



SHREE H. N. SHUKLACOLLEGE OF SCIENCE

(AFFILIATED TO SAURASHTRA UNIVERSITY)

Shree H.N. Shukla College Campus Nr. Lalpari lake, Behind old Marketing Yard,
Amargadh, Bhichari, Rajkot-360001, Ph. No-9727753360

Saurashtra University Semester 3rd Syllabus of Biochemistry (CBCS) Biochemistry – 301 BIOMOLECULES

Credit : 4

Theory : 6 lectures/week Total Lectures: 60

Unit 1: Carbohydrates and glycobiology [12 hours]

- Monosaccharides - structure , function and properties ,
- Formation of disaccharides, reducing and nonreducing disaccharides.
- Polysaccharides –types, structure and function
- Proteoglycans, glycoproteins and glycolipids—types, structure and function

Unit 2: Lipids [12 hours]

- Building blocks of lipids - fatty acids, glycerol, ceramide.
- Classification of lipids
- Storage lipids - triacylglycerol and waxes.
- Structural lipids in membranes – glycerophospholipids, galactolipids and sulpholipids, sphingolipids
- Sterols, structure, distribution and role of membrane lipids.

Unit 3: Amino acids and Proteins [12 hours]

- Structure and classification of amino acids.
- Physical, chemical and optical properties of amino acids
- Biologically important amino acids (standard and non standard)
- **Peptides:** Structure of peptide bond. Determination of the amino acid sequence of polypeptide chain.
- **Protein structure:** Primary, secondary, tertiary and quaternary structure of proteins. Denaturation and renaturation of proteins. Behavior of proteins in solutions, salting in and salting out of proteins.
- Introduction, classification based on solubility, shape, composition and functions.
- Structure and biological functions of fibrous proteins (keratins, collagen and elastin), globular proteins (hemoglobin, myoglobin), lipoproteins, metalloproteins, glycoproteins and nucleoproteins.

Unit 4: Nucleic acids [12 hours]

- Experimental evidences of Genetic Material
- Building Blocks of Nucleic Acids
- Nucleic acid structure – Watson-Crick model of DNA, Different forms of DNA
- Structure of major species of RNA - mRNA, tRNA and rRNA.
- Nucleic acid chemistry- UV absorption, effect of acid and alkali on DNA.

UNIT 5: Porphyrins and Vitamins: [12 hours]

- Porphyrins: Porphyrin nucleus and classification of porphyrins. Important metalloporphyrins occurring in nature. Detection of porphyrins spectrophotometrically and by fluorescence.
- Bile pigments- chemical nature and their physiological significance.
- Vitamins: Introduction, classification, biological significance
- Deficiency and or toxicity symptoms of different vitamins.



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Text Books:

1. Satyanarayan, U., & Chakrapani, U. (2013). Textbook of Biochemistry .4 edition
2. Jain, J. L. Sunjay Jain and Nitin Jain (2004). Fundamentals of biochemistry. S. Chand Publishing, New Delhi.

Reference Books:

1. Nelson, D. L., & Cox, M. M. (2013). Lehninger Principles of Biochemistry. [6th edition] Freeman and Company, New York.
2. Berg, J. M., Tymoczko, J. L., Gatto G.J. & Stryer, L., (2015) Biochemistry, [8th Revised edition] W H Freeman, New York.
3. Devlin, T. M. (Ed.). (2010). Textbook of biochemistry: with clinical correlations. 7th Edition, John Wiley & Sons, New York.

Biochemistry Practicals:301

Credit: 3

6 Hours / Week (2 Days)

- 1) Qualitative analysis of carbohydrates.
- 2) Qualitative analysis of amino acids and proteins.
- 3) Qualitative analysis of different classes of lipids.
- 4) Introduction to colorimeter and spectrophotometer and their use in quantitative analysis.
- 5) Estimation of reducing sugars by DNSA method.
- 6) Quantitative estimation of amino acids by Ninhydrin method.
- 7) Estimation of proteins by Biuret method.
- 8) Estimation of RNA by orcinol method.