



## University of Kerala

Discipline	<b>ZOOLOGY</b>				
Course Code	<b>UK1DSCZOO102</b>				
Course Title	<b>Diversity of Non- Chordates</b>				
Type of Course	<b>DSC</b>				
Semester	I				
Academic Level	100 – 199				
Course Details	Credit	Lecture per week	Tutorial per week	Practical per week	Total Hours/Week
	4	3 hours	-	2 hours	5
Pre-requisites	Pass in class XII				
Course Summary	This course offers students a comprehensive understanding of the varied forms, structures, and behaviours exhibited by invertebrate animals. Through exploration of the major groups of invertebrates, including arthropods, which dominate the planet's animal species, students gain insights into biodiversity. Moreover, the course equips the learners with the necessary tools to describe and appreciate biodiversity.				

### Detailed Syllabus

Module	Unit	Content	45 hrs
I	<b>Protista and Animalia</b>		
	1.1	<b>Introduction:</b> Classification of organisms- two kingdom system, three kingdom system, four kingdom system and five kingdom system.	2
	1.2	<b>Kingdom- Protista-</b> General features and classification: Examples- Noctiluca, Trichonympha and Paramecium <b>Morphology, life history, pathogenicity and prophylaxis of Plasmodium vivax</b>	3
	1.3	<b>Kingdom Animalia:</b> Salient features. Levels of organization- cellular, tissue, organ and organ system. Radiata, Bilateria, Acoelomata, Pseudocoelomata, Eucoelomata, Protostomia, Deuterostomia. Branches- Mesozoa, Parazoa and Eumetazoa. Body segmentation- metamerism and pseudo metamerism.	4
II	<b>Porifera, Cnidaria and Platyhelminthes</b>		
	2.1	<b>Phylum Porifera:</b> General characters, Classification up to classes- Sycon, Euplectella, Spongilla	2

	2.2	<b>Phylum Cnidaria:</b> General characters, Classification up to classes. Examples - Obelia, Aurelia, Sea anemone and Physalia. Mention polymorphism and larval stages.	3
	2.3	<b>Phylum Platyhelminthes:</b> General characters, Classification up to classes- Examples - Bipalium, Fasciola and <i>Taenia solium</i> . (Life cycle of <i>Taenia solium</i> )	4
III	<b>Nemathelminthes and Annelida</b>		<b>6</b>
	3.1	<b>Phylum Nemathelminthes:</b> General characters, Ascaris and Trichinella. General Topic - Human nematode parasites ( <i>Ascaris</i> , <i>Enterobius</i> , <i>Ancylostoma</i> , <i>Wuchereria</i> and <i>Trichinella</i> )	3
	3.2	<b>Phylum Annelida:</b> General characters, Hirudinaria, Nereis (mention parapodium, heteronereis.) and Earthworm (mention setae;vermiculture)	3
IV	<b>Arthropoda and Mollusca</b>		<b>12</b>
	4.1	<b>Phylum Arthropoda:</b> General characters, Prawn (Morphology, Nervous system, Larval stages), Cockroach (external characters, mouth parts, digestive system); Limulus, Scorpion, Sacculina and Spirostreptus Mosquitoes - Anopheles, Culex and Aedes and pathogenicity of mosquitoes.	7
	4.2	<b>Phylum Mollusca:</b> General characters, Pearl oyster, Pila and Sepia General topic: Economic importance of mollusca	5
V	<b>Onychophora and Echinodermata</b>		<b>9</b>
	5.1	<b>Phylum Onychophora:</b> General characters, eg. Peripatus- evolutionary significance.	4
	5.2	<b>Phylum Echinodermata:</b> General characters, Star fish, Sea urchin and Sea cucumber. Mention larval stages.	5

## References

1. Barnes, R.D. (1987). Invertebrate Zoology. W: B. Saunders. New Delhi.
2. Barnes, R.S.K., Calow, P., Olive, P. J. W., Golding, D.W. and Spicer, J.I. (2002). The
3. Ekambaranatha Ayyar M. (1990). A Manual of Zoology. Vol. Invertebrates- Part1 &
  - a. Invertebrates: A New Synthesis, III Edition, Blackwell Science
4. Jordan, EL and Verma, P.S. (2000). Invertebrate Zoology. S. Chand and Co Ltd. New Delhi
5. Kotpal, R. L. (2005). Modern text book of Zoology Invertebrates (Animal Diversity-I). Rastogi Publications pp 795-831.
  - a. Part II. S. Viswanathan Printers and Publishers. Pvt. Ltd.
6. Rastogi V. B. (2015). Invertebrate Zoology. Publisher- Kedar Nath Ram Nath.

### Practicum (30 hrs)

<b>Sl No.</b>	<b>Contents</b>
1	Protista: Noctiluca, Paramecium, Entamoeba (spotters)
2	Porifera: Sycon (spotters)
3	Cnidaria: Obelia, Physalia, Sea anemone(spotters)
4	Platyhelminthes: Fasciola, <i>Taenia solium</i> (spotters)
5	Nematoda: Ascaris, Ancylostoma (spotters)
6	Annelida: Nereis, Hirudinaria(spotters)
7	Arthropoda: Limulus, Scorpion, Sacculina (spotters)
8	Mollusca: Pearl Oyster, Sepia (spotters)
9	Echinodermata: Starfish, Sea urchin, Sea cucumber(spotters)
10	Examination of pond water collected from different places for diversity in protists
11	Submit a report on 5 invertebrate animals from various phyla after visiting Campus/Ecosystem
12	Mount the mouth parts of Cockroach / Honey bee/ mosquito (any one)
13	Mounting of Earthworm setae/ Nereis parapodium
14	Dissection of nervous system of prawn/ Digestive system of Cockroach (any one)

#### **References**

- Verma, P. S. (2015). A Manual of Practical Zoology Invertebrates. S. Chand & Company Pvt. Ltd. Ram Nagar, New Delhi-110055.
- Yadav, V., Yadav, P. Varshney, V. K., Varshney, V. C. (2015). Text Book of Practical Zoology-I. Publisher- Kedar Nath Ram Nath Meerut.

#### **Course Outcomes**

<b>No.</b>	<b>Upon completion of the course the graduate will be able to</b>	<b>Cognitive Level</b>	<b>PSO addressed</b>
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 examples.	R, U	PSO-1, 3

CO-3	Obtain an overview of general characters of Nemathelminthes and their parasitic adaptation	R, U	PSO-1, 3
CO-4	Develop skill to identify and categorise organism	Ap	PSO-6
CO-5	Gain knowledge about the life cycle of human parasites	R, U, Ap	PSO- 1,2

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

**Name of the Course: Diversity of Non-Chordates**

**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	PO - 1,2,3,4 PSO-1, 3	U	F	L	
CO-2	Understand the diagnostic characters of different phyla through brief studies of examples.	PO - 1,2,3,4 PSO-1, 3	R, U	F, C	L	
CO-3	To obtain an overview of general characters of Nemathelminthes and their parasitic Adaptation	PO - 1,2,3,4 PSO-1, 3	R, U	E, C	L	
CO-4	Apply field identification skill to categorise organism	PO - 1,2 PSO- 1,6	Ap	F, C, P		P
CO-5	Gain Knowledge about the life history of human parasites	PO - 2,3,4 PSO -1,2	U, Ap	F, C	L	

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

### Mapping of COs with PSOs and POs

	<b>PS O1</b>	<b>PS O2</b>	<b>PS O3</b>	<b>PSO 4</b>	<b>PSO 5</b>	<b>PS O6</b>	<b>PS O7</b>	<b>PO 1</b>	<b>PO 2</b>	<b>PO 3</b>	<b>PO 4</b>	<b>PO 5</b>	<b>PO 6</b>	<b>PO 7</b>	<b>PO8</b>
<b>CO 1</b>	3	-	2	-	-	-	-	3	2	2	3	-	-	-	-
<b>CO 2</b>	3	-	2	-	-	-	-	2	1	2	3	-	-	-	-
<b>CO 3</b>	3	-	3	-	-	-	-	3	3	2	3	-	-	-	-
<b>CO 4</b>	2	-	3	-	-	3	-	2	3	-	-	-	-	-	2
<b>CO 5</b>	2	2	-	-	-	-	-	-	-	3	2	2	-	-	-

#### Correlation Levels:

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

**Assessment Rubrics:****Assignment/ Seminar topics**

1. Human Nematode parasites
2. Economic importance of molluscs
3. Different types and pathogenicity of mosquitoes.
4. Life cycle of *Taenia solium*
5. Peripatus and its evolutionary significance

**Continuous Comprehensive Assessment**

1. Assignments
2. Seminars
3. Test
4. Model preparation

**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		✓		✓