



SYLLABI OF BIOTECHNOLOGY DSC PAPERS

SEMESTER-I

BTC DSC 101T CELL BIOLOGY

Contact Hours: 45

Full Marks = 100 [ESE (70) CCA (30)]

***Course Objective:** The objective of the course in Cell Biology is to provide students with a comprehensive understanding of the fundamental principles and concepts related to the structure, function, and behavior of cells. The course aims to introduce students to the various components of cells, including organelles, cytoskeletons, and cell membranes, and to explore their roles in cell biology. Additionally, the course aims to familiarize students with key processes such as the cell cycle, nucleic acid structure, cell adhesion, extracellular matrix, and the development and progression of cancer.*

UNIT 1

(9 Lectures)

Introduction to cell biology: cell theory; ultrastructure of prokaryotic and eukaryotic cells; cytosol and cytoplasm. **Structure and function of motile cells:** amoeboid, ciliary and flagellar. **Cytoskeletons:** microfilaments, intermediate filaments, and microtubules.

UNIT 2

(8 Lectures)

Structure and function of cell organelles: endoplasmic reticulum, golgi complex, mitochondria, chloroplast, ribosomes, lysosomes, peroxisomes and vacuole.

UNIT 3

(9 Lectures)

Nucleus: structure and function. **Cell Membrane:** components of biological membranes; fluid mosaic model; cell recognition and membrane transport.

UNIT 4

(9 Lectures)

Cell cycle: regulation of cell cycle; mitosis and meiosis; cell cycle check point; cell senescence; programmed cell death. **Nucleic acids:** nucleosides and nucleotides; purines and pyrimidines; physical and chemical properties of nucleic acids; double helical model of DNA.

UNIT 5

(10 Lectures)

Cell adhesion molecules: cadherins and integrins. **Extracellular Matrix:** composition and function. **Cancer:** carcinogenesis; agents promoting carcinogenesis; oncogenes; characteristics and molecular basis of cancer; treatment and prevention of cancer.

Course Outcomes: The Cell Biology course provides a comprehensive understanding of cell structure, organelles, membrane function, cell cycle regulation, nucleic acids, cell adhesion, and cancer. Students will gain knowledge and insights into fundamental cellular processes and their implications in biological systems.

SUGGESTED READING

1. Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. 6th Edition. John Wiley & Sons. Inc.
2. De Robertis, E.D.P. and De Robertis, E.M.F. 2006. Cell and Molecular Biology. 8th edition. Lippincott Williams and Wilkins, Philadelphia.
3. Cooper, G.M. and Hausman, R.E. 2009. The Cell: A Molecular Approach. 5th edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.
4. Becker, W.M., Kleinsmith, L.J., Hardin, J. and Bertoni, G. P. 2009. The World of the Cell. 7th edition. Pearson Benjamin Cummings Publishing, San Francisco.