DEPARTMENT OF HORTICULTURE

FACULTY OF AGRICULTURAL SCIENCES

University of the Punjab, Lahore

Programme	B.Sc. (Hons.) HORTICULTURE	Course Code	IBB-301	Credit Hours	3(2-1)
Course Title	**PRINCIPAL OF BIOCHEMISTRY AND CELL BIOLOGY**				

Course Introduction

Biochemistry and cell biology are two interconnected fields that explore the intricacies of life at the molecular and cellular level. Biochemistry delves into the chemical processes that occur within living organisms, examining the structure and function of biomolecules, metabolic pathways, and energy transformations. Cell biology, on the other hand, focuses on the intricate mechanisms and processes that govern cellular behavior, including cell signaling, growth, division, differentiation, and survival.

Learning Outcomes

On the completion of the course, the students will:

1. Understand the principles of genetic engineering and biotechnology
2. Concept of molecular biology techniques

	Course Content	Assignments/Readings
Week 1	**Unit-I** 1.1 Introduction to the science of biochemistry 1.2 Introduction to the nature of organic matter	
	1.3Introduction to the nature of organic matter	
Week 2	**Unit-II** 2.1 properties of water	
	2.2 Properties of aqueous solution	
Week 3	**Unit-III** 3.1 thermodynamic principal 3.2 Prebiotics molecules evolution	
	3.3 Origin of life	
Week 4	**Unit-IV** 4.1 Structure and function of cell organelles in	

	prokaryotic cell 4.2 Structure and function of cell organelles in eukaryotics cell	
Week 5	**Unit-V** 5.1 Organization	
	5.2 Fluidity of membrane component	
Week 6	**Unit-VI** 6.1 Organization of intracellular compartement	
	6.2 Organization of intracellular compartement	
Week 7	**Unit-VII** 7.1 protein sorting	
	7.2 protein sorting	
Week 8	**Unit-VIII** 8.1 junction between cells	
	8.2 junction between cells	
Week 9	**Unit-IX** 9.1 Intracellular vesicular traffic.	
	9.2 Intracellular vesicular traffic.	
Week 10	**Unit-X** 10.1 Mitochondria and their genome	
	10.2 Mitochondria and their genome	
Week 11	**Unit-XI** 11.1 Chloroplast and their genome	
	11.2 Chloroplast and their genome	
Week 12	**Unit-XII** 12.1 Human mitochondrial genome	
	12.2 Genetically controlled energy delivery process	

	in mitochondria	
Week 13	**Unit-XIII** 131 Energy conversion	
	13.2 Cytoskeleton ,motility and shape;composition	
Week 14	**Unit-XIV** 14.1 structural diversity of extracellular matrix	
	14.2 Cell division ;mitosis,maturation division,crossing over.	
Week 15	**Unit-XV** 15.1 formation of gametes	
	15.2 Differentiation and development;cell division	
Week 16	**Unit-XVI** 16.1 Apoptosis	
	16.2 Apoptosis	

Textbooks and Reading Material

- Voet, Donald, Judith G. Voet, and Charlotte W. Pratt. Principles of biochemistry. Vol. 4. New York: Wiley, 2008.
- Alberts, Bruce, Dennis Bray, Julian Lewis, Martin Raff, Keith Roberts, and James D. Watson. Molecular biology of the cell. Vol. 3. New York: Garland, 1994.
- Purves, William K. Life: the science of biology. Macmillan, 2001.
- Biology, N.A. Campbell, 9th Edition, 2010, benjamin/Cummings Publisher Co. Inc.
- The Philosophy and Biochemistry of Prokaryotes, David white, 4th Edition, (2011), Oxford University Press.

Teaching Learning Strategies

1. Lectures
2. Discussions
3. Presentations
4. Quiz
5. Assignments

Assignments: Types and Number with Calendar

1. Metabolic pathway project
2. Cell division lab reports

Assessment

Sr. No.	Elements	Weightage	Details
1.	Midterm Assessment	35%	Written Assessment at the mid-point of the semester.
2.	Formative Assessment	25%	Continuous assessment includes: Classroom participation, assignments, presentations, viva voce, attitude and behavior, hands-on-activities, short tests, projects, practical, reflections, readings, quizzes etc.
3.	Final Assessment	40%	Written Examination at the end of the semester. It is mostly in the form of a test, but owing to the nature of the course the teacher may assess their students based on term paper, research proposal development, field work and report writing etc.