

**FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)**  
**DEPARTMENT OF ZOOLOGY**  
**COURSE CURRICULUM**

<b>PART- A: Introduction</b>			
<b>Program: Bachelor in Life Science</b> (Diploma / Degree/ Honors)		<b>Semester - III</b>	<b>Session: 2024-2025</b>
1	Course Code	ZOSC-03T	
2	Course Title	Diversity of Invertebrates	
3	Course Type	Discipline Specific Course	
4	Pre-requisite (if, any)	<i>As per Program</i>	
5	Course Learning Outcomes (CLO)	<p>After successfully completing this course, the students will be able to -</p> <ul style="list-style-type: none"> <li>➤ Develop understanding on Invertebrate Animals on the basis of classification and Nomenclature.</li> <li>➤ Develop understanding how simple/unicellular animals changed into multicellular and diploblastic forms through their anatomy and physiology.</li> <li>➤ Gain Knowledge of key processes like formation of triploblastic animals (simple to complex form of body plan).</li> <li>➤ Develop understanding on parasitic adaptations and life cycle of Helminthes.</li> <li>➤ Develop understanding on the diversity in Artropoda, Mollusca and Echinodermata.</li> </ul>	
6	Credit Value	3 Credits	<i>Credit = 15 Hours - learning &amp; Observation</i>
7	Total Marks	Max. Marks: 100	Min Passing Marks: 40
<b>PART -B: Content of the Course</b>			
Total No. of Teaching-learning Periods (01 Hr. per period) - 45 Periods (45 Hours)			
Unit	Topics (Course contents)		No. of Period
I	General Characters, Classification up to order and Type Study of Phylum Protozoa and Porifera with some special features: Protozoa: General Characters and Classification of Phylum Protozoa up to order. Type study: Paramoecium, Protozoa and Disease. Porifera: General Characters and Classification of Phylum Porifera up to order. Type study: Sycon.		11
II	General Characters, Classification and Type Study of Phylum Coelenterata, Helminthes and Annelida: Coelenterata - General Characters and Classification of Phylum Coelenterata up to order. Type Study: Obelia. Helminthes - Classification of Phylum Helminthes up to order. Type study: Fasciola. Annelida- Classification of Phylum Annelida up to order. Type study: Pheretima (Earthworm).		11
III	General Characters, Classification and Type Study of Phylum Arthropoda and Mollusca: Arthropoda - General Characters and Classification of Phylum Arthropoda up to order. Type study: Prawn. Mollusc- General Characters and Classification of Phylum Mollusca up to order. Type study: Pila.		12
IV	General Characters, Classification and Type Study of Phylum Echinodermata and Hemichordata: General Characters and Classification of Phylum Echinodermata up to order. Type Study: Asterias (Starfish). General Characters and Classification of Phylum Hemichordata Type Study: Balanoglossus		11
Keywords	Taxonomy, Nomenclature, Canal System, Protozoa, Balanoglossus, Torsion		
Signature of Convener & Members (CBoS) :			

## PART-C: Learning Resources

### Text Books, Reference Books and Others

#### Text Books Recommended –

- R.L. Kotpal, Modern Textbook of Zoology Invertebrates. Rastogi Publication, Gangotri, Shivaji Road, Meerut
- V.K. Tiwari, Unified Zoology, Shival Agrawal and Company, Pustak Prakashak, Khajuri Bazar, Indore.
- Dr. S.M. Saxsen, Zoology, Ist Year, by a, Ram Prasad and Sons, Agra and Bhopal.
- N. Arumugam, M.G. Ragnathan, T. Murugan, B. Ramnathan, A Textbook of Invertebrates by Saras Publication

#### Reference Books Recommended –

- Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition. E.L.B.S. and Nelson.
- Boradale, L.A. and Potts, E.A.(1961) Invertebrates: A Manual for the use of Students. Asia Publishing Home.
- Bushbaum, R. (1964). Animals without Backbones. University of Chicago Press.
- Hyman, L.H. (1940-67). The Invertebrates, Vol. I-VI. McGraw-Hill, New York.
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#### Online Resources–

- [http://ndl.iitkgp.ac.in/he document/inflibnet eggp/inflibnet eggp/IN I e P P 1 Z 512 96 P 0 B o p 51542 M 1 M L c P D a P o E P 1 51562 51563?e=9|\\*||](http://ndl.iitkgp.ac.in/he%20document/inflibnet%20eggp/inflibnet%20eggp/IN%20I%20e%20P%20P%201%20Z%20512%2096%20P%200%20B%20o%20p%2051542%20M%201%20M%20L%20c%20P%20D%20a%20P%20o%20E%20P%201%2051562%2051563?e=9|*||)

## PART -D: Assessment and Evaluation

### Suggested Continuous Evaluation Methods:

Maximum Marks: 100 Marks

Continuous Internal Assessment (CIA): 30 Marks

End Semester Exam (ESE): 70 Marks

<b>Continuous Internal Assessment (CIA):</b> (By Course Teacher)	Internal Test / Quiz-(2): 20 +20	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against 30 Marks
	Assignment / Seminar - 10	
	Total Marks - 30	
<b>End Semester Exam (ESE):</b>	<b>Two section – A &amp; B</b> Section A: Q1. Objective – 10 x1= 10 Mark; Q2. Short answer type- 5x4 =20 Marks Section B: Descriptive answer type qts., 1out of 2 from each unit-4x10=40 Marks	

Name and Signature of Convener & Members of CBoS:











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<b>PART- A: Introduction</b>			
<b>Program: Bachelor in life Science</b> <i>(Diploma / Degree/ Honors)</i>		<b>Semester - III</b>	<b>Session: 2024-2025</b>
1	Course Code	ZOSC-03P	
2	Course Title	Diversity of Invertebrates	
3	Course Type	Discipline Specific Lab Course	
4	Pre-requisite (if, any)	<i>As per Program</i>	
5	Course Learning Outcomes (CLO)	<p>After successfully completing lab course the students will be able to-</p> <ul style="list-style-type: none"> <li>➤ Develop understanding on the diversity of life with regard nonchordates.</li> <li>➤ Gain Knowledge of grouping of animals on the basis of their morphological characteristics.</li> <li>➤ Develop critical understanding how animals have changed from simple form to complex body plan.</li> <li>➤ Acquired the detailed knowledge to think and interpret different animal species individually.</li> </ul>	
6	Credit Value	1 Credits	<i>Credit =30 Hours Laboratory or Field learning/Training</i>
7	Total Marks	Max. Marks: 50	Min Passing Marks: 20
<b>PART -B: Content of the Course</b>			
Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)			
Module	Topics (Course contents)		No. of Period
Lab./Field Training/ Experiment Contents of Course	<p style="text-align: center;"><b>List of labs to be conducted</b></p> <ul style="list-style-type: none"> <li>• Study of different non-chordate taxa animals through models, slides and museum specimens in the laboratory. Emphasising classification, biogeography and diagnostic features of: Protozoa, Porifera, Coelenterata (also with special reference to Corals of Cnidarians), Helminthes, Annelida, Arthropoda, Mollusca and Echinodermata.</li> <li>• Histological slides of different Non chordate Taxa, slides of various larval forms of Helminthes, Crustacea and Echinodermata</li> <li>• <b>Dissection</b> of <i>Pheretima</i> to expose Alimentary canal and circum pharyngeal ganglia through Alternative methods of dissection.</li> <li>• Dissection of <i>Periplaneta</i> to expose the digestive system, salivary glands and Mouth Parts through Alternative methods of dissection.</li> <li>• Dissection of Prawn to expose appendages and statocyst through Alternative methods of dissection</li> <li>• Dissection of <i>Pila</i> to expose Nervous System through Alternative methods of dissection.</li> <li>• Study of Invertebrate animals in nature during a survey of a National Park/ Forest area/College campus.</li> <li>• <b>Group discussion/Viva or Seminar presentation on two related topics:</b> Polymorphism, Parasitic adaptations, Freshwater sponges, Biodiversity and climate change, Tree of Life, Marine zooplanktons and their ecological importance including oxygen evolution.</li> <li>• An “<b>animal album or Practical Record</b>” containing sketches, photographs, cut outs, with appropriate write up about the above mentioned taxa.</li> <li>• Study of some videos to develop understanding on the animals of different taxa.</li> </ul>		<b>30</b>
Keywords	<i>Museum specimens, Histological slides, Alternative of Dissection, Animal album</i>		
<b>Signature of Convener &amp; Members (CBoS) :</b>			

## **PART-C: Learning Resources**

### **Text Books, Reference Books and Others**

#### **Text Books Recommended –**

- S.S. Lal, Practical Zoology, Invertebrate. 12<sup>th</sup> Edition Rastogi Publications, Meerut, New Delhi.
- A manual of practical Zoology. Dr. P.S Verma, S. Chand Publication, New Delhi

#### **Reference Books Recommended-**

- Barrington, E.J.W. (1979). Invertebrate Structure and Functions. II Edition. E.L.B.S. and Nelson.
- Hyman, L H. (1940-67). The Invertebrates, Vol. I-VI. McGraw-Hill, New York.

#### **Online Resources–**

- <https://www.youtube.com/watch?v=GC5Ua6m873I>
- <https://www.youtube.com/watch?v=-qyM2Hskj84>

## **PART -D: Assessment and Evaluation**

### **Suggested Continuous Evaluation Methods:**

**Maximum Marks: 50 Marks**

**Continuous Internal Assessment (CIA): 15 Marks**

**End Semester Exam (ESE): 35 Marks**

<b>Continuous Internal Assessment (CIA): (By Course Teacher)</b>	Internal Test / Quiz-(2): <b>10 &amp; 10</b>	Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against <b>15 Marks</b>
	Assignment/Seminar +Attendance - <b>05</b> Total Marks - <b>15</b>	
<b>End Semester Exam (ESE):</b>	<b>Laboratory / Field Skill Performance: On spot Assessment</b>	
	A. Performed the Task based on lab. work - <b>20 Marks</b>	<b>Managed by Course teacher as per lab. status</b>
	B. Spotting based on tools & technology (written) – <b>10 Marks</b> C. Viva-voce (based on principle/technology) - <b>05 Marks</b>	

*Name and Signature of Convener & Members of CBoS:*

*S. K. Bhatnagar*

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