

## CELL AND MOLECULAR BIOLOGY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/ week	Total Hours/ Semester	Hrs/ week	Total Hours/ Semester		
I	21CPZO1C	Core-III	5	75	5	75	Nil	5

### COURSE OBJECTIVES

- To understand the structure and molecular basis of cellular interactions, energy transformation, regulation and control of genes, cell cycle and information transfer.

### COURSE OUTCOMES

On the successful completion of the course, students will be able to:

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	To understand the knowledge on the structure and functions of cell organelles.	K2
CO2	To understand the knowledge on the structure and functions of nucleus and chromosomes.	K2
CO3	To gain the knowledge about cell cycles and cancer cells.	K3
CO4	To understand the knowledge on chemistry of DNA and its replication.	K2
CO5	To gain the knowledge the experimental techniques of DNA replication and mechanism of genes.	K3

Knowledge Level : K1-Remember ; K2 –Understand ; K3 – Apply ; K4 – Analyze

### Mapping with Programme Outcome

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

S- Strong; M – Medium ; L- Low

DISTRIBUTION OF MARKS: THEORY 100%

**UNIT-I** **15 Hours**  
**STRUCTURE AND FUNCTIONS OF CELL ORGANELLES**

**Plasma membrane:** Structure, Membrane receptors, Membrane transport -Membrane Potentials - cell adhesion, intercellular recognition - Intercellular junctions. Endoplasmic reticulum - intracellular transport. Mitochondria - Energetics - cellular respiration - mitochondrial replication. Ribosomes - Structure and function.

**UNIT-II** **15 Hours**  
**NUCLEUS AND CHROMOSOMES**

Cytoplasmic interactions, Nuclear receptors - Cell fusion: homokaryons, heterokaryons. Structure and function of Chromatin - Euchromatin and heterochromatin - Polytene and lampbrush Chromosomes.

**UNIT-III** **15 Hours**  
**CELL CYCLES AND CANCER CELL**

Cell cycles - its components G<sub>0</sub>-G<sub>1</sub> transition - Spindle organization - Chromosome movements - Regulation and synchronization of cell division.

Cancer cell: Differences between normal and cancer cell- structural and functional characteristics -Tumour Viruses- Oncogenes - Environmental factors inducing cancer. Hormones in relation to cancer-Theories of carcinogenesis.

**UNIT-IV** **15 Hours**  
**DNA REPLICATION AND REPAIR**

Chemistry of DNA - types of DNA - Enzymology and mechanism of DNA replication in prokaryotes - DNA repair- Mismatch repair, Base Excision Repair, Nucleotide Excision Repair.

**UNIT-V** **15 Hours**  
**TRANSCRIPTION AND TRANSLATION**

Types of RNA, RNA polymerase, promoters, transcription in prokaryotes and eukaryotes, post transcriptional modification- splicing, capping and polyadenylation. Genetic code, Wobble hypothesis, Mechanism and regulation of translation in prokaryotes and eukaryotes, post translational modifications. antibiotic inhibitors of Protein synthesis.

**TEXT BOOKS**

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	De Robertis. E.D.F. and De Robertis. E.M.F.	Cells and Molecular Biology	B.I Publications Pvt Ltd, India.	2001
2.	Lewin. B.	Genes VII	Oxford University Press, New York.	2000

3.	Shanmugam, G.	A laboratory manipulation in fish	Madurai Kamaraj University	1988
4.	De Witt	An evolutionary approach. Biology of the cell.	Saunders Company	1977
5.	Karp, G.	Cell Biology	McGraw Hill Ltd., Japan.	1979

#### REFERENCE BOOKS

S.NO	AUTHORS	TITLE	PUBLISHERS	YEAR OF PUBLICATION
1.	Howland J.L.	Cell Physiology	McMillan Publishing Co., New York	1973
2.	Avers. C.J.	Cell Biology	Van Nostrand Company, New York	1976
3.	Korenberg. A	DNA Replication	Dorothy- W.H. Freeman and Company, San Francisco	1974
4.	Hawkins, J.D	Gene Structure and Expression	Cambridge University Press, London.	1996
5.	Albert, B and Watson. J.D.	Molecular Biology of the cell.	Garland Publishing, London.	1990

#### WEB SOURCES:

[www.sciencedaily.com](http://www.sciencedaily.com)  
[www.sciencemag.com](http://www.sciencemag.com)  
[www.treehugger.com](http://www.treehugger.com)  
[www.nature.com](http://www.nature.com)

#### TEACHING METHODOLOGY

- Class room teaching
- Assignments
- Discussions
- Home test
- PPT Presentations
- Demonstration from the Video slides, videos and interactive software.

#### SYLLABUS DESIGNERS

- Dr D.Sasikala, Assistant Professor & HOD
- Dr.V.Kiruthiga, Assistant Professor
- Dr V.Rekha, Assistant Professor
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