BIRLA INSTITUTE OF TECHNOLOGY AND SCIENCE, Pilani
Pilani Campus
AUGS/ AGSR Division

SECOND SEMESTER 2019-20
COURSE HANDOUT (Part II)

Date: 07.01.2021

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. : **PHA F215**
Course Title : **Introduction to Molecular Biology**
Instructor-in-Charge : **Dr. Aniruddha Roy**

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. 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. H. Lodish et al., Molecular Cell Biology, 7th Ed., MacMillan, 2013.
2. B. Albert et al., Molecular Biology of the cell, 5th edition, Taylor & Francis Group, 2008.
3. Janeway's Immunobiology, Eighth Edition.

4. Course Plan

Lec. No.	Topic to be Covered	Learning Objectives	Ref.
1-2	Introduction to molecular biology	Molecular biology of a cell and its applications. Brief outline of molecular chemistry	TB1, Ch1,2
3-4	Genome	Structures of RNA, DNA	TB1 Ch4, 5
5-8	DNA replication	DNA replication, repair and recombination.	TB1 Ch6
9-11	RNA and Protein	RNA and protein synthesis, RNA polymerases, transcription, regulation of protein function	TB1 Ch7, 8
12-15	Protein structure and function	Structure of proteins, Protein folding, Regulating protein function, Purification and characterization of proteins.	RB1 Ch3
16-20	Molecular Biology Techniques	DNA cloning, Plasmid vectors, cDNA library, PCR and RT-PCR, Screening of cDNA library, DNA sequencing, Microarray, Different hybridization techniques, Knock out and knock down of gene.	Class note
21-23	Cell signaling	Signaling at cell surface, Cell surface receptors, Intracellular signal transduction, Second messenger, Cell signaling to control gene activity, TGFβ, JAK-STAT, Tyrosine kinase and MAP kinase pathway.	RB1 Ch13-14
24-26	Cell cycle and cell growth control	Regulation of cell cycle, Cell birth, Lineage and Death, Cancer.	TB1, Ch3, 11, 12, 14, 16

27-28	Immune system	Cells, organs and tissues of immunity, receptors and signaling, antigen, antibody, immunoglobulin genes	TB2, Ch1-3
29-33	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
34-37	Cell-based Immunity	T-cell and B-cell activation, differentiation, memory, effector responses	TB2, Ch11-13
38-40	Immune disorders	Immunodeficiency diseases, autoimmune diseases, allergy and hypersensitivity reactions, etc.	TB2, Ch15-16

5. Evaluation:

Component	Duration	Weightage (%)	Date & Time	Nature of component (Close Book/ Open Book)
Mid-Semester Test	90 Min.	30	<TEST_1>	CB
Comprehensive Examination	3 h	40	<TEST_C>	CB + OB
*Continuous Assessment		30	During semester	

*Continuous assessment will be based on theory covered in class. Topics and number will be announced in the class. It will be in terms of home assignments, tutorials, and surprise tests.

6. Grading Procedure: Grading would be done by the bunching procedure. In borderline cases subjective judgment will be used to award the grades. It is not mandatory to award all the eight grades (i.e. from A to E). Subjective judgment based on attendance for the lectures, tutorials, appearance in quiz, student's involvement in the course and performance in the class would be used in the award of grades. **The student shall not be considered as "exposed" to the course, unless he/she demonstrates appreciable skill in both the class and theory components of the course and through classroom participation.** Attending tutorial and appearing surprise quiz is very important. Students not appeared in any quiz or not submitted assignments, not appeared in any test/ comprehensive exam will not be considered exposed to the course. It is also expected that student will attend classes regularly to get proper exposure and to provide chance of evaluation of his knowledge.

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

8. Notices: Notices concerning the course will be displayed on the Pharmacy Notice Board.

9. 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.

Instructor-in -Charge

PHA F215