

B.Tech. Biotechnology: Semester-III BBT 305: CELL BIOLOGY	
Teaching Scheme	Examination Scheme
Lectures: 3 hrs/Week	Class Test -12 Marks
Tutorials: 1 hr/Week	Teachers Assessment – 6 Marks
Credits: 4	Attendance – 12 Marks
	End Semester Exam – 70 marks

### Course Objective

The course is aimed to impart knowledge of structural and functional aspects of cells as unit of living systems. Also, it aims to understand the functions of various organelles and transport of information and matter across cell membrane.

### Course Learning Outcomes

After completing the course, the student shall be able to:

CO1: Describe the fundamental principles of cellular biology.

CO2: Apply these principals to current biological questions of today.

CO3: Develop a deeper understanding of cell structure and how it relates to cell functions.

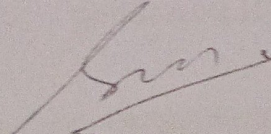
CO4: Understand cell movement and how it is accomplished.


CO5: Understand how cells grow, divide, and die and how these important processes are regulated. Understand cell signaling and how it regulates cellular functions. Also how its dysregulation leads to cancer and other diseases.

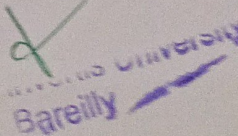
### Unit 1: The Evolution of the Cell

From Molecules to the First Cell, From Prokaryotes to Eucaryotes, From Single Cells to Multicellular Organisms. Ultrastructure and function of cell and cell organelles. Membrane Structure: Physicochemical Properties; Molecular Organization – asymmetrical organization of lipids, proteins and carbohydrates. Eukaryotic cell division cycle: Different phases and molecular events. Control of cell division cycle, Transport of Small Molecules Across Cell Membranes: Types and Mechanism; Active Transport by ATP-Powered Pumps, Patch pump technique.

### Unit 2: Intracellular Compartments and Protein Sorting

  
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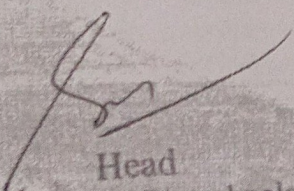
Structure, function and transport of proteins into mitochondria and chloroplast. Transport of proteins and RNA into and of nucleus. Transport of proteins into endoplasmic reticulum and Golgi bodies. Transport by vesicle formation: Endocytosis and Exocytosis and molecular Mechanism of vesicular transport. Cell motility and shape: Structure and functions of microfilaments, Structure and functions of microtubules and intermediate filaments. Intracellular communication through cell junctions: Occluding junctions, anchoring junctions and communicating junctions.

**Unit 3: Molecular mechanism of cell-cell adhesions, Extra-cellular matrix of animals**

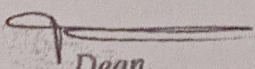
Organization and functions. Extra-cellular matrix receptors on animal cells: integrins Cell Signaling: Signaling via G-Protein linked cell surface receptors, MAP kinase pathways and tyrosine kinase pathway: Initiation, interaction and regulation. Apoptosis: Phases and significance, Morphological and biochemical changes associated with apoptotic cells, Apoptotic pathways and regulators

**Suggested Readings**

- Tortora, Microbiology –an introduction (Pierson education Publication)
- Prescott and Dunn, Industrial microbiology
- Pelczar, Microbiology (W C Brown publication)
- Stainet, Microbiology by (Mac Millan Publication)
- Pawar and Dagniwala, Microbiology (Himalaya publishing House)



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