

**Institute of Zoology  
Faculty of Life Sciences  
University of the Punjab, Lahore  
Course Outline**



<b>Programme</b>	BS Zoology	<b>Course Code</b>	ZOOL-211	<b>Credit Hours</b>	2
<b>Course Title</b>	<b>Animal Form And Function–II</b>				
<b>Course Introduction</b>					
<i>The Objectives of the courses are:</i>					
<ol style="list-style-type: none"> <li>1. To teach about animals' diversity adapted in different strategies' for performance of their similar functions through modifications in body parts in past and present times.</li> <li>2. To impart understanding of diverse strategic structural adaptations in each of the functional systems of nutrition, excretion, osmoregulation and reproduction and development for effective survival in their specific conditions.</li> <li>3. To understand the organ systems, their specialization and coordination with each other and constantly changing internal and external environment, inside and outside the animal's body.</li> <li>4. To embrace the phenomena in basic structure of each system that determines its particular function.</li> </ol>					
<b>Learning Outcomes</b>					
On the completion of the course, the students will:					
<ol style="list-style-type: none"> <li>1. Acquire the concept that for the performance of a function for example exchange of respiratory gases the different forms are adapted in the environments e.g. gills in aquatic and lungs in terrestrial environment.</li> <li>2. Understand that diverse forms adapted to perform the same functions are because of the different past and present conditions.</li> <li>3. Solve of emergence of diversity of forms for the performance of similar function.</li> <li>4. Analyze the requirements of diverse forms for the performance of similar function in their past and present needs.</li> <li>5. Evaluate the adaptations in forms for its efficiency in managing the function in differing situations in the past and present times.</li> <li>6. Demonstrate that a form is successfully adapted to perform a function adequately and successfully.</li> </ol>					
<b>Course Content</b>					<b>Assignments/Readings</b>
<b>Week 1</b>	Internal transport and circulatory systems in invertebrates				
	Characteristics of invertebrate coelomic fluid, hemolymph, and blood cells				
<b>Week 2</b>	Transport systems in vertebrates				
	Characteristics of vertebrate blood, blood cells and vessels				
<b>Week 3</b>	The hearts and circulatory systems of bony fishes				
	The hearts and circulatory systems of Amphibians, reptiles, birds and mammals				
<b>Week 4</b>	The lymphatic system				
	<b>Immunity:</b> nonspecific defenses, the immune response				
<b>Week 5</b>	<b>Gas exchange:</b> Respiratory surfaces, Invertebrate respiratory systems.				
	<b>Vertebrate respiratory systems:</b> Cutaneous exchange, Gills				

<b>Week 6</b>	<b>Vertebrate respiratory systems:</b> Lungs, Lung ventilation.	
	<b>Evolution of nutrition;</b> the metabolic fates of nutrients in heterotrophs; digestion	
<b>Week 7</b>	Animal strategies for getting and using food, diversity in digestive structures of invertebrates	
	Animal strategies for getting and using food, diversity in digestive structures of vertebrates.	
<b>Week 8</b>	<b>Homeostasis and Temperature Regulation;</b> The Impact of Temperature on Animal Life	
	<b>Homeostasis and Temperature Regulation;</b> Heat Gains and Losses	
<b>Week 9</b>	<b>Homeostasis and Temperature Regulation;</b> Some Solutions to Temperature Fluctuations; Temperature Regulation in Invertebrates	
	<b>Homeostasis and Temperature Regulation;</b> Some Solutions to Temperature Fluctuations; Temperature Regulation in Fishes, Amphibians and Reptiles	
<b>Week 10</b>	<b>Homeostasis and Temperature Regulation;</b> Some Solutions to Temperature Fluctuations; Temperature Regulation in birds	
	<b>Homeostasis and Temperature Regulation;</b> Some Solutions to Temperature Fluctuations; Temperature Regulation in mammals	
<b>Week 11</b>	Heat Production in Birds	
	Heat Production in Mammals	
<b>Week 12</b>	Control of Water and Solutes (Osmoregulation and Excretion)	
	Invertebrate Excretory system	
<b>Week 13</b>	Vertebrate Excretory Systems; How vertebrates achieve osmoregulation	
	Vertebrate kidney variations.	
<b>Week 14</b>	Asexual reproduction in invertebrates	
	Advantages and disadvantages of asexual reproduction	
<b>Week 15</b>	Sexual reproduction in invertebrates	
	Advantages and disadvantages of sexual reproduction	
<b>Week 16</b>	Sexual reproduction in vertebrates; reproductive strategies	
	Examples of reproduction among various vertebrate classes	
<b>Textbooks and Reading Material</b>		

**Text Books:**

1. Miller, S.A. and Harley, J.P., 2019. Zoology, 11<sup>th</sup> Ed. (International), Singapore: McGraw-Hill.

**Reference Books:**

1. Pechenik, J.A. 2013. Biology of Invertebrates, 4<sup>th</sup> Ed. (International), Singapore: McGraw-Hill.
2. Hickman, C.P., Roberts, L.S., Larson, A. 2004. Integrated Principles of Zoology, 11<sup>th</sup> Ed. (International), Singapore: McGraw-Hill.
3. Campbell, N.A. 2002. Biology, 6<sup>th</sup> Ed. Menlo Park, California: Benjamin/Cummings Publishing Company, Inc.
4. Kent, G.C., Miller, S. 2001. Comparative Anatomy of Vertebrates. New York: McGraw-Hill.
5. Hickman, C.P., Kats, H.L. 2000. Laboratory Studies in Integrated Principles of Zoology. Singapore: McGraw-Hill.

**Teaching Learning Strategies**

Teaching will be a combination of class lectures, class discussions, and group work. Short videos/films will be shown on occasion.

**Assignments: Types and Number with Calendar****Group Presentations:**

- The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

**Assessment**

Sr. No.	Elements	Weightage	Details
1.	Midterm Exam	35%	Written Assessment at the mid-point of the semester.
2.	Sessional Work	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 Exam	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.