Course Handout (Part-II)

Date: 03/08/2015

In addition to Part I (General Handout for all courses appended to the Time Table) this portion gives further specific details regarding the course.

Course No.	**: BIO F213**
Course Title	**: CELL BIOLOGY**
Instructor-in-charge	**: VISHAL SAXENA**
Instructor	**: Rajesh Mehrotra**

1. **Course Description**
   The course aims to detail fundamental processes of life at cellular and sub-cellular levels, cell environments, membrane transport, cell movements, division and control mechanisms. It will provide the base to understand the physiological properties, structure, intracellular organelles, interactions with microenvironments, division, regulatory mechanisms of a cell, and related experimental procedures to prepare students for developing their understanding into the fundamentals of life.
2. **Scope and Objective of the Course:**
   The discipline of cell biology is both dynamic and evolving constantly. Thus, an advanced understanding of '*the cell*' is must for biology students. This course will impart the vast knowledge of animal/ plant cell and mechanisms of cell functioning to students willing to pursue their further knowledge in any related area of study or research.
3. **Text Book (TB):** *Cell and Molecular Biology* by Phillip Sheeler and Donald E. Bianchi, John Wiley and Sons (3rd Ed).
4. **Reference Books (RB):**
   RB1: *The World of Cell* by W.M Becker, L.J. Kleinsmith and J. Hardin. Pearson Education (5th Ed).
   RB2: *Essential Cell Biology* by Bruce Albert, Garland Science (2nd Ed).
5. **Course Plan:**

Lect. #	Learning Objectives	Contents	References*
1-4	**Preview of Cell**	Brief introduction, overview of cell organelles. The composite animal, plant, bacterial, Mycoplasma cells and viruses	Ch.1(TB), Ch. 4(RB1), Ch. 1 (RB2)
5-6	**Microscopy**	Light, fluorescent and confocal and electron microscopy. Preparation of sample for microscopy and specialized applications	Ch.1 (TB) Ch. 1 (RB2)
7-10	**Cell Membrane and cell-cell junctions**	Structure and chemical organizations of plasma membrane. Lipids, carbohydrates and proteins in the membrane. Membrane fluidity and lipid asymmetry. Cell-cell junctions and other specialized structures	Ch. 15 (TB) Ch. 7 (RB1) Ch. 11 (RB2)
11-13	**Membrane functions**	Passive movement through cell membrane, Facilitated diffusion, Active transport, Bulk transport, Endo- and Exo-cytosis. Membrane channels, channel inhibitors and their therapeutic importance	Ch. 15 (TB) Ch. 8 (RB1) Ch. 12, 15 (RB2)

14-17	**Endo-membrane system**	Membrane-enclosed organelles, protein trafficking and transportation, post translational modifications	Ch. 15 (RB2) Ch. 12 (RB1)
18-20	**Cytoskeleton**	Cytoplasmic filaments, microtubules, spindle fibers and centriole structures and functions	Ch. 23 (TB) Ch. 17 (RB2)
21-23	**Nuclear processes**	Nuclear organization, transcription, division and cytokinesis	Ch. 20 (TB), Ch. 7,19 (RB2)
24-27	**Ribosome & translation**	Eukaryotic and prokaryotic ribosome. Ribosome composition, rRNA operon, translation	Ch. 22 (TB) Ch. 7 (RB2)
28-30	**Cell growth**	Growth curve and kinetics. Continuous culture of cells. Synchronous cell cultures. Cell quantitation and sorting.	Ch. 2 (TB)
31-34	**Cell cycle**	Overview of the cell cycle, regulation of cell cycle. Cell cycle and cell division. Growth control and cancer	Ch. 19 (RB1) Ch. 18 (RB2)
35-36	**Apoptosis**	Mechanism of programmed cell death/apoptosis	Ch. 18 (RB2)
37-39	**Cell communication**	General principle, signaling molecules, receptors, secondary messengers, signal transduction, receptor-mediated signaling	Ch. 14 (RB1) Ch. 16 (RB2)
40-42	**Modern Techniques and Cell Biology Applications**	Cell organelles and human diseases, Cloning, Gene therapy, embryonic stem cells. Transgenesis and applications of Cell Biology, Cell biology of aging, Cell biology in forensic science	Class notes

*** Class notes will also be included along with mentioned references.**

5. Evaluation Scheme:

Components	Duration	Weightage (%)	Date Time Venue	Remarks
Mid-Term Test	90 min	30	9/10 2:00 - 3:30 PM	**CB**
Quizzes	15 min	10	Surprise	**CB**
Regular tutorials (seminars)		10		**CB/OB**
Assignments		5		
Compre exam	3 hrs	45	11/12 FN	CB/OB

CB (Closed book), OB (Open book)

6. **Chamber Consultation Hours:** To be announced in the class.

7. **Notices:** Notices concerning the course will be displayed on the notice board at Department of Biological Sciences or Intra BITS.

8. **Make-up Policy:** Make-up will be granted only during hospitalization or for genuine cases validated by concerned Wardens and/or Medical Officers. No make-up will be considered for quizzes, seminars and assignments.

Instructor-in-charge
BIO F213