

Syllabus Major III Theory DSE – (Table 3a) for BSc. (H) Biotechnology

Course Name - Biotechnology II

Course objective – Aim of the course is to provide knowledge of various techniques used in the development of Modern Biotechnology and further its technological gain, importance and applications in different fields of life science.

Course outcomes – After successful completion of the course students able to understand

- Understand structure and functions of DNA RNA, Lipids and Proteins
- Different techniques used in the field of Biotechnology
- Applications of these techniques in different area of life sciences

UNIT I: Biomolecules: DNA Structure, Nucleotide and Nucleoside, semiconservative replication, RNA: Structure, Type and Function, Genetic code: structures and its Properties, Amino acids and Proteins: Classification, Structure and Properties of amino acids, Proteins (1⁰, 2⁰, 3⁰ 4⁰) structure and Functions. Central Dogma of Molecular Biology

UNIT II: Lipids

Biological importance of lipids. Fats and Oils, Classification of fatty acids, Saturated and unsaturated fatty acids. Their sources. Nomenclature of fatty acids. Essential fatty acids.

Outline Classification of lipids

Simple lipids. Triglycerides, Waxes.

Compound lipids. Phospholipids, sphingolipids,

Derived lipids. Sterols, Cholesterol.

Bile pigments- chemical nature and physiological significance.

Unit III: Electrophoresis: Principle and applications, Agarose gel electrophoresis, Polyacrylamide gel electrophoresis

UNIT IV: Chromatography: Principle and types, Paper chromatography, thin layer chromatography, Gas Chromatography

Unit V: PCR: Principle and Procedure (Denaturation, Annealing, Extension), RT-PCR, applications of PCR, DNA fingerprinting, Human Genome Project, DNA sequencing (Maxam and Gilbert, Sanger dideoxy method)

References:

1. Nelson and Cox , Principles of Biochemistry, Fourth Edition
2. 3. Physical Biochemistry: Principles and Applications, 2nd Edition (2013), David Sheehan
4. B.D. Singh – Biotechnology, Expanding Horizons, Kalyani Publication.
5. P.K. Gupta – Biotechnology and Genomics, Rastogi Publication.
6. Principals and Techniques of Biochemistry and Molecular Biology-7th edition (2010) Wilson and Walker