



M.Sc. – Semester I Microbiology and Biotechnology

PAPER: (MB/BT) 403: CELL BIOLOGY

[ CSIR – UGC – NET - TOPIC: 2 ]

**Total Credits – 3**

**Total Hours – 45**

**Objectives:**

- To understand the mechanism of molecular structures and cellular functions of the cells.

**Unit – 1: Cellular organisation**

Membrane structure and function (Structure of model membrane, lipid bilayer and membrane protein diffusion, osmosis, ion channels, active transport, membrane pumps, mechanism of sorting and regulation of intracellular transport, electrical properties of membranes).

**Unit – 2: Cell structure and function**

Structural organization and function of intracellular organelles (Cell wall, nucleus, mitochondria, Golgi bodies, lysosomes, endoplasmic reticulum, peroxisomes, plastids, vacuoles, chloroplast, structure & function of cytoskeleton and its role in motility).

Organization of genes and chromosomes (Operon, unique and repetitive DNA, interrupted genes, gene families, structure of chromatin and chromosomes, heterochromatin, euchromatin, transposons).

**Unit – 3: Cell division and microbial physiology**

Cell division and cell cycle (Mitosis and meiosis, their regulation, steps in cell cycle, regulation and control of cell cycle).

Microbial physiology (Growth yield and characteristics, strategies of cell division, stress response)

**References:**

1. The Cell: A Molecular Approach – Geoffrey M. Cooper, Publisher Oxford University Press, 2018, Eighth Edition.
2. Cell and Molecular Biology: Concepts and Experiments – Gerald Karp, Publisher Wiley, 2020, Ninth Edition.
3. Molecular Biology of the Cell – Bruce Alberts, Alexander Johnson, Julian Lewis, David Morgan, Martin Raff, Keith Roberts, and Peter Walter, Publisher Garland Science, Taylor and Francis Group, 2015, Sixth Edition
4. Cell And Molecular Biology – Robertis De. Robertis DE Jr., Wolters Kluwer Publication, 2011, South Asia Edition, Eighth edition.
5. Molecular Cell Biology: International Edition – Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger, Anthony Bretscher, Hidde Ploegh, Angelika Amon, and Matthew P. Scott, Publisher W. H. Freeman, 2017, Seventh Edition.
6. Molecular Biology of the Gene – James D. Watson, Tania A. Baker, Stephen P. Bell, Alexander Gann, Michael Levine, and Richard Losick, Publisher Pearson, 2007, Sixth Edition.