



Subject Code: 02MB1402

Subject Name: Cell Structure and Organization

M. Sc. Semester - I

Objective: To provide comprehensive knowledge of cellular architecture and functional aspects of cellular organelles.

Credits Earned: 6 Credits

Course Outcomes: After completion of this course, student will be able to

1. Distinguish between various modes of transport across cell membranes.
2. Explain the function of various cellular organelles and its importance.
3. Explain various components of signal transduction and their crosstalks.
4. Explain the organization of genetic material and cell cycle regulation.

Pre-requisite of course: Fundamental knowledge of prokaryotic and eukaryotic cells.

Teaching and Examination Scheme

Teaching Scheme (Hours)			Credits	Theory Marks			Tutorial/ Practical Marks		Total Marks
Theory	Tutorial	Practical		ESE (E)	IA (M)	CSE (I)	Viva (V)	Practical	
5	0	2	6	50	30	20	25	25	150



Contents:

Unit	Topics	Contact Hours
1	Membrane structure and function Structure of model membrane; lipid bilayer and membrane protein diffusion; osmosis; ion channels; active transport; membrane pumps; mechanism of sorting and regulation of intracellular transport; electrical properties of membranes.	15
2	Structural and functional organization of cell Cell wall; nucleus; mitochondria; Golgi bodies; lysosomes; endoplasmic reticulum; peroxisomes; plastids; vacuoles; chloroplast; structure & function of cytoskeleton and its role in motility. Organization of Genetic Material: Operons; unique and repetitive DNA; interrupted genes; gene families; structure of chromatin and chromosomes; heterochromatin; euchromatin; transposons.	20
3	Signal Transduction Basic elements of signalling system; extracellular signal molecules; receptors-ion linked; G- protein linked and enzyme linked receptors; calcium and NO as intracellular messengers. Convergence; divergence and crosstalk among different signalling pathways.	15
4	Cell division and cell cycle Steps in cell cycle; cell cycle regulation and control; Cell cycle check points; Mitosis and Meiosis.	10
	Total Hours	60



References:

1. Basic cell biology , Abhilash Jain, Cumpus Books International
2. Cell Biology, T Devasena, Oxford University Press.
3. The Cell: A molecular approach, Cooper, G. M. and Hausman, R. E. Sinauer Associates.
4. Getzen berg, R.H.and E.E.Bittar, Cell Structure and Signalling, Elsevier Science.
5. Henderson et al., 1999 Cellular Microbiology.
6. Cossart et al., 2000 Cellular Microbiology
7. Phillip Sheeler and Donald E.Blanch Cell & Molecular Biology 3rd ED John Willey Pub.
8. Ernet, J.M. Helmreich, The Biochemistry of Cell Signalling, Oxford Press.
9. De Roberts and De Roberts, 1998 Cell and Molecular Biology. Wavely Pvt. Ltd.
10. Voet and Voet J.G .3rd Edition , Biochemistry John Wiley and sons INC
11. Zubay .G. Biochemistry- Wm.C.brown Publishers.
12. White .D. 2000 The Physiology and Biochemistry of prokaryotes-Oxford Univ. Press

Suggested Theory distribution:

The suggested theory distribution as per Bloom's taxonomy is as per follows. This distribution serves as guidelines for teachers and students to achieve effective teaching-learning process

Distribution of Theory for course delivery and evaluation					
Remember	Understand	Apply	Analyze	Evaluate	Create
20%	20%	30%	15%	10%	5%

Instructional Method:

- d. The course delivery method will depend upon the requirement of content and need of students. The teacher in addition to conventional teaching method by white board may also use any of tools such as demonstration, role play, Quiz, brainstorming, etc.
- e. The internal evaluation will be done based on continuous evaluation of students in the classroom in the form of attendance, assignments, presentations, verbal interactions etc.
- f. Students will use supplementary resources such as online videos, ebooks, ppts etc.



List of Experiments

1. Cell wall staining
2. Nucleus staining.
3. Flagella staining.
4. Mitosis/Meiosis
5. Buccal smear/Barr body identification.
6. Isolation of Chloroplast
7. Isolation of mitochondria.