



TEACHING PLAN: Life and Diversity of Annelida to Hemichordata

SCHOOL: SCHOOL OF BASIC & APPLIED SCIENCES (SOBAS), RAFFLES UNIVERSITY			
ACADEMIC SESSION: 2022 – 2025		FOR STUDENT’S BATCH: B.Sc. (CBZ) I Year (II-Semester)	
1	Course No.	ZOO - 102	
2	Course Title	Life and Diversity of Annelida to Hemichordata	
	Credits	3	
4	Learning Hours	Contact Hours	38
		Assessment	22
		Guided Study	30
		Total hours	90
3 lectures per week			

5	Course Objective	<ol style="list-style-type: none"> 1. Understand the general characters of Annelida and classify them up to the order level. 2. Explore the biodiversity of Annelida and recognize their economic importance. 3. Conduct a type study on Pheretima (Earthworm) to comprehend its anatomy and ecological role. 4. Investigate the concept of metamerism in Annelida and its significance in the overall organization of the body. 5. Examine the Trochophore larva in Annelida, exploring its affinities and evolutionary significance. 6. Study the general characters of Arthropoda and classify them up to the order level. 7. Investigate the biodiversity of insects within Arthropoda and understand their economic importance. 8. Conduct a type study on Periplaneta to gain insights into the anatomy and behavior of this insect. 9. Examine the general characters of Mollusca and classify them up to the order level. 10. Explore the biodiversity of Mollusca and recognize their economic importance. 11. Conduct a type study on Pila to understand the anatomy and ecological role of this mollusk. 12. Investigate the processes of torsion and detorsion in gastropods and their implications. 13. Examine the respiratory and locomotor adaptations in Mollusca, with a focus on the foot. 14. Study the general characters of Echinodermata and classify them up to the order level. 15. Explore the biodiversity of Echinodermata and recognize their economic importance.
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		<p>16. Conduct a type study on Asteries (Sea Star) to understand the anatomy and behavior of this echinoderm.</p> <p>17. Investigate the different larval forms in Echinodermata, understanding their developmental significance.</p> <p>18. Examine Aristotle's Lantern, a unique feeding structure found in some echinoids.</p> <p>19. Explore the general characters of Hemichordata and classify them, with a specific focus on Balanoglossus.</p> <p>20. - Understand the unique characteristics of Balanoglossus and its role as a representative species in Hemichordata.</p>
6	Course Outcomes	<p>1. Demonstrate a comprehensive understanding of the general characters and classification of Annelida, extending up to the order level.</p> <p>2. Analyze the biodiversity of Annelida and articulate their economic importance in various ecological contexts.</p> <p>3. Conduct a detailed type study on Pheretima (Earthworm), showcasing proficiency in anatomical analysis and ecological roles.</p> <p>4. Explore and explain the concept of metamerism in Annelida, emphasizing its organizational significance in the body structure.</p> <p>5. Investigate the Trochophore larva in Annelida, interpreting its affinities and elucidating its evolutionary significance.</p> <p>6. Demonstrate knowledge of the general characters and classification of Arthropoda, extending up to the order level, and apply this understanding to practical contexts such as the type study on Periplaneta.</p>

7.	Outline syllabus:				
7.01	Paper Code	Unit	Introduction	Reference number	Teaching methods
	Paper Code: ZOO-102	I	<p>Phylum – Annelida</p> <p>1. General characters and classification up to order level</p> <p>2. Biodiversity and economic importance of Annelida</p> <p>3. Type study - Pheretima (Earthworm)</p> <p>4. Metamerism in Annelida</p> <p>5. Trochophore larva: Affinities, evolutionary significance</p>		Providing them notes, elucidating all processes and mechanisms on a whiteboard, and conveying information through presentations (PPT) and videos.
		II	<p>Phylum - Arthropoda</p> <p>1. General characters and classification up to order level</p> <p>2. Biodiversity and economic importance of insects</p> <p>3. Type study – Periplaneta</p>		-----do-----
		III	<p>Phylum – Mollusca</p> <p>1. General characters and classification up to order level</p> <p>2. Biodiversity and economic importance</p> <p>3. Type study - Pila</p>		-----do-----

			4. Torsion and detorsion in gastropoda 5. Respiration and foot		
		IV	Phylum - Echinodermata 1. General characters and classification up to order level 2. Biodiversity and economic importance 3. Type Study -Asteries (Sea Star) 4. Echinoderm larvae 5. Aristotle's Lantern Phylum – Hemichordata 1. General characters and classification, Type study: Balanoglossus		-----do-----
8.	Course Evaluation				
8.1	CA: 20%				
8.2	Attendance	5			
8.3	Homework	-			
8.4	Quizzes	5			
8.5	Projects	-			
8.6	Presentation	10			
8.7	Any other	-			
8.2	MTE	20%			
8.3	End-term examination	60%			
9.	Textbooks & References				
9.1	Textbook	-			
9.2	References	Barnes, R. S. K., Calow, P. P., Olive, P. J., Golding, D. W., & Spicer, J. I. (2009). The invertebrates: a synthesis. John Wiley & Sons. Moore, J. (2001). An introduction to the invertebrates. Cambridge University Press. Buchsbaum, R., Buchsbaum, M., Pearse, J., & Pearse, V. (2013). Animals without backbones: an introduction to the invertebrates. University of Chicago Press.			
9.3	Video References	https://youtu.be/q2k66JG4fl0?si=LiM_U5N5IV1YIJZX https://youtu.be/vyaOLS8R5cE?si=pRoQ-rjV3o-bf9BO https://youtu.be/HBSyimETHlo?si=EN9WAfzsTvKZ__qg			

Practical's: Zoology Lab – II

(6 labs per week)

Outcome	UNIT 1	UNIT 2	UNIT 3	UNIT 4	Phylum - Hemichordata
1	→	→			
2	→	→	→	→	
3	→				
4	→				
5	→				
6		→			

Question Bank

1. What are the general characters and classifications of Annelida up to the order level?
2. Explain the biodiversity of Annelida and its economic importance in various ecological contexts.
3. What is the focus of a detailed type study on Pheretima (Earthworm)?
4. How does metamerism manifest in Annelida, and what is its organizational significance in the body structure?
5. Investigate the Trochophore larva in Annelida, discussing its affinities and evolutionary significance.
6. Provide a comprehensive understanding of the general characters and classifications of Arthropoda up to the order level.
7. Analyze the biodiversity and economic importance of insects within the phylum Arthropoda.
8. What is the main objective of a type study on Periplaneta?
9. Outline the general characters and classifications of Mollusca up to the order level.
10. Discuss the biodiversity and economic importance of Mollusca.
11. What aspects are covered in a type study on Pila within the phylum Mollusca?
12. Explain torsion and detorsion in gastropods and their significance.
13. Elaborate on the respiratory and foot functions in Mollusca.
14. Provide an overview of the general characters and classifications of Echinodermata up to the order level.
15. Analyze the biodiversity and economic importance of Echinodermata.
16. What is the main focus of a type study on Asterias (Sea Star) within the phylum Echinodermata?
17. Describe the characteristics of Echinoderm larvae.
18. Explain Aristotle's Lantern and its significance in Echinodermata.
19. Outline the general characters and classifications of Hemichordata and provide an example type study (Balanoglossus).
20. How do Annelida and Arthropoda demonstrate metamerism differently?
21. Compare the economic importance of Annelida and Arthropoda in ecological contexts.
22. Discuss the evolutionary significance of the Trochophore larva in Annelida.
23. What is the significance of torsion and detorsion in gastropods within the phylum Mollusca?
24. Explain the economic importance of Echinodermata in various ecological contexts.
25. Compare the characteristics of Echinoderm larvae and Trochophore larvae.

PROJECTS (To be given to group of students)

1. Annelida Biodiversity Survey:

Conduct a comprehensive survey to document the biodiversity of Annelida in a selected ecological area. Classify and identify different annelid species, extending up to the order level. Analyze the ecological roles and economic importance of the identified species within their respective habitats.

2. Earthworm Farming and Sustainable Agriculture:

Develop a project focusing on sustainable agriculture by studying the ecological roles of earthworms (*Pheretima*). Explore the use of earthworms in organic farming, composting, and soil enrichment. Demonstrate the economic and environmental benefits of incorporating earthworms into agricultural practices.

3. Arthropoda Diversity in Urban Environments:

Investigate the diversity of Arthropoda in urban settings. Classify and identify arthropod species up to the order level, emphasizing those commonly found in urban areas. Assess the ecological roles and potential economic impacts of these arthropods on urban ecosystems.

4. Mollusca Conservation Project:

Design a conservation project focused on Mollusca, targeting a specific mollusk species or group identified in the biodiversity and economic importance analysis. Develop strategies for habitat preservation, population monitoring, and public awareness to contribute to the conservation of mollusk species.

5. Echinodermata Educational Outreach Program:

Create an educational outreach program to raise awareness about Echinodermata in local communities. Develop informative materials, such as brochures, presentations, and videos, highlighting the general characteristics, biodiversity, and economic importance of Echinodermata. Organize workshops and events to engage the community in learning about these marine organisms.