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

Programme	BS Zoology	**Course Code**	**ZOOL-102**	**Credit Hours**	1
Course Title	**Lab. Animal Diversity-I**				

Course Introduction

This course provides an in-depth exploration of the diversity, structure, function, and evolutionary relationships of protozoans, parazoans, radiates, and protostome phyla. Students will study the taxonomy, morphology, physiology, ecological roles, and evolutionary significance of these groups, with a focus on comparative analysis.

Learning Outcomes

On the completion of the course, the students will:

1. Understand the distinguishing features and classification of protozoans, parazoans, radiates, and protostome phyla.
2. Explore the evolutionary relationships and phylogeny of these groups.
3. Examine the anatomical and physiological adaptations of each group.
4. Investigate the ecological roles and life histories of these organisms.
5. Develop skills in comparative analysis and scientific observation.

Course Content		**Assignments/Readings**
Week 1	Microscopic examination of protozoan specimens, Identification of key anatomical features, Observing protozoan movement and feeding , Comparative study of locomotion and feeding in different protozoans, Observing protozoan reproduction	
Week 2	Examination of sponge specimens, Observing sponge body plans and canal systems, Studying sponge feeding and filtering mechanisms	
Week 3	Comparative study of different sponge types (e.g., calcareous, glass, demosponges)	
Week 4	Examination of cnidarian and ctenophore specimens, Observing cnidarian polyp and medusa forms	
Week 5	Studying ctenophore locomotion and feeding, Comparative study of different cnidarian classes (Hydrozoa, Scyphozoa, Anthozoa), Observing cnidarian and ctenophore feeding and behavior	
Week 6	Dissection of a flatworm (e.g., planarian)	
Week 7	Comparative study of free-living and parasitic flatworms	
Week 8	Examination of nematode specimens (e.g., Ascaris, C. elegans)	
Week 9	Dissection of a mollusk (e.g., clam, squid)	
Week 10	Comparative study of different mollusk classes (Gastropoda, Bivalvia, Cephalopoda)	
Week 11	Dissection of an annelid (e.g., earthworm)	

Week 12	Observing annelid locomotion and segmentation	
Week 13	Comparative study of different annelid classes (Polychaeta, Oligochaeta, Hirudinea)	
Week 14	Examination of insect and myriapod specimens	
Week 15	Dissection of an insect (e.g., grasshopper)	
Week 16	Dissection of a crustacean (e.g., crayfish)	

Textbooks and Reading Material

1. Miller, A.S. and Harley, J. B. 1999, 2002, 2007, 2009, 2012 and 2016 Zoology, 4th , 5th, 6th, 7th, 8th 9th & 10th Edition (International), Singapore : McGraw Hill.
2. Hickman, C.P., Roberts, L.C. and Larson, A., 2018. Integrated principles of zoology, 15th Edition (International), Singapore: McGRAW-Hill.
3. Hickman, C.P., Roberts, L.C/, AND Larson, A., 2007. Integrated principles of zoology, 12th& 13th Edition (International). Singapore: McGraw-Hill.
4. Pechenik, J.A., 2015. Biology of invertebrates, 7th Edition, (International), Singapore: McGraw-Hill.
5. Kent, G. C. and Miller, S., 2001. Comparative anatomy of vertebrates New York: McGraw-Hill.
6. Campbell, N.A., 2002; Biology 6th Edition, Menlo Park, California; Benjamin Cummings Publishing Company, Inc.
7. Miller, S.A., 2002. General zoology laboratory manual. 5th Edition (International), Singapore: McGraw-Hill.
8. Hickman, C.P. and Kats, H.L., 2000. Laboratory Studies in integrated principal of zoology. Singapore: McGraw-Hill.
9. Edward E. Ruppert, Richard S. Fox, Robert D. Barnes 2003 Invertebrate Zoology: A Functional Evolutionary Approach 7th Edition Cengage Learning
10. Jan Pechenik 2015 Biology of the Invertebrates, 7th Edition McGraw Hill.

Teaching Learning Strategies

This course will be based on following outcomes:

Learning Objectives:

1. Acquire the basic concepts of invertebrates with explanation of evolutionary origin and diversification.
2. Understand invertebrate organismal concepts in laboratory and field.
3. Demonstrate major evolutionary innovations for invertebrates with functional importance.
4. Understand how reproduction and development occurred and able to breed animal in the laboratory/field
5. Analyze economic and ecological importance of invertebrates.

Teaching Strategies:

1. Interactive Lectures:

Objective: Provide foundational knowledge on the taxonomy, morphology, physiology, and evolution of Protozoans, Parazoa, Radiata, and Protostome Phyla

Strategy:

- Use multimedia presentations (slides, videos, animations) to illustrate concepts.
- Incorporate real-life examples and case studies to enhance understanding.
- Encourage active participation through question-and-answer sessions and small group discussions.

2. Laboratory Sessions:

Objective: Develop hands-on skills in identifying and analyzing anatomical structures and physiological processes.

Assignments: Types and Number with Calendar

Group Presentations:
Objective: Foster collaboration and deeper understanding through research and peer teaching.
Strategy:

- Assign group projects on specific topics such as evolutionary relationships, ecological roles, or conservation issues.
- Require groups to prepare and deliver presentations, promoting peer learning.
- Incorporate peer assessment and feedback to improve learning outcomes and presentation skills.

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.