COURSE TITLE	**CELL BIOLOGY**
COURSE CODE	**02MB0464**
COURSE CREDITS	**4**

Objective:

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

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

1 Explain the Basics of Cellular Architecture of Cell and its Importance.

2 Explain the Cellular Structure of Cell and its Functions.

3 Explain various modes of Cellular Transport System and mode of Signal Transduction.

4 Explain Structural organization of Cytoskeleton and Regulation of Cell Cycle.

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

Teaching and Examination Scheme

Theory Hours	Tutorial Hours	Practical Hours	ESE	IA	CSE	Viva	Term Work
4	0	0	50	30	20	0	0

Contents : Unit	Topics	Contact Hours
1	**Cellular Architecture** • Cell theory, Discovery of Cell, History and Contributions • Types of Cell Structure of Prokaryotic and Eukaryotic • Cells Diversity: Size, Shape, Composition • Structure and Function - I: Evolution of Nucleus, Structure of Nucleus and Nucleolus • Structure and Function - II:Endosymbiotic theory, Structure of Mitochondria, Mitochondrial Genome Organization • Structure and Function – III: Ribosomes (Prokaryotes and Eukaryotes),Vacuoles	15
2	**Cellular Structures** • Structure and Function - IV: Types of Plastids, Structure of Chloroplast, Biogenesis of Chloroplast, Chloroplast as semiautonomous organelle, Chloroplastic Genome Organization • Structure and Function – V: Cell Motility, External Structure:Cilia, Flagella • Structure and Function – VI: Diversity of Cell wall: Archaea, Bacteria, Fungi, Plant • Structure and Function – VII: Plasma membrane: Molecular models of Plasma membrane • Chemical Composition of Plasma membrane: (i) Lipid: A. Phospholipid, B. Sphingolipid, C. Glycolipid, D. Cholesterol (ii) Protein: A. Integral membrane proteins, B. Peripheral membrane proteins (iii) Carbohydrate: A. Glycoproteins, B. Glycolipids	15

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Contents : Unit	Topics	Contact Hours
3	**Cellular Transport System & Signaling Pathway** • Membrane Transport – I: Passive Transport: A. Diffusion, B. Facilitated Diffusion, C. Osmosis • Membrane Transport – II: Active Transport: Carrier Proteins: Uniporters, Symporters, Antiporters, Sodium-potassium (Na+-K+) pump, Coupled transport • Membrane Transport – III: Bulk Transport: Endocytosis, Exocytosis • Structure and Function – VIII: Golgi Apparatus, Endoplasmic Membrane, Lysosome • Membrane Transport – IV: GERL System • Membrane Transport – V: Protein Sorting: A. Gated transport, B. Transmembrane transport, C. Vesicular transport. signal recognition particle (SRP),Signal Hypothesis, Singal RP. • Structure and Function – VIII: Microbodies: Peroxisome &Glyoxysome • Signal Transduction - I: Definition & Concept, Bacterial Cell Signaling, Modes of Endogenous Signal Transduction • Signal Transduction - II: G-protein coupled receptor, Mechanism of Tyrosine Kinase Receptors	20
4	**Cytoskeleton and Cell Cycle Process** • Cytoskeleton: Role and Types of Filaments • Microfilaments: Polymerization of G-Actin, F-Actin Proteins • Microtubules: Polymerization of Alpha and Beta tubulin • Intermediate filaments: Filament Assembly • Cell cycle and its regulation cell cycle:Steps in Cell Cycle, Cell Cycle Check Points, Cell Cycle Regulation and Control • Loss of Cell Cycle Control: Cell senescence and Death - Apoptosis • Cell division: Mitosis and Meiosis	10
Total Hours		**60**

Textbook :

1 cell biology, C B Powar, Himalaya Publishing House, 2001

2 Cell Biology, S C Rastogi, New Age International, 2005

References:

1 Basic Cell Biology, Basic Cell Biology, Abhilash Jain, Cumpus Books International, 2020

Suggested Theory Distribution:

The suggested theory distribution as per Bloom's taxonomy is as 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 / Knowledge	**Understand**	**Apply**	**Analyze**	**Evaluate**	**Higher order Thinking**
10.00	20.00	25.00	25.00	10.00	10.00

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Instructional Method:

1 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.

2 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.

3 Students will use supplementary resources such as online videos, ebooks, ppts etc.

Supplementary Resources:

1 https://doi.org/10.1098/rstb.2014.0330

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