

Programme	BS Chemistry	Course Code	ZOOL-104	Credit Hours	1
Course Title	Cell Biology (Lab)				
Course Introduction					
This course introduces the methods of working in cell biology Lab. The objectives of the course are:- 1. To explain the basic concepts of cell biology and use of lab instruments in cell biology. 2. To understand cellular structure, composition of the organelles, cell growth and cell division and types of staining.					
Learning Outcomes					
On the completion of the course, the students will: 1. ACQUIRE the basic concepts of cell biology. 2. UNDERSTAND the working in a cell biology lab to explore the structure and functional processes of cells in terms of cellular organelles, membranes, and biological molecules. 3. ABILITY to understand the role of cell components or cells in the living system. 4. FORMULATE the critical thinking skills and knowledge on cell.					
Course Content				Assignments/Readings	
Week 1	Lab 1: • Microscopy Basic Introduction				
Week 2	Lab 2: • Microscopy Applications			Familiarize working with the Microscope	
Week 3	Lab 3: • Hemocytometer Study			Understand the grids and chambers of hemocytometer and the volume each chamber holds	
Week 4	Lab 4: • Staining techniques (Gram’s staining)			Understand the importance of Gram’s Staining	
Week 5	Lab 5: • Staining techniques (H and E staining)			Read about the purpose of H and E staining	
Week 6	Lab 6: • Identification of cell organelles (prepared slides)				
Week 7	Lab 7: • Identification of cell organelles (prepared slides)			Lab Notebook (Soft or Hard form) needs to be Checked.	
Week 8	Lab 8: • RBC Count Using Hemocytometer				
Week 9	Lab 9: • RBC Count Using Hemocytometer				
Week 10	Lab 10: • WBC Count Using Hemocytometer				
Week 11	Lab 11: • Differential Leukocyte Count			Understand the function of each W.B.C in normal and diseased condition.	

Week 12	Lab 12:	
	Preparation of temporary whole mount.	
Week 13	Lab 13:	
	Preparation of permanent whole mount.	
Week 14	Lab 14:	
	Squash preparation of onion root tip for mitotic stages.	
Week 15	Lab 15:	
	Study of mitotic (prepared slides)	
Week 16	Lab 16:	
	Study of meiotic stages (prepared slides)	
Textbooks and Reading Material		
Textbooks. - Karp G, Iwasa J, Marshall W. Karp's Cell Biology, Global Edition. John Wiley & Sons; 2018. Suggested Readings - Alberts, B., Bray, D., Lewis, J., Raff, M., Roberts, K., Watson, J. D. 2017. Molecular Biology of the Cell. 6th Edition. Garland Publishing Inc., New York. - Lodish H., Berk A., Kaiser C., Krieger M., Bretscher A., Ploegh H., Martin K., Yaffe M., Amon A. 2021. Molecular Cell Biology. W. H. Freeman; 9th ed. edition (Jan. 27, 2021) 978-1319208523 - Articles in Journal of Cell Biology ISSN: 0021-9525 - Bain B.J., Bates I., Laffan M.A. 2016. Dacie and Lewis Practical Haematology. 12th Edition. ISBN: 9780702069307. Elsevier		
Teaching Learning Strategies		
- Use of Technology resources. - Use of Google Classroom management and Tools Resources - Provision of Handouts - Demonstration of the concepts using animations of cellular processes - Group activity of the students for problem solving skills		
Assignments: Types and Number with Calendar		
Lab Manual/Notebook: Due before the week of Final Term Examination		