The Islamia University of Bahawalpur

Department of Biochemistry and Biotechnology

PhD Biotechnology

Semester I Course: Advances in Cell Biology (3+0)

Course Code:

Instructors: Dr. Muhammed Farooq Class Room: ...

Class Days: Wed- Thursday Class Time: 02:00-03:30 pm

**PURPOSE OF THE COURSE AND APPROACH TO THE SUBJECT:**

This course will focus on understanding cell biology which is fundamental to all of the biological sciences and necessary for molecular bioengineering research. This course is designed for graduate students who have successfully completed an undergraduate course in cell biology. Topics include the principles of cellular organization and function, regulation of the cell cycle, interactions between cells and cellular signaling pathways.

**TEACHING METHODOLOGY**: The class shall be conducted in a lecture and discussion environment. The instructor will deliver the lecture followed by sessions of group discussions where the students will be encouraged to critically evaluate the information under the guidance of the course instructors.

**COURSE CONTENTS**.

Week Topics

1 Introduction to cells; Prokaryotic, Eukaryotic Cell structure and function

2 Protein structure & function;

3 DNA and chromosomes, DNA replication, repair, and recombination

4 From DNA to protein: How cells read the genome

5 Control of gene expression

6 Manipulating genes and cells; Locating and analyzing Human Disease genes

7 Biomembrane Structure, Membrane transport, Intracellular compartments and transport

8 **Mid Term Examination**

9 Cell Signaling

10 Cytoskeleton

11 Cell-Division cycle and control

12 Cell division and cell death

13 Stem Cells, Cell asymmetry

14 Cancer

15 Modern Recombinant DNA Technology

16 Final Tutorial, Student presentation

17 **Final Term Examination**

**BOOKS RECOMMENDED**

1. Molecular\_Cell\_Biology\_8th\_ed\_Lodish\_et. 2016 by W. H. Freeman and Company
2. ESSENTIAL CELL BIOLOGY fourth edition, 2014 by Bruce Alberts, Dennis Bray, Karen Hopkin, Alexander Johnson, Julian Lewis, Martin Raff, Keith Roberts, and Peter Walter