

Course	Discipline Specific Core
Semester	I
Paper Number	MBTCR1022T & MBTCR1022P
Paper Title	CELL BIOLOGY
No. of Credits	6
Theory/Composite	Composite
No. of periods assigned	4 Theory + 4 Practical
Course description/objective	<p>The course aims to</p> <ol style="list-style-type: none"> 1. impart a comprehensive overview of the basic principles of cell biology. 2. provide information about the chemistry and structure of the cell membrane. 3. provide information about the assembly and dynamics of the cytoskeleton. 4. provide an overview of cell-cell communication. 5. to introduce students to basic biochemical techniques used for study of biomolecules. 6. to familiarize students with techniques and equipment used in the studies of cells and tissues.
Syllabus	<p>Theory</p> <p>Module A: Cell Membrane, Cytoskeleton and Sub Cellular Organelles (25 marks)</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: Cytoskeleton and cell motility: Structure and function of microtubules, Microfilaments, Intermediate filaments</p> <p>UNIT III: Subcellular organelles: Lysosomes: Vacuoles and micro bodies: Structure and functions and dysfunction Ribosomes: Structures and function including role in protein synthesis. Mitochondria: Structure and function and dysfunction, Genomes, biogenesis. Nucleus: Structure and function, chromosomes and their structure. Endoplasmic reticulum: Structure, function including role in protein segregation.</p> <p>No. of Classes: 2 Classes per week</p> <p>Module B: Cell-Cell Communication (25 marks)</p> <p>UNIT IV: Extracellular matrix – Composition, molecules that mediate cell adhesion, membrane receptors for extra cellular matrix, macromolecules, regulation of receptor expression and function, Signal transduction, integrin, cell-cell junctions</p> <p>UNIT V: Cancer: Carcinogenesis, agents promoting carcinogenesis, characteristics and molecular basis of cancer, apoptosis</p> <p>No. of Classes: 2 Classes per week</p>

	<p>Practical</p> <ol style="list-style-type: none"> 1. Study of effect of temperature and organic solvents on semi permeable membrane. 2. Demonstration of dialysis. 3. Study of plasmolysis and de-plasmolysis. 4. Cell fractionation and determination of enzyme activity in organelles using sprouted seed or any other suitable source. 5. Study of structure of any Prokaryotic and Eukaryotic cell. 6. Section cutting, double staining of animal tissues like liver, oesophagus, stomach, pancreas, intestine, kidney, ovary, testes. 7. Cell division in onion root tip/ insect gonads. 8. Preparation of nuclear & cytoplasmic fractions. 9. Preparation of buffers. 10. Qualitative tests for Carbohydrates, lipids and proteins.
Readings	<ol style="list-style-type: none"> 1) The Cell – A Molecular Approach – G.M. Cooper, R.E. Hausman 2) Molecular Biology of the cell - Bruce Alberts 3) Karp, G. 2010. Cell and Molecular Biology: Concepts and Experiments. John Wiley & Sons.Inc. 4) De Robertis, E.D.P. and De Robertis, E.M.F. 2006.Cell and Molecular Biology.
Evaluation	<p>Theory: Continuous Internal Assessment: 10 marks End-Semester Theory Examination: 50 marks</p> <p>Practical: Continuous Internal Assessment: 32 marks End-Semester Examination: 8 marks</p>
Paper Structure for End Sem Theory	<p>Module A (25 Marks) Objective questions – 1 X 5 = 5 marks Subjective: Two questions of 10 marks each, i.e. 2 x 10 = 20</p> <p>Module B (25 Marks) Five Objective questions – 1 X 5 = 5 marks Subjective: Two questions of 10 marks each, i.e. 2 x 10 =20</p>