

# **Bhakta Kavi Narsinh Mehta University, Junagadh**



**B.Sc. BIOTECHNOLOGY**

**(SEMESTER II)**

**Effective June-2018**

**Bhakta Kavi Narsinh Mehta University**

**Junagadh-362263**

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## **SEMESTER II**

### **B.SC. (BIOTECHNOLOGY) SYLLABUS**

#### **FUNDAMENTALS OF BIOCHEMISTRY, BIOCOMPUTING AND BIostatISTICS**

##### **Unit 1:- Chemistry of Life: An Introduction**

- 1.1 The Properties of Water
- 1.2 The Properties of Biomolecules
- 1.3 Chemical Bonds/Interactions : Ionic, Covalent, Nonpolar, Polar, Hydrogen Bonds, Hydrophobic Interactions, Vander Wall's Attractive Force
- 1.4 pH, pKa, Acids, Bases and Buffers
- 1.5 Thermodynamics of Biological System : The First Law, The Second Law, The Third Law, Free Energy, ATP and other High Energy Compounds

##### **Unit 2:- The Molecules of Life - I (Carbohydrates)**

- 2.1 Chemistry of Carbohydrates: Functions And Classifications, Monosaccharides: Configuration and Conformation,
- 2.2 Reactions of Monosaccharides and Sugar Derivatives
- 2.3 Disaccharides
- 2.4 Polysaccharides: Classifications and Functions
- 2.5 Glycoconjugates: Proteoglycans, Glycoproteins and Glycolipids

##### **Unit 3:- The Molecules of Life – II (Proteins)**

- 3.1 Amino Acids: Structures, General Properties, Classifications, Nomenclature, Nonstandard Amino Acid (Amino Acid Derivatives)
- 3.2 Proteins: An Overview of Four Levels of Structures in Proteins, Classifications of Proteins, Properties of Proteins, Biologically Important Peptides
- 3.3 Protein folding
- 3.4 DNA-protein and Protein-Protein Interactions
- 3.5 Protein sequencing

##### **Unit 4:-The Molecules of Life – III (Nucleic acids)**

- 4.1 Basic Understanding of Nucleotides, Structure and Properties of Nitrogen Basis, Functions of Nucleotides. Nucleotide Analogs
- 4.2 Nucleic Acids: Historical aspects of DNA as Genetic Material, Semi Conservative Nature of DNA, Chargaff's Rule
- 4.3 Watson and Crick DNA Double Helix Structure, other Types of DNA Structure, Denaturation and Renaturation of DNA

4.4 Types of RNA and their Functions, Catalytic RNAs (Ribozymes)

4.5 Nucleic acid sequencing

#### **UNIT:-5 The Molecules of Life – IV (Lipids and vitamins)**

5.1 Lipids: Classifications of Lipids and Functions of Lipids

5.2 Structure of Fatty Acids, Triacylglycerols, Phospholipids and Steroids

5.3 Functions of Fatty Acids, Triacylglycerols, Phospholipids and Steroids

5.4 Vitamins: Classification, Functions and Sources

5.5 Vitamins: Deficiency Disorders

#### **LIST OF PRACTICALS**

Exp.1 Operation of pH meter.

Exp.2 Preparation of buffer

Exp.3 Qualitative tests for carbohydrates

Exp.4 Qualitative tests for Amino acids

Exp.5 Titration curve of amino acids and determination of pI, pK1 and pK2.

Exp.6 Qualitative test for Lipids

Exp.7 Qualitative test for Nucleic acids

Exp.8 Estimation of reducing and non-reducing sugars

Exp.9 Titrimetric analysis of Ascorbic acid

Exp.10 Estimation of Saponification value of Lipids

Exp.11 One day Field visit

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4. J. Jayaraman. Lab Manual in Biochemistry.
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8. Seidman and Moore. 2000. Basic laboratory methods for biotechnology. Lovgman
9. Boyer. 1999. Concepts in biochemistry. Thomson
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