BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE PILANI-HYDERABAD CAMPUS
FIRST SEMESTER 2020-2021
Course Handout (Part - II)

Course No. : PHA F215
Course Title : Introduction to Molecular Biology & Immunology
Instructor-in-Charge : Arti Dhar
Instructors : Arti Dhar

1. Scope and Objective of the Course:

This course deals with Basic aspects of cell and molecular biology, DNA replication, transcription, translation and control mechanisms of protein synthesis. Post transcriptional modifications, DNA-protein interactions and regulation of gene expression. Basic aspects of immune system, cell-mediated and humoral immunity.

2. **Learning Outcome**:

This course imparts knowledge of biology of cell at molecular level (cell cycle, checkpoints, and apoptosis) and central dogma (Transcription, translation, DNA and RNA polymerases) in healthy and diseased states. It also deals with general principles of immunology and immunology linked disorders.

3. Text Book :

1. G.M. Cooper and R.E. Hausman, The Cell: A Molecular approach, ASM Press, Washington, D.C.4th Edition. 2007.
2. Kuby Immunology by Owen et al., 7th Ed. Freeman press. 2013.

3. Reference Books :

1. B. Albert et al., Molecular Biology of the cell, 5th edition, Taylor & Francis Group, 2008.
2. H. Lodish et al., Molecular Cell Biology, 7th Ed., MacMillan, 2013.
3. L. Picorina, Molecular Biology of Cancer: Mechanisms, Targets and Therapeutics, 3rd Ed., Oxford University Press, 2012

4. Course Plan

Lec. No.	Learning Objectives	Topic to be covered	Chapter in text book
1-6	Introduction to molecular biology	Molecular biology of a cell and its applications. Brief outline of molecular chemistry	TB1, Ch1,2

7-9	Cells	Cellular activities, check points, programmed cell death, cell-cell interactions, molecular basis for human diseases	TB1, Ch3, 11, 12, 14
10-11	Genome	Structures of RNA, DNA	TB1 Ch4, 5, 7
12-14	DNA replication	DNA replication, repair and recombination, genetic disorders and cancer	TB1 Ch6
15-19	Cell cycle	Regulation of cell cycle, proliferation, events of meiosis, cytokines, etc,	TB1 Ch16
20-22	RNA and Protein	RNA and protein synthesis, RNA polymerases, transcription, regulation of protein function	TB1 Ch7, 8
23-24	Plasma membrane	Structure of plasma membrane, transport of small molecules, receptors	TB1 Ch13
25-27	Cell signaling	Signaling molecules, receptors and transporters, cell surface proteins, signal transduction and cytoskeleton, protein kinases, signal transduction and ocogenes	TB1 Ch15
28-29	Immune system	Cells, organs and tissues of immunity, receptors and signaling, antigen, antibody, immunoglobulin genes	TB2, Ch1-3
30-35	Innate immunity, MHC and antigen presentation	Infection barriers, phagocytosis, inflammation and adaptive immune responses, Role of MHC and expression patterns, antigen processing and presentation	TB2, Ch5, 8
36-38	Cell-based immunity	T-cell and B-cell activation, differentiation, memory, effector responses	TB2, Ch11-13
39-42	Immune disorders	Immunodeficiency diseases, autoimmune diseases, allergy and hypersensitivity reactions, etc.	TB2, Ch15-16

5. Evaluation:

Component	Duration	Weightage (%)	Date & Time	Remarks

Test 1	30 min	15	September 10-20, 2020	OB
Test 2	30 min	15	October 09-20, 2020	OB
Test 3	30 min	15	Noember 10-20, 2020	OB
Seminars, Quiz, Assignments	60 min.	20	To be announced in class	OB
Compre Exam	120 min.	35	To be announced by November 15, 2020	

6. Chamber consultation hours: To be announced in class.

7. Notices: Notices concerning the course will be displayed on the CMS online.

8. Make-Ups: Make-Ups are not given as a routine. It is solely dependent upon the GENUINENESS OF THE CIRCUMSTANCES under which a student fails to appear in a scheduled evaluation component. In such circumstances, prior permission should be obtained from the Instructor-in-Charge.

Academic Honesty and Integrity Policy: Academic honesty and integrity are to be maintained by all the students throughout the semester and no type of academic dishonesty is acceptable.

Arti Dhar

Instructor - in -Charge

PHA F215