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

FIRST YEAR SEMESTER-I				
Code	**Course Title**	**Course Type**	**HPW**	**Credits**
BS104	CHEMISTRY OF BIOMOLECULES	DSC-1A	4T +2P = 6	4+1=5
FIRST YEAR SEMESTER-II				
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

Classificationof 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 acidsand non-protein aminoacids.
Peptide bond- Nature and conformation, Naturally occurring peptides – Glutathione, encephalin.
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 pKa 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, Tm 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

Model paper: Theory

Duration 3 hours Max. Marks 80

Section - A (Short Answer Type)

Answer all Questions 8 x 4 = 32 Marks

1.
2.
3.
4.
5.
6.
7.
8.

Section - B (Essay Answer Type)

Answer all Questions 4 x 12 = 48 Marks

9. (A).

(OR)

(B)

10. (A)

(OR)

(B)

11. (A)

(OR)

(B)

12. (A)

(OR)

(B)

Model Paper Practicals (end of semester)

Duration 3 hours Max. Marks 25

1. **Write the Principles for the following experiments 5 Marks**
2. **Major Experiment 10 Marks**
3. **Minor Experiment 5 Marks**
4. **Viva-Voce and Record 5 Marks**