C-6: CELL BIOLOGY (THEORY)
SEMESTER –III

HMBCR3062T

TOTAL HOURS:52 **CREDITS: 4**
Module 1 **Marks 30**

Unit 1 Structure and organization of Cell **No. of Hours: 10**
Cell Organization – Eukaryotic (Plant and animal cells) and prokaryotic
Plasma membrane: Structure and transport of small molecules
Cell Wall: Eukaryotic cell wall, Extra cellular matrix and cell matrix interactions, Cell-Cell Interactions - adhesion junctions, tight junctions, gap junctions, and plasmodesmata (only structural
aspects), Mitochondria, chloroplasts and peroxisomes; Cytoskeleton: Structure and organization of actin filaments, association of actin filaments with plasma membrane, cell surface protrusions, intermediate filaments, microtubules

Unit 2 Nucleus **No. of Hours: 10**
Nuclear envelope, nuclear pore complex and nuclear lamina, Chromatin – Molecular organization
Nucleolus, Changes in Chromatin Structure - DNA methylation and Histone Acetylation mechanisms.

Unit 3 Cell Cycle, Cell Death and Cell Renewal **No. of Hours: 12**
Eukaryotic cell cycle and its regulation, Mitosis and Meiosis
Development of cancer, causes and types
Programmed cell death, Stem cells, Embryonic stem cell, induced pleuripotent stem cells
Module 2 **Marks 20**

Unit 4 Protein Sorting and Transport **No. of Hours: 12**
Ribosomes, Endoplasmic Reticulum – Structure, targeting and insertion of proteins in the ER, protein
folding, processing and quality control in ER, smooth ER and lipid synthesis, export of proteins and
lipids, Golgi Apparatus – Organization, protein glycosylation, protein sorting and export from Golgi Apparatus, Lysosomes

Passive and facilitated diffusion, Primary and secondary active transport, concept of uniport, symport and antiport, Group translocation, Iron uptake

Unit 5 Cell Signalling **No. of Hours: 8**

Major Signalling molecules and their receptors

Function of cell surface receptors

Pathways of intra-cellular receptors **–** Cyclic AMP pathway, cyclic GMP and MAP kinase pathway

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(PRACTICAL) HMBCR3062P

TOTAL HOURS: 39 **CREDITS: 2**

1. Study a representative plant and animal cell by microscopy.
2. Study of the structure of cell organelles through electron micrographs
3. Cytochemical staining of DNA – Feulgen
4. Demonstration of the presence of mitochondria in striated muscle cells/ cheek epithelial cell using
vital stain Janus Green B
5. Study of polyploidy in Onion root tip by colchicine treatment.
6. Identification and study of cancer cells by photomicrographs.
7. Study of different stages of Mitosis.
8. Study of different stages of Meiosis.

SUGGESTED READING

1. Hardin J, Bertoni G and Kleinsmith LJ. (2010). Becker's World of the Cell. 8th edition. Pearson.
2. Karp G. (2010) Cell and Molecular Biology: Concepts and Experiments. 6th edition. John Wiley &
Sons. Inc.
3. De Robertis, EDP and De Robertis EMF. (2006). Cell and Molecular Biology. 8th edition. Lipincott
Williams and Wilkins, Philadelphia.
4. Cooper, G.M. and Hausman, R.E. (2009). The Cell: A Molecular Approach. 5th Edition. ASM Press & Sunderland, Washington, D.C.; Sinauer Associates, MA.

5. Lodish. Molecular Biology

6. Bruce Alberts The Cell