



CLUSTER UNIVERSITY SRINAGAR

SYLLABUS (FYUP UNDER NEP 2020)

Offered By Department Of BIO-CHEMISTRY

Semester 1st (Major Course)

Course Title: Fundamentals of Bio-Chemistry

Course Code: UGBCH22J101

Credits: 4 (Theory: 3, Practical: 1)

Contact Hrs: 75 (Theory: 45, Practical: 30)

Max. Marks 100

Theory External: 60; Min Marks: 24

Theory Internal (Continuous Assessment): 15 Marks, Min Marks: 06

Practical Experimental Basis= 15, Min. Marks: 06

Practical Experimental (Continuous assessment) = 10, Min. Marks: 04

Objectives

Biomolecules perform or trigger important biochemical reactions in living organisms. While studying biomolecules, one is expected to understand the physiological functions that regulate the proper growth and development of a living organism.

Learning Outcomes

After the completion of the semester the student should be able to:

1. Understand the structures, classification and properties of carbohydrates, proteins, lipids and nucleic acids.
2. Understand the functional significance of biomolecules in sustaining life.
3. The student will exploit this knowledge in characterization of biomolecules in research.

UNIT 1: CARBOHYDRATES

15 Hrs

Carbohydrates: Structure and properties of monosaccharides (glucose, fructose and galactose), disaccharides (maltose, lactose and sucrose) and polysaccharides (starch, glycogen and cellulose), isomerism in monosaccharides and Mutarotation.

UNIT 2: PROTEINS

15 Hrs

Amino acids: Structure, classification, and properties

Proteins: Introduction, classification and properties.

Levels of protein structure:

Primary Structure: Peptide bond (Formation and properties).

Secondary structure: alpha-helix and β -pleated sheets. Ramachandran plot and its significance. Biological functions of proteins.

Tertiary and Quaternary Structure with examples (Hemoglobin and ribonuclease).

UNIT 3: NUCLEIC ACIDS AND LIPIDS

15 Hrs

Nucleic Acids:

Structure of purines and pyrimidines. Nucleosides, nucleotides and polynucleotides.

Types of DNA, structure and roles of mRNA and tRNA.

Lipids:

Structure and significance of triacylglycerols, phospholipids, glycolipids, steroids.

UNIT 4. PRACTICAL (LAB COURSE)

30 Hrs

1. Preparation of normal and molar solutions.
2. Preparation of standard buffers.
3. Qualitative tests for carbohydrates.
4. Qualitative tests of proteins and amino acids.
5. Iodine and saponification number of lipids.

SUGGESTED READING

- Cox, M.M and Nelson, D.L. (2008). Lehninger's Principles of Biochemistry, V Edition, W.H. Freeman and Co., New York.
- Berg, J.M., Tymoczko, J.L. and Stryer, L. (2007). Biochemistry, VI Edition, W.H. Freeman and Co., New York.
- Murray, R.K., Bender, D.A., Botham, K.M., Kennelly, P.J., Rodwell, V.W. and Well, P.A. (2009). Harper's Illustrated Biochemistry, XXVIII Edition, International Edition, The McGraw- Hill Companies Inc.
- Biochemistry: 6th Edition 2021 By U. Satyanarayana & U. Chakrapani