Module 1

Unit 1 Structure and organization of Cell
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
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
Eukaryotic cell cycle and its regulation, Mitosis and Meiosis
Development of cancer, causes and types
Programmed cell death, Stem cells, Embryonic stem cell, induced pluripotent stem cells

Module 2

Unit 4 Protein Sorting and Transport
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

C-6: CELL BIOLOGY

(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
   Sons. Inc.
   Williams and Wilkins, Philadelphia.

5. Lodish. Molecular Biology

6. Bruce Alberts The Cell