BTPC2001 BIOMOLECULES AND BIOCHEMISTRY (3-0-0)

Module I (10 hours)
Structure and Function of Carbohydrates (Classification, configuration and conformation): Monosaccharide, Oligosaccharides & Polysaccharides (Starch, Glycogen, & Cellulose),
Carbohydrate metabolism: Glycolysis, TCA cycle, phosphorylation, electron transport and ATP synthesis, pentose-phosphate pathway.

Module II (10 hours)
Amino acids: Classification and properties, Acid–base properties, Non-standard amino acids, amino acid derivatives in proteins, D-amino acids.
Peptides: Peptide bond, ionization behavior of peptides, biologically active peptides, Ramchandran plot

Module III (6 hours)
Nomenclature and classification of enzymes, Properties of enzymes. Enzyme kinetics: Chemical kinetics, enzyme kinetics (Michaelis-Menten equation, Briggs-Halden Modification, determination of Vmax and Km), Mechanism of enzyme action

Module IV (7 hours)
Structure and Function of Lipids: Saturated and Unsaturated FattyAcids, Triacylglycerols, Phosphoglycerides, Sphingolipids, Waxes and Sterol, Structure and Function of Lipids:Saturated and Unsaturated Fatty Acids, Triacylglycerols, Phosphoglycerides, Sphingolipids, Waxes and Sterol

Module V (7 hours)
Structure and Function of Nucleotides & NucleicAcids: DNA, RNA, Double Helix Model of DNA, Denaturation and Renaturation DNA, Vitamins; Types of vitamins and their functions. Minerals; Types of minerals and their functions

Books:

1. Principle of Bio-Chemistry–Lehinger, Nelsonand Cox
2. Biochemistry of Biochemistry by L.Stryer
3. Fundamentals of Biochemistry–Voet & Voet
4. Biochemistry by Zubay.

Course Outcomes (COs):
1. DNA/RNA Structure and Function: Understand the structure and function of nucleic acids.
2. Gene Expression: Describe the mechanisms of transcription and translation.
3. Genetic Engineering: Apply techniques of genetic engineering and recombinant DNA technology.
4. Genomic Analysis: Analyze genomic data using bioinformatics tools.
5. Molecular Cloning: Perform molecular cloning and understand its applications in research and industry

Program outcomes (POs):
1. Fundamental Knowledge: Demonstrate a comprehensive understanding of the principles of biochemistry, molecular biology, and related fields.
2. Laboratory Skills: Develop proficiency in biochemistry laboratory techniques and the ability to design, conduct, and interpret experiments.
3. Critical Thinking: Apply critical thinking and problem-solving skills to biochemical problems and research questions.

4. Communication Skills: Effectively communicate scientific information through written, oral, and digital means.
5. Ethical Practice: Understand and adhere to ethical standards in scientific research and practice.

Program specific outcomes (Psos)

1. Advanced Biochemical Techniques: Graduates will be able to utilize advanced biochemical techniques such as mass spectrometry, NMR, and X-ray crystallography.
2. Research Competence: Graduates will be capable of designing and conducting independent research projects, including hypothesis formulation, experimental design, data analysis, and interpretation.
3. Biotechnology Applications: Graduates will demonstrate the ability to apply biochemistry knowledge in biotechnology and pharmaceutical industries.
4. Clinical Biochemistry: Graduates will understand the biochemical basis of disease and the principles of clinical biochemistry in medical diagnostics and treatment.
5. Environmental Biochemistry: Graduates will be knowledgeable about the biochemical aspects of environmental issues and the role of biochemistry in environmental monitoring and remediation.