CELL BIOLOGY

Semester	Subject Code	Category	Lecture		Theory		Practical	Credits
			Hrs/ week	Total Hours/ Semester	Hrs/ week	Total Hours/ Semester		
III	21CZO3A	Core III	4	60	4	60	Nil	4

COURSE OBJECTIVES

To learn the cytological and biochemical techniques to separate various cellular components.

To understand the ultrastructure and functions of cellular organelles.

To understand the integrated activity of the whole cell as in mitosis, meiosis and protein synthesis.

COURSE OUTCOMES (CO)

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

CO Number	CO Statement	Knowledge Level (K1-K4)
CO1	Students can understand the basic principles and working mechanism of microscope, cytological and biochemical techniques.	K2 , K3
CO2	Students can understand the structures and functions of basic cellular components especially biomolecules, membranes, and organelles.	K1, K2
CO3	Students understand and Distinguish between the mitotic and meiotic cell division.	K2, K3
CO4	Students will apply their knowledge in understanding the growth and development of the organism.	K3, K4
CO5	Students can comprehend the environmental, physiological changes or alterations of cell function brought about by mutation.	K3,K4

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

MAPPING WITH PROGRAMME OUTCOMES

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

S- Strong; M – Medium; L- Low

Distribution of Marks: Theory 100% and Problems Nil %

UNIT-I

INTRODUCTORY CYTOLOGY (12 Hours)

History of Cell Biology- Prokaryotic and Eukaryotic cells. Principles and applications of Light-simple and compound and Electron Microscopes; Cytological Techniques- Fixation– Sectioning and Staining. Cell Fractionation methods used in Molecular Biology - Homogenization and Centrifugation. Biochemical Techniques- Paper Chromatography, Agarose Gel Electrophoresis and their Applications.

UNIT-II

CELL ORGANELLES (12 Hours)

Cell: Ultra Structure of Animal Cell, Cell Theory, Structure, Composition and Functions of Cell Components- Plasma Membrane- Structure of Plasma membrane and Cell Junctions- Desmosomes, Tight Junction, Zonula adhaerens and Gap junction. Ultrastructure and functions of Endoplasmic Reticulum, Ribosomes, Golgi Complex, Lysosomes, Centrioles and Mitochondria.

UNIT-III

NUCLEUS and CELL CYCLE (12 Hours)

Ultra structure and Functions of Nucleus and Nucleolus. Chromosomes- Structure and types. Giant chromosomes-Polytene and Lampbrush chromosomes. Cell cycle and cell division – Types- Direct cell division (Amitosis), Indirect cell division (Mitosis) and Reduction division (Meiosis), interphase and its regulation, Meiosis and its significance.

UNIT IV

NUCLEIC COMPONENTS (12 Hours)

Structure and functions of Nucleic acids- DNA (Watson and Crick's model) and RNA. Replication of DNA, Types of RNA (messenger RNA (mRNA), Transfer RNA (tRNA), Ribosomal RNA (rRNA). Properties of Genetic code – Mechanism of Protein synthesis – Transcription, Translation and post transcriptional modifications.

UNIT-V

CANCER BIOLOGY (12 Hours)

Introduction to Cancer, Characteristic features of Cancer, Types of cancer (Carcinomas-lung cancer, Sarcomas-Osteosarcoma, Lymphomas-Hodgkin's disease, Leukemias- leukemic cancer) - Causes of Cancer- Mutational nature of cancer, Environmental causes of cancer, Oncogenes, Carcinogenic agents, Biology of cancer exclusively in women-Breast cancer, ovarian and Uterus cancer.

TEXT BOOKS

S. No.	Author	Title	Publishers	Year of Publications
1	Burke, Jack. D	Cell Biology	Scientific Book Agency, Calcutta	1999
2	Cohn, N.S	Elements of Cytology	Freeman Book Co., New Delhi.	1979
3	De Robertis, E.D.P. and E.M.F. De Robertis,	Cell and Molecular Biology, 8th edition,	International edition, informes Hongkong,	1988
4	Gies, A.C	Cell physiology	Saunders Co., Philadelphis, London, Toronto,	1979

REFERENCE BOOKS

S. No.	Authors	Title of the Book	Publishers	Year of Publication
1	Albert L Lehninger	Biochemistry, Second Edition	Kalyani Publishers, New Delhi	2nd Edition
2	De Robertis, E.D.P. and De Robertis E.M.F	Cell and Molecular Biology	Lippincott Williams and Wilkins, Philadelphia	1988, 8th Edition
3	Satyanarayana U and Chakrapani U	Essentials of Biochemistry	Book and Allied (P) Ltd.	2009
4	Karp, G	Cell and Molecular Biology: Concepts and Experiments	John Wiley and Sons. Inc.	6th Edition, 2010

WEB SOURCES:

www.sciencedirect.co.

www.pebmed.com

www.khansacademy.com

www.epatsala.com

www.swayam.com

TEACHING METHODOLOGY

- Class room teaching
- Charts/ Models
- Power point Presentations
- Discussions
- Assignments
- Home test

SYLLABUS DESIGNERS

- Dr. D. Sasikala, Assistant Professor and HOD
- Dr. V. Kiruthiga, Assistant Professor
- Dr. V. Rekha, Assistant Professor
- Dr. A. Vinodhini, Assistant Professor
- Dr. G. Vidhya, Assistant Professor