 6thEdition. W. H. Freeman.
9. Metzler D. E., 2012. Biochemistry: The Chemical Reactions of Living Cells, Academic Press Elsevier USA
10. Murray, R., Granner, D., Mayes, P., and Rodwell, V., 2006. Harper's Illustrated Biochemistry 27thEdition. McGraw-Hill Education.
11. Voet, D., Voet, J. G. and Pratt, C. W., 2002. Fundamentals of Biochemistry; John Wiley and Sons. Inc., New York.