

Semester	I
Course ^{*1}	Major-2
Paper Title	Cell Biology
Paper Code	C1BT230122T / C1BT230122P
No. of Credits ^{*2}	4 (Th =3, Pr =1)
Theory / Practical / Composite	Composite
Minimum No. of preparatory hours per week a student has to devote	3
Number of Modules	2
Syllabus	<p>Module A:</p> <p>UNIT I: Cell: Introduction and classification of organisms by cell structure, cytosol, compartmentalization of eukaryotic cells, cell fractionation. Cell Membrane and Permeability: Chemical components of biological membranes, organization and Fluid Mosaic Model, membrane as a dynamic entity.</p> <p>UNIT II: Subcellular organelles: Lysosomes, vacuoles and microbodies: Structure, functions and dysfunction. Ribosomes: Structures and function including role in protein synthesis. Mitochondria: Structure, function and dysfunction. Nucleus: Structure and function. Endoplasmic reticulum: Structure, and function including role in protein segregation.</p> <p>Module B:</p> <p>UNIT III: Cytoskeleton and cell motility: Structure and function of microtubules, microfilaments, intermediate filaments</p> <p>UNIT IV: Extracellular matrix: composition, molecules that mediate cell adhesion, cell-cell junctions, membrane receptors for extra cellular matrix proteins, regulation of receptor function and signal transduction.</p> <p>UNIT V: Cell Division, Cancer & Apoptosis: Mitosis and Meiosis. Cancer as dysregulation of cell division, characteristics of cancer cells, agents promoting carcinogenesis. Apoptosis: definition, pathways and significance.</p>

	<p>Practical (1 credit)</p> <ol style="list-style-type: none"> 1. Study of effect of temperature and organic solvents on semi permeable membranes. 2. Demonstration of dialysis. 3. Study of plasmolysis and de-plasmolysis. 4. Study of prokaryotic and eukaryotic cells and eukaryotic tissues. 5. Demonstration of action of an enzyme. 6. Concepts of buffer preparation. 7. Qualitative tests for carbohydrates, lipids and proteins. 	
Learning Outcomes * ³	<ol style="list-style-type: none"> 1. Getting a comprehensive overview of the basic principles of cell biology. 2. Acquiring information about the structure and function of the cell membrane and cellular organelles 3. Acquiring information about the assembly and dynamics of the cytoskeleton. 4. Getting an overview of cell-cell communication and role of the extracellular matrix. 5. An introduction to cell division, cancer and apoptosis in eukaryotic cells. 6. Introduction to basic biochemical techniques and to familiarize them with techniques and equipment used in the studies of biomolecules, cells and tissues. 	
Reading/Reference Lists * ⁴	<p>Module B</p> <ol style="list-style-type: none"> 1. G.M. Cooper, R.E. Hausman. The Cell – A Molecular Approach 2. Bruce Alberts et al. Molecular Biology of the Cell. 3. R.A. Weinberg. The Biology of Cancer <p>Practical</p> <ol style="list-style-type: none"> 1. K. C. Ghose, B. Manna. Practical Zoology 	
Evaluation	<p>Theory</p> <p>CIA: 15</p> <p>Semester Exam: 45</p>	<p>Practical (if applicable)</p> <p>CA: 40</p> <p>Semester Exam:</p>
Paper Structure for Theory Semester Exam	Module A (18 marks)	

Any two from three questions: Each of 2 marks
Any two from three: Each of 7 marks with subparts; [No sub-part will be less than 2 mark and more than 5 marks]

Module B (27 marks)

Any three from four: Each of 2 marks
Any three from four: Each of 7 marks with subparts; [No sub-part will be less than 2 mark and more than 5 marks]