Date: **02.08.2016**

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 G542**
Course Title : **Advanced Cell and Molecular Biology**
Instructor-in-charge : **VISHAL SAXENA**
Instructor : **Sandhya Mehrotra**

1. **Course Description :**
   Extra cellular matrix & adhesion, growth factors and their interaction with receptors, cytokines and signal transduction, stem cells and their potential in therapy, transport in and out of nucleus, eukaryotic cell cycle: restriction point, G1 phase progression, role of cyclin and CKIs, cell cycle & cancer, metastasis, molecular chaperones, apoptosis and necrosis.
2. **Scope and Objective of the Course**:
   This course will give insights to the students into some frontier areas in cell and molecular biology like control of cell division, cell-cell recognition, basis of receptors & signal transduction, adhesion, programmed cell death and stem cells.
3. **Text Book (**TB**):**
   Molecular Biology of the Cell (6th edition), Bruce Alberts, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts and Peter Walter. Garland Publishing Inc., New York and London, 2014.
4. **Reference Books:**
   R1. Molecular Cell Biology (Seventh Edition), Lodish, Berk, Krieger, Scott, Bretscher, Ploegh, Matsudaira. Freeman, 2013.
   R2. Cell and molecular biology: concepts and experiments, Gerald Karp. John Wiley and Sons.

Course Plan:

Lecture No.	Learning Objectives	Topics to be covered	Ref. Chap./ Sec.# (Book)
1 (1)	Introduction	Course Orientation, discussion on mode of conductance of various evaluation components, seminar topics, etc	-
2-7 (6)	The cell cycle	Cell cycle Overview, different phases, cell cycle control and regulatory components, control of cell division and cell growth, Cyclin Kinase inhibitors	Chap. 17, TB; Chap. 20, R1
8-11 (4)	Apoptosis or programmed cell death	Mechanism of cell death with special reference to apoptosis and necrosis, cascade of apoptosis implications	Chap. 18, TB; Chap. 21, R1
12-13 (2)	Transport through nuclear pore complex	Mechanism for the transport of “Cargo” proteins into and out of nucleus	Chap. 12, TB; Chap. 13 (13.6) R1

14-20 (7)	Mechanisms of cell communication	Mechanisms of signal transduction by cell surface receptor proteins (G proteins, enzyme coupled receptors), growth factors and their interaction with receptors in cell proliferation and its regulation, JAK – STAT, Wnt, Hedgehog, Notch, NF-κB pathways.	Chap. 15, TB
21-24 (4)	Tissue renewal and Stem cell engineering	Epidermis and its renewal by Stem cells, multipotent stem cells, stem cell engineering	Chap. 22, TB
25-28 (4)	Protein folding & Correction of malfolded protein	Mechanism of protein folding in *E.coli* and mammalian systems, Molecular chaperones, Proteolysis	Chap. 3 TB; Chap. 3 (3.2), Chap. 13 (13.3), R1
29-34 (6)	Cancer	Cancer as microevolutionary process, cancer critical genes, molecular basis of cancer – cell behavior.	Chap. 20, TB; Chap. 25, R1
35-40 (6)	Cell Junctions, cell adhesion and Extra cellular matrix	Cadherins, cell – cell adhesions, tight junctions and gap junctions, Role of CAMs in cell attachment, Basal Lamina, integrins, Components of ECM, role of ECM in bi-directional signaling.	Chap. 19, TB

Additional references will be provided as required.

5. Evaluation Scheme:

Component	Duration	Wtg. (%)	Date & Time	Remarks
Mid-term test	90 minutes	30	<TEST_1>	Partly Closed Book partly Open book
Quizzes & Assignment	variable	20	To be Announced	Closed Book/ Open Book
Seminar	''	10	To be Announced	
Comprehensive Examination	3 hrs.	40	<TEST_C>	Partly Closed Book partly Open book

7. Chamber Consultation Hours: To be announced in the class.

8. Notice: Notices for tests will be displayed on Biological Sciences Notice Board. Quizzes will be unannounced.

9. Makeup Policy: Makeups for quizzes, seminar or assignment will not be granted. Make-ups for Tests will be granted only in case of severe medical urgency or hospitalization.

Instructor-in-charge
BIO G542