

Course Code	Course Name	Credits
26BT001	CELL BIOLOGY	4

Course Objectives

- Recall the history and fundamentals of cell biology
- Explain the mechanisms of cell growth, division (mitosis/meiosis), and their regulation.
- Evaluate cell signalling pathways and their role in physiological processes, including cell death and apoptosis.
- Analyse the structure and function of cellular organelles and components, specifically comparing prokaryotic and eukaryotic systems.
- Understand the molecular interactions between cells and their environment, including the extracellular matrix

Learning Outcomes

Upon successful completion of this course, it is intended that a student will be able to:

- Understand the structure of prokaryotic and eukaryotic cell.
- Explain the organization of Genes and chromosomes, chromosome morphology and its aberrations.
- Explain the regulation of the cell cycle, signal transduction pathways, and cell motility.
- Explain the communications of cells with other cells and to the environment.
- Understand about the cell organelles and locate its parts along with functions.

Unit 1 - Basics of Cells (10 Hrs)

History of cell biology. Biogenesis theory of origin of life. Cell as a Basic unit; Cell size and shape; Prokaryotic & eukaryotic cell organization. Structural comparison of microbial, plant and animal cells.

Unit 2 – Cell wall and membrane (15 Hrs)

Plasma membrane-Model of plasma membrane; fluidity of membranes; Membrane proteins and their functions; Transport across the membrane- selective permeability of membrane; Cell adhesion; Cell junctions; Composition of bacterial cell wall.

Unit 3 - Structure and function of cell organelle (12 Hrs)

Mitochondria, Chloroplast, Endoplasmic reticulum, Golgi complex, lysosomes, Ribosomes, Peroxisomes, Vacuoles, Centrioles and Cytosols. Nucleus and molecular organization of chromatin, chromosomes and specialized chromosome

Unit 4 – Cell cycle and cell signaling (13 Hrs)

Cell Cycle, Mitosis, Meiosis. Cell signaling- types- G Protein receptors, Cell membrane traffic. Cellular Senescence and Apoptosis.

Unit 5 Specialized cells (10 Hrs)

Motile cells (amoeboid, ciliary, flagellar movements), nerve Cells and nerve impulse conduction, cancer cell, muscle cells and muscle contraction.

Reference Books:

- Aminul Islam. A Text Book of Cell Biology. Books and Allied (P) Ltd, Kolkata. 1st Edition, 2011.
- Gerald Karp. Cell and Molecular Biology. Publisher John Wiley and Sons, New York. 3rd Edition, 2002.
- Powar. C.B. Cell Biology. Himalaya publishing house, New Delhi, 1983.
- Watson., Baker., Bell., Gann., Levine&Losick. Molecular Biology of Gene. Published by Pearson Education Pvt Ltd., Singapore. 5th Edition, 2005
- DeRoberties. Cell Biology. Blaze publishers & Distributors Pvt.Ltd., New Delhi.
- Sharp. Fundamentals of Cytology. Mc Graw Hill Company.
- Wilson &Marrison. Cytology. Reinform Publications.
- Gerlad Karp. Cell and Molecular Biology concepts and experiments. 4th Edition.
- Cooper Geoffrey M. The cell A molecular approach. Sinauer Associates Inc., U.S. 6th Edition, 2013.