

CELL BIOLOGY

Semester	Subject Code	Category	Lecture		Theory		P	C
II	21CBT2A	Core - II	5 hrs Per week	75	5 hrs Per week	75	0	5

COURSE OBJECTIVE:

- To understand the basics, characteristics and functions of cell types, cell organelles and investigate the cell division, cytoskeleton and study the interaction between cells or with the environment and learn the principles of signaling mechanisms.

COURSE OUTCOMES: Up on successful completion of the course, students will be able to

CO NUMBER	CO STATEMENT	KNOWLEDGE LEVEL (K1-K4)
CO1.	Remember cells as the basic units of all living things and as the building blocks of multi-cellular organisms and Understand different Cell types and functions of cell organelles.	K1, K2
CO2.	Apply their knowledge by comparing how structures of cell and its organelles are related to their functions.	K3
CO3.	Analyze how cells reproduce by cell cycle, mitosis and meiosis.	K4
CO4.	Understand the fundamental structures and functions of cytoskeleton which gives motility to cells.	K2
CO5.	Identify and understand the principles of interaction between cells and environment and to determine cell signalling pathways.	K1, K2

Knowledge level: K1- Remember; K2- Understand; K3- Apply; K4- analyze

MAPPING WITH PROGRAMME OUTCOMES

COS	PO1	PO2	PO3	PO4	PO5	PO6
CO1	S	S	S	M	S	M
CO2	S	S	S	M	M	S
CO3	S	S	S	M	M	M
CO4	S	S	M	M	S	M
CO5	S	S	S	S	M	S

S-strong; M- medium; L-low

Discovery of cells, cell theory, properties of cells, two different types of cells- prokaryotes and eukaryotes, types of prokaryotic cells- bacteria and archaea, eukaryotic cells- plant cell, animal cell and viruses, human cells types, blood cells- RBCs and WBCs.

Structure and function of cell organelles- plasma membrane, cell wall, mitochondria, cytoplasm, golgi complex, lysosomes, vacuoles, peroxisomes, endoplasmic reticulum, ribosomes, chloroplast, nucleus- chromosomes and types.

Cell cycle- Mitosis and Meiosis and its different phases, asexual and sexual reproduction, vegetative reproduction, binary fission, budding.

Cytoskeleton structures and functions- microtubules, microfilaments and intermediate filaments, centrioles and basal bodies, cilia and flagella, muscle contractility, non muscle motility

Extracellular matrix, interaction of cell with extracellular matrix- integrins, hemidesmosomes, interaction of cells with other cells- selectins, immunoglobulin super family, cadherins, adherens and desmosomes, Tight junctions, Gap junctions and plasmadesmata, signal transduction by G-Protein coupled receptor, Ras MAP Kinase pathway, signaling by insulin receptor, apoptosis- intrinsic and extrinsic pathway. Signaling pathways in plants.

Distribution of Marks: Theory 80% and Problems 20%

- Class room teaching
- Assignments
- Discussions
- Homework
- PPT presentations
- Seminars
- Models and charts

TEXT BOOKS:

S.no.	Authors	Title	Publishers	Year of publication
1.	Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger	Molecular Cell biology	W.H. Freeman and Company, New York, USA	2016
2.	P.S. Verma & V K Agarwal	Cytology	S.Chand Publishing, New Delhi, India.	2010

REFERENCE BOOKS:

S.no.	Authors	Title	Publishers	Year of publication
1.	Gerald Karp	Cell and Molecular Biology: concepts and experiments:	John Wiley and sons, Inc., NJ.	2015
2.	Geoffrey M Cooper, E. Robert Hausman,	Cell: a molecular approach	Sinauer Associates Inc, Publishers Sunderland, Massachusetts U.S.A	2013
3.	Harvey Lodish, Arnold Berk, Chris A. Kaiser, Monty Krieger, Anthony Bretscher, Hidde Ploegh; Angelika Amon; Kelsey C. Martin	Molecular cell biology	W.H.Freeman publishers & Co.	2016

WEB SOURCES:

1. <https://www2.le.ac.uk/projects/vgec/highereducation/topics/cellcycle-mitosis-meiosis>
2. <https://www2.le.ac.uk/projects/vgec/highereducation/topics/dna-genes-chromosomes>
3. <https://www.nap.edu/read/19207/chapter/8#34>
4. <https://www.khanacademy.org/test-prep/mcat/cells/cell-cell-interactions/a/cell-cell-interactions-how-cells-communicate-with-each-other>
5. https://www.youtube.com/watch?v=S-Kj2FR_6_g
6. <https://www.toppr.com/guides/biology/the-fundamental-unit-of-life/cell-organelle/>

Syllabus Designer:

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