



Semester – II

BRANCH	Subject	Subject Code
B.Sc. (Biotechnology – Minor/GE)	Cell Biology and Biochemistry	BTM2/BT-121

Course Objective:-The Main Objective of the course will be to build the basic foundation for studying Biotechnology. The Demand for Trained workforce in Biotechnology is ever growing in Fundamental Research and Industry Sector. Academic and Research Sectors also require Interdisciplinary trained manpower to foster the Biotechnology Revolution. The restructured syllabus combines basic principles of Chemical and Biological sciences in light of advancements in technology. The curriculum aims to impart basic knowledge with emphasis on its applications to make the students ready for industries and research work in concerned field.

Course learning outcomes (CLO):-

1. Understand the basic of cell biology.
2. Appreciate the importance of bonding spatiel arrangement of molecules of proper function and stability.
3. Understand both the physical as well as chemical properties of biomolecules.
4. Students can pursue a career in biochemical testing. The decrease of increase in the amount of some of the biomolecules can have clinical significance.
5. Students can also go in for medical laboratory tech courses. Opening opportunities of hospital and pathology laboratories.

Unit - I

Cell as a Basic Unit:

1. Historical background of the Cell

- 1.1 History of Cell Biology.
- 1.2 Cell Structure.
- 1.3 Cell Theory.

2. Prokaryotic Cell and Cell Organells:

- 2.1 Ultrastructure of Prokaryotic Cell.



2.2. Structure and function of cell organelles: Flagella. Pili. Cell wall. Cytoplasmic membrane, nuclear region. Ribosomes, Vacuoles, Metachromatic granules, Spores and Cysts. Microtubules. Microfilaments, Centriole.

2.3 Difference between Prokaryotic and Eukaryotic cells.

Unit - II

Cell Organelles and Cell Cycle:

1. Eukaryotic Cell and Cell Organelles:

1.1 Ultrastructure of Eukaryotic cell (Plant and Animal cells).

1.2 Structure and function of cell organelles: Cell membrane, Mitochondria.

Chloroplast, Endoplasmic reticulum, Golgi bodies. Lysosomes.

Peroxisomes, Nucleus.

2. Cell Cycle:

2.1 Cell cycle and Cell division.

2.2 Apoptosis or Cell death .

Unit - III

Molecular Structure of Water:

1. Water structure and Buffer:

1.1 Properties of Water.

1.2 Interaction of Water.

1.3 Role of Water in Bio molecular Structure.

1.4 Acid and Bases, Buffer solutions.

2. Chemical Bonds:

2.1 Chemical Bonds (Ionic Bond, Covalent Bond, Coordinate Bond. Non Covalent Bonds, Hydrogen Bond)

Unit - IV

Biomolecules: Sources, Nomenclature, Classification. Structures, Characteristics, and



Functions:

1. Carbohydrates,
2. Lipids,
3. Proteins and Nucleic Acids.

Unit - V

Tools and Techniques

1.1 Principle and Applications of Light Microscopy, Centrifugation. Chromatography (Paper. Thin layer and Column), Colorimeter and Spectrophotometer.

List of Experiments/Exercise (Practicals)

1. To study the plant cell structure using various plant materials.
2. To study the animal cell structure using cheek cells.
3. To Prepare Onion root tip for the stages of Mitosis.
4. To Prepare and study the different stages of Mitosis and Meiosis.
5. To analyze Carbohydrates Quantitatively.
6. To analyze proteins quantitatively
7. To analyses lipids Quantitatively
- 8 To Prepare Buffers.
9. To Separate plant pigments by Paper Chromatography
- 10 To Separate amino acids by TLC analyze lipids quantitatively