

II Year B.Tech. Bioinformatics I - Semester	L	T	P	To	C
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## BI 201 CELL BIOLOGY & MICROBIOLOGY

### Course Description and Objectives:

*To familiarize the student to know different cell components and their functions like transport of material, cell signaling, etc. This course will provide students the knowledge about the classification, diversity and physiology of microorganisms.*

### Course Outcomes:

Students will demonstrate knowledge of

1. The structure of prokaryotic and eukaryotic cells.
2. Classification of microbial system.
3. The pivotal role played by cell cycle in normal functioning of cells.
4. Controlling microbial systems via various methods
5. Staining techniques for the characterization of microbes

### UNIT - I : Biology of Cells:

Structure of prokaryotic and eukaryotic cells - Overview of organelles (Mitochondria, Chloroplasts, ER, Golgi, nucleus). Protein folding and processing in ER – Protein glycosylation and sorting in Golgi - Cytoskeletal proteins - contractile proteins - Actin and Myosin.

### UNIT - II : Transport Across Cell Membranes :

Organization of plasma membrane – Passive and active transport, Sodium potassium pump - Ca<sup>2+</sup> ATPase pump - Lysosomal and vacuolar membrane, ATP dependent proton pumps - co transport, symport, anti port, ion-gated and ligand gated channels - Endocytosis and exocytosis.

### UNIT - III : Regulation Of Cell Cycle And Cancer :

Cell division- mitosis and meiosis – Cell cycle and regulation - Cancer- types, development and causes - Mutagenesis - Tumor suppressor genes and Oncogenes.

**UNIT - IV : Microbial Systems :**

Classification and nomenclature of micro organisms - light and electron microscopy - principle of different staining techniques - gram staining - acid fast and capsular staining, Physical and chemical control of microorganisms - Microbial biosensors.

**UNIT - V : Microbial Nutrition, Growth and Metabolism :**

Nutritional requirements of bacteria and different media used for bacterial culture - growth curve and different methods to quantitate bacterial growth - aerobic and anaerobic bioenergetics - utilization of energy for biosynthesis of important molecules.

**TEXT BOOKS :**

1. Verma P. S. and Agarwal V. K., "Cell Biology, Genetics and molecular Biology", S. Chand and company, New Delhi, 2000.
2. Lodish H., Bert A., Matsudaria Kaiser C.A., Kriegar M., Scott M.P., Zipursky S.L. and Darnell 1., "Molecular cell Biology", WH Freeman and company, New York, 2004.

**REFERENCE BOOK :**

1. Pelzer M. Chan E.C.S. and Krein N.R., "Microbiology", Tata Me Graw Hill Publishers, New Delhi, 2000.