

## B.Sc. CBCS Biochemistry syllabus (wef.2016-17)

<b>FIRST YEAR SEMESTER-I</b>				
<b>Code</b>	<b>Course Title</b>	<b>Course Type</b>	<b>HPW</b>	<b>Credits</b>
BS104	CHEMISTRY OF BIOMOLECULES	DSC-1A	4T +2P = 6	4+1=5
<b>FIRST YEAR SEMESTER-II</b>				
BS204	CHEMISTRY OF NUCLEIC ACIDS & BIOCHEMICAL TECHNIQUES	DSC-1B	4T+2P=6	4+1=5

### DETAILED SYLLABUS

#### BS104 (Theory) Chemistry of Biomolecules

##### Unit 1: Introduction

Scope of biochemistry  
Water as biological solvent  
Weak acids and bases  
pH, buffers, Biological Buffers, Henderson- Hasselbalch equation.  
(Simple numerical problems)  
Stereo chemistry with reference to carbohydrates & amino acids.

##### Unit 2: Carbohydrates

Classification of carbohydrates

Mono saccharide straight chain and ring structures

Reactions of monosaccharides, mutarotation, aminosugars & glycosides

Disaccharides, oligosaccharides & polysaccharides

Storage and structural polysaccharides, glycosaminoglycan's and bacterial cell wall polysaccharides.

### **Unit 3: Lipids**

Classification of lipids, essential fatty acids. Reactions & properties of lipids

General properties and structures of neutral fats, waxes, phospholipids

sphingolipids, cholesterol, glycolipids.

Prostaglandins and lipoproteins.

Bio membranes, behavior of amphipathic lipids in water, formation of micelles, bilayers, vesicles, membrane composition and fluid mosaic model.

### **Unit 4: Amino acids & proteins**

Classification, structure, stereochemistry and chemical reactions of amino acids.

Titration curve of glycine & pK values.

Essential, nonessential amino acids and non-protein amino acids.

Peptide bond- Nature and conformation, Naturally occurring peptides –

Glutathione, enkephalin.

Outlines of protein classification, structural organization of proteins: primary, secondary, tertiary and quaternary structures (ex. hemoglobin & myoglobin).

General properties of proteins, denaturation and renaturation of proteins.

Determination of amino acid composition of proteins.

### **BS104 (practical) Qualitative Analysis of biomolecules**

Laboratory general safety procedures.

Preparation of standard solutions

Determination of pK<sub>a</sub> values of amino acids by titration

Preparation of buffers

Qualitative identification of Carbohydrates, Amino acids & Lipids.

## **BS204 (Theory) Chemistry of Nucleic Acids & Biochemical Techniques**

### **Unit 1:Composition of Nucleic acids**

Nature (functions) of nucleic acids.

Structure of purines and pyrimidines.

Nucleosides, nucleotides, DNA & RNA.

Stability and formation of phosphodiesterlinkages, effect of acids, alkali and nucleases.

Photochemical and Spectral characteristics of Nucleic acid.

### **Unit 2:Structure of nucleic acids**

Watson& Crick DNA double helix structure.

Introduction to circular DNA, supercoiling, helix to random coil transition, denaturation of nucleic acids.

Hyper chromic effect,  $T_m$  values and their significance.

Reassociation kinetics, cot curves and their significance.

Different types of RNA and their biological functions.

### **Unit3:Specrophotometric and Centrifugation Techniques.**

Colorimetry and spectrophotometry.

Beer-Lamberts law and its limitations.

UV, visible spectra, molar extinction coefficient.

Principle of fluorimetry

Principle and applications of Centrifugation technique in biology

### **Unit.4 Chromatography techniques**

Principle in chromatographic technique.

Application of chromatographic technique in paper chromatography (dimensional), TLC, gel filtration (molecular sieve), ion exchange

Chromatography and affinity chromatography.

## **BS204 (practical)Quantitative Analysis of Biomolecules**

Aminoacid Estimation by Ninhydrin method

Protein Estimation by Folin`s Method

Total Sugar Estimation by Anthrone Method

Total Reducing Sugar Estimation by Dinitrosalicylate

Estimation ofKeto sugar by Roe`s resorcinol Method