

Subject Code: 2SC2000104	Subject Title: Advance Cytology
COURSE TYPE: CORE	
COURSE	

Course Objective:

The study of cells in terms of structure, function, and regulation is pivotal to all the other biological courses. The basic elements of cell membrane, and membrane proteins, role of cytoskeleton in cell motility and intracellular traffic, transport of molecules in and out of cells, molecular mechanisms of cell-cell interaction and adhesion, cell division, along with basic microscopy techniques are covered.

Teaching scheme (hours) per week		Credit			Theory Marks		Practical Marks		Total
Theory	Practical	Theory	Practical	Total	Uni. Assessment	Cont. Assessment	Uni. Assessment	Cont. Assessment	
4	-	4	-	4	60	40	-	-	100

Unit	Content	Lectures	Weightage
1	Ultra structure of cellular components of prokaryotic cell Ultra structure of cellular components of eukaryotic: cell -cell wall, plasma membrane, endoplasmic reticulum, Golgi complex Ultra structure of cellular components of eukaryotic cell :mitochondria, chloroplast, lysosome, peroxisomes and vacuoles Transport across the cell membrane: Active, secondary, Passive, Facillitated, Group translocation	10	16%
2	Over view of protein trafficking in cell & Role of golgi complex and other cell organelles in protein trafficking and sorting. Protein folding: Protein folding and the roles of Molecular chaperones Cyto skeleton and Cell movement Endocytic pathway. Exocytic pathway.	12	20%
3	Cell – Cell Adhesion and Communication: Cell Junctions and Adhesion Molecules , Quorum sensing and quorum quenching Cell Signaling: Cell Surface Receptors; Second Messenger System; different signaling pathways-Insulin, Epinephrine, steroid hormone, signaling in plants and microorganisms Development biology: Events during fertilization, post fertilization, early embryonic development.	13	22%
4	Cell division and cell cycle (Mitosis and meiosis, their regulation, steps in cell cycle, regulation and control of cell cycle and cancer). Cancer development:Genetic rearrangements in progenitor cells, oncogenes,	25	42%

	tumor suppressor genes, cancer and the cell cycle, virus-induced cancer. Cancer propagation: Metastasis, interaction of cancer cells with normal cells. Cancer treatment: Therapeutic interventions of uncontrolled cell growth. Apoptosis, Programmed cell death		
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Learning Outcome:

The course will provide thorough understanding of the cellular behavior in isolation, in tissue, and organ levels. This will enable better understanding of molecular mechanisms responsible for various diseases including cancer; cell culture techniques, stem cell research, and all the related aspects

LIST OF TEXTBOOKS:

1. Pollard, T. D., and Earnshaw, W. C., Cell Biology 2nd Edition, Saunders Elsevier, 2008.
2. Gerald K., Cell and Molecular Biology, Concept and Experiment, 5th Edition, Wiley, 2007.
3. Kleinsmith, L. J. J. Principles of Cell and Molecular Biology, 2nd Edition, Benjamin Cummings, 1997.
4. Lodish, H., Berk A., Kaiser C. A., Krieger M., Scott M.P., Bretscher A., Ploegh H., and Matsudaira P., Molecular Cell Biology, 6th Edition, Freeman, W. H. and Co., 2008.
5. Roberts, K., Lewis J., Alberts B., Walter P., Johnson A., and Raff. M., Molecular Biology of the Cell, 5th Edition, Garland Publishing Inc., 2008.
6. Human Embryology (6th ed.) Inderbir Singh
7. Alberts et al., 2008 Molecular Biology of the Cell, Garland Science, Taylor & Francis Group, New York, USA. 3.
8. Sperelakis 2001 Cell Physiology Source Book : A Molecular approach, Academic Press, New York, USA.
9. Powar C. B. 1983 Cell Biology, Himalaya Publishing House, Mumbai, India