

CELL BIOLOGY AND GENETICS

LESSON PLAN

Branch: B.Tech in Biotechnology

Semester: 3rd

Subject: BTPC2003 – Cell Biology and Genetics

Name of the Teaching Faculty: Dr. Susmita Mahapatra

Week	Class Day	Theory Topics
1st	1st	Introduction to Cell Biology and Genetics
	2nd	Structural intricacy and chemical composition of cells
	3rd	Organization of Prokaryotic and Eukaryotic cells
	4th	Question–Answer Session and Doubt Clearing
2nd	1st	Cell wall structure and functions
	2nd	Cell membrane structure and Fluid Mosaic Model
	3rd	Membrane transport mechanisms
	4th	Numerical and conceptual discussion on membrane transport
3rd	1st	Cell organelles: Mitochondria and Chloroplast
	2nd	Endoplasmic reticulum and Golgi apparatus
	3rd	Lysosomes, Peroxisomes and Vacuoles
	4th	Diagram practice and doubt discussion
4th	1st	Nucleus and nuclear organization
	2nd	Cytoskeleton: microtubules, microfilaments and intermediate filaments
	3rd	Functional significance of cytoskeleton
	4th	Revision class on Module I
5th	1st	Molecular organization of chromosome
	2nd	Nucleosome concept and chromatin organization
	3rd	Cell cycle and phases of cell cycle
	4th	Question–Answer Session
6th	1st	Regulation of cell cycle

	2nd	Mitosis: stages and significance
	3rd	Meiosis: stages and significance
	4th	Comparative study of mitosis and meiosis
7th	1st	Programmed cell death (Apoptosis)
	2nd	Cell fate determination and embryonic patterning in <i>Drosophila</i>
	3rd	Stem cells: embryonic stem cells
	4th	Stem cell applications and doubt clearing
8th	1st	Adult stem cells and characteristics
	2nd	Revision of Module II
	3rd	Assignment discussion and tutorial class
	4th	Internal assessment discussion
9th	1st	Origin and evolution of mitochondria
	2nd	Origin and evolution of chloroplast
	3rd	Cellular energetics and ATP synthesis
	4th	Oxidative phosphorylation
10th	1st	Photophosphorylation
	2nd	Chemiosmotic hypothesis
	3rd	Membrane transport and trafficking
	4th	Question–Answer Session
11th	1st	Mechanisms of protein sorting and targeting
	2nd	Intercellular communication
	3rd	Signaling pathways and cell communication
	4th	Cell death pathways and doubt clearing
12th	1st	Mendel’s experiments and Mendelian genetics
	2nd	Mendel’s laws of inheritance
	3rd	Monohybrid cross and principle of segregation
	4th	Problem solving on monohybrid cross
13th	1st	Incomplete dominance and codominance

	2nd	Dihybrid cross and independent assortment
	3rd	Back cross and test cross
	4th	Numerical problems and discussion
14th	1st	Linkage and linkage groups
	2nd	Crossing over and recombination
	3rd	Molecular mechanism of recombination – Holiday model
	4th	Question–Answer Session
15th	1st	Significance of linkage and recombination
	2nd	Comprehensive revision of all modules
	3rd	Problem-solving and assignment discussion
	4th	Doubt clearing and internal assessment