

**Institute of Microbiology and Molecular Genetics,  
Faculty of Life Sciences  
University of the Punjab, Lahore  
Course Outline**



<b>Programme</b>	BS	<b>Course Code</b>	MMG 203	<b>Credit Hours</b>	3(2+1)
<b>Course Title</b>	<b>CELL BIOLOGY</b>				
<b>COURSE INTRODUCTION</b>					
<p>This course explores the fundamental concepts of cell biology, including cell structure, function, and communication. Emphasis is placed on the molecular mechanisms underpinning cell processes and how these contribute to the larger function of tissues and organs.</p>					
<b>LEARNING OUTCOMES</b>					
<p>On the completion of the course, the students will:</p> <ol style="list-style-type: none"> <li>1. Understand cell structure and organelles</li> <li>2. Grasp cell metabolism and energy dynamics</li> <li>3. Learn about cell communication and signaling pathways</li> <li>4. Explore cell division, growth, and development</li> </ol>					
<b>COURSE CONTENT</b>					
<p>Introduction to Cells and Cell Theory: Overview of cell types, cell theory, and historical perspectives, Cell Organelles: Structure and function of membranes, mitochondria, ER, Golgi apparatus, DNA, RNA, and Protein Synthesis: DNA structure, transcription, translation, and gene regulation, Cell Metabolism and Energy: Metabolic pathways, ATP production, photosynthesis, and respiration, Cell Communication and Signaling: Signal transduction, cellular responses, and intercellular communication, Cell Cycle and Division: Mitosis, meiosis, cell cycle regulation, and cancer biology.</p>					
<b>PRACTICALS</b>					
<p>Laboratory techniques to study cell structure using microscopy, subcellular fractionation to isolate and identify organelles, DNA extraction and visualization through gel electrophoresis, investigation of photosynthetic activity in plants under varying light conditions, signal transduction analysis in cultured cells using Western blotting or ELISA, and observation of mitosis and meiosis through slide preparation and staining.</p>					
<b>TEXTBOOKS AND READING MATERIAL</b>					
<ol style="list-style-type: none"> <li>1. Alberts, B., Johnson, A., Lewis, J., Raff, M., Roberts, K., &amp; Walter, P. (2015). <i>Molecular biology of the cell</i> (6th ed.). Garland Science. New York, United States.</li> <li>2. Alberts, B. (2013). <i>Essential Cell Biology</i>, 4th Edition, Garland Science, New York, United States.</li> <li>3. Cooper, G.M. (2019). <i>The Cell: A Molecular Approach</i>, 8th Edition, Oxford University Press, Oxford, United Kingdom.</li> </ol>					

**ASSESSMENT**

<b>Sr. No.</b>	<b>Elements</b>	<b>Weightage</b>	<b>Details</b>
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, practicals, 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, fieldwork , report writing etc.