SEMESTER I

	University of Kerala				
Discipline	**ZOOLOGY**				
Course Code	**UK1DSCZOO101**				
Course Title	**Non-Chordate Diversity - Part I**				
Type of Course	**DSC**				
Semester	I				
Academic Level	100-199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 hours	0	2 hours	5
Pre-requisites	Pass in class XII				
Course Summary	This course provides the students with an in-depth knowledge of the diversity in form, structure and habits of acoelomata to pseudocoelomata. By the end of the course, the students shall get a comprehensive understanding of the diversity, biology, and ecological significance of invertebrate animals and the students shall achieve an appreciation for their crucial role in the natural world.				

Detailed Syllabus

Module	Unit	Content	45 hrs
I	**Introduction to Zoology**		**5**
	1.1	Taxonomy, nomenclature, principles of nomenclature, International Code of Zoological Nomenclature (ICZN), uni, bi and trinomialism	3
	1.2	Five kingdom classification, Three domain system, Super- group model of eukaryotes, tree of life approach in animal classification (Brief account)	2
II	**Protista, Parazoa and Metazoa**		**10**

	2.1	Levels of organization- cellular, tissue, organ and organ system. Radiata, Bilateria, Acoelomata, Pseudocoelomata, Eucoelomata, Protostomia, Deuterostomia.	2
	2.2	General characters of Protista, Parazoa and Metazoa	2
	2.3	Zoological importance and systematic position of Noctiluca, Paramecium and Trichonympha.	2
	2.4	Parasitic protozoans- Morphology, life cycle, pathogenicity and prophylaxis of *Plasmodium vivax* and *Trypanosoma gambiense.*	4
III	**Porifera**		**8**
	3.1	General Characteristics and classification (up to classes)	1
	3.2	Calcispongia: eg. Sycon; Hydrospongia: eg. Euplectella: Demospongia, eg. Spongilla.	4
	3.3	General topic: Canal system in sponges	3
IV	**Cnidaria and Ctenophora**		**9**
	4.1	General characteristics and classification (up to classes)	1
	4.2	Hydrozoa eg. Obelia, Physalia; Scyphozoa: eg. Aurelia; Anthozoa: eg. Sea anemone	3
	4.3	General topic: Polymorphism in Cnidarians; Corals - different types, Coral reefs	3
	4.4	General characteristics and Evolutionary significance of Ctenophora, Plurobranchia (Brief account).	2
V	**Platyhelminthes and Nemathelminthes**		**13**
	5.1	General characteristics and classification (up to classes) of Platyhelminthes	1
	5.2	Turbellaria: eg. Planaria, Trematoda: eg. Fasciola, Cestoda : eg. *Taenia solium*. General topic: Life cycle and pathogenicity of *Fasciola hepatica* and *Taenia solium*	7
	5.3	General characteristics of Nemathelminthes: *Caenorhabdites elegans* (Brief account), General topic: Human nematode parasites (*Ascaris*, *Enterobius*, *Ancylostoma*, *Wuchereria* and *Trichinella*)	5

References

1. Barnes, R.D. (1987): Invertebrate Zoology. W: B. Sunders. New Delhi.
2. Barnes, R.S.K., Calow, P., Olive, P. J. W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
3. Barrington E.J.W. (1967). Invertebrate Structure and Function. ELBS and Nelson, London.

4. Brusca, R.C, Giribet G, and Moore W (2023). Invertebrates (fourth edition). Sinauer Associates, Sunderland, M.A. Oxford University Press, USA.
5. Burki F, Roger AJ, Brown MW, Simpson AGB (January 2020). "The New Tree of Eukaryotes". Trends Ecol Evol. 35 (1): 43–55.
6. Dhami. P.S and Dhami, J. K. (1979). Invertebrate zoology. R. Chand & Co. New Delhi.
7. Ekambaranatha Ayyar M. (1990). A Manual of Zoology. Invertebrata- Part1 & PartII. S. Viswanathan Printers and Publishers. Pvt. Ltd.
8. International Edition.
9. Jordan, EL and Verma, P.S. (2000). Invertebrate Zoology. S. Chand and Co Ltd. New Delhi.
10. Kotpal, R.I, Agarwal, S.K. and R.P. Khetarpal. (2002). Modern text book of Zoology, Invertebrates.
11. Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders
12. Whittaker, R.H. (1969). "New concepts of kingdoms or organisms. Evolutionary relations are better represented by new classifications than by the traditional two kingdoms". Science. 163 (3863): 150–60.
13. Woese CR, Kandler O, Wheelis ML (June 1990). "Towards a natural system of organisms: proposal for the domains Archaea, Bacteria, and Eucarya". Proceedings of the National Academy of Sciences of the United States of America. 87 (12): 4576–9

Web Resources

1. https://eol.org
2. http://www.tolweb.org
3. https://www.marinebio.org/creatures/marine-invertebrates
4. https://www.montereybayaquarium.org/animals/animals

Practicum (30 hrs)

Sl No.	Contents
1	Examination of pond water collected from different places for diversity in Protista
2	Demonstration of ciliary movement in Paramecium
3	Study of Sycon, Hyalonema, Euplectella, Spongilla
4	Study of Obelia, Physalia, Hydra, Millepora, Aurelia, Tubipora, Gorgonia, Pennatula, Fungia, Meandrina, Madrepora
5	Study of *Fasciola hepatica*, *Taenia solium* and their life cycles
6	Study of *Ascaris lumbricoides* and its life stages
7	Study of parasitic protists
8	Submit a report on invertebrate diversity after visiting a forest/marine/ freshwater/ wetland ecosystem

References

1. Barnes, R.S.K., Calow, P., Olive, P. J. W., Golding, D.W. and Spicer, J.I. (2002). The Invertebrates: A New Synthesis, III Edition, Blackwell Science
2. Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition, E.L.B.S. and Nelson
3. Boradale, L.A. and Potts, E.A. (1961). Invertebrates: A Manual for the use of Students. Asia Publishing Home
4. Brusca, R.C, Giribet G, and Moore W (2023). Invertebrates (fourth edition). Sinauer Associates, Sunderland, M.A. Oxford University Press, USA.
5. Dhami. P.S and Dhami, J. K. (1979). Invertebrate zoology. R. Chand & Co. New Delhi.
6. Ekambaranatha Ayyar M. (1990). A Manual of Zoology. Invertebrata- Part1 & PartII. S. Viswanathan Printers and Publishers. Pvt. Ltd.
7. Henry Sherring Pratt (2015). A Course in Invertebrate Zoology: A Guide to the Dissection and Comparative Study of Invertebrate Animals. Palala Press
8. Jordan, EL and Verma, P.S. (2000). Invertebrate Zoology. S. Chand and Co Ltd. New Delhi.
9. Ruppert and Barnes, R.D. (2006). Invertebrate Zoology, VIII Edition. Holt Saunders International Edition.

Course Outcomes

No.	Upon completion of the course the graduate will be able to	Cognitive Level	PSO addressed
CO-1	Understand the basics of taxonomy and new methods of classification	U	PSO-1,3
CO-2	Understand the diagnostic characters of different phyla through brief studies of examples.	R, U	PSO-1, 3
CO-3	Obtain an overview of polymorphic form, evolutionary significant and parasitic invertebrate especially acelomata to pseudocelomata	R, U	PSO-1, 4
CO-4	Apply identification skill, to observe and categorise organism	Ap	PSO-6
CO-5	Understand the faunal diversity of various ecosystems	Ap	PSO-6

R-Remember, U-Understand, Ap-Apply, An-Analyse, E-Evaluate, C-Create

Name of the Course: Non-Chordate diversity - Part 1
Credits: 3:0:1 (Lecture: Tutorial: Practical)

CO No.	CO	PO/PSO	Cognitive Level	Knowledge Category	Lecture (L)/Tutorial (T)	Practical (P)
CO-1	Understand the basics of taxonomy and new methods of classification	PO2 PSO-1, 3	U	F	**L**	
CO-2	Understand the diagnostic characters of different phyla	PO-2, 3 PSO -1, 3	R, U	F,C	**L**	

	through brief studies of examples.					
CO-3	Obtain an overview of polymorphic form, evolutionary significant and parasitic invertebrate especially acoelomata to pseudocoelomata	PO6 PSO -1, 4	R, U	F,C	**L**	
CO-4	Apply field identification skill to categorise organism	PO6 PSO -6	Ap	F,C,P		**P**
CO-5	Understand the faunal diversity of various ecosystems	PO-2 PSO -6	Ap	F,C,P		**P**

F-Factual, C- Conceptual, P-Procedural, M-Metacognitive

Mapping of COs with PSOs and POs

	PSO1	**PSO 2**	**PSO 3**	**PSO 4**	**PSO 5**	**PSO 6**	**PSO 7**	**PSO 8**	**PO 1**	**PO2**	**PO 3**	**PO 4**	**PO5**	**PO 6**
CO 1	3	-	3	-	-	-	-	-	-	2	-	-	-	-
CO 2	3	-	2	-	-	-	-	-	-	2	2	-	-	-
CO 3	3	-	-	2	-	-	-	-	-	-	-	-	-	3
CO 4	-	-	-	-	-	3	-	-	-	-	-	-	-	2
CO 5	-	-	-	-	-	3	-	-	-	-	-	-	-	2

Correlation Levels:

Level	Correlation
-	Nil
1	Slightly / Low
2	Moderate / Medium
3	Substantial / High

Assessment Rubrics:

Assignment/ Seminar topics

1. Students shall collect any five invertebrates and add a brief note and then submit for evaluation
2. Invertebrates and human health
3. Parasitic adaptation of Nematodes
4. Polymorphism in Cnidarians
5. Life cycle of *Plasmodium vivax*

Continuous Comprehensive Assessment

1. Assignments
2. Seminars
3. Submission of activity report
4. Test
5. Quiz/Debate

End Semester Evaluation

1. Multiple Choice Questions
2. Very Short Answer Questions
3. Short Answer questions
4. Essay Type questions

Mapping of COs to Assessment Rubrics

	Internal Exam	Assignment	Project Evaluation	End Semester Examinations
CO 1	✓	✓		✓
CO 2	✓	✓		✓
CO 3	✓	✓		✓
CO 4		✓		✓
CO 5		✓		✓