

ZOOL-105 + ZOOL-106 ANIMAL DIVERSITY-I (INVERTEBRATES) Cr. 4(3+1)

Course Objectives:

1. To provide the knowledge of evolutionary/phylogenetic relationship (from simple to the complex organisms).
2. To impart the basic taxonomic characteristics and classification of all the invertebrate phyla.
3. To provide understanding of body organization, Feeding and Digestive system; Other Organ System;
4. To provide the description of mode of Reproduction and Development
5. To provide the information of their economic and ecological importance

Course Learning Outcomes:

This course will be based on following outcomes:

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.

Course Contents:

Note: The minimum details of the titles in the content must be of the principal book Zoology by Miller and Harley. This must be kept in view in teaching and assessments.

1. INTRODUCTION

4. Classification of Organisms:
5. Evolutionary Relationships and Tree Diagrams: Patterns of organization.

2. ANIMAL-LIKE PROTISTS: THE PROTOZOA

- Evolutionary perspective; Life within a single plasma Membrane;
- Symbiotic Life-styles.
- Protozoan Taxonomy; (up to Phyla, subphyla and super Classes, wherever applicable).
- Pseudopodia and Amoeboid Locomotion; Cilia and other pellicular structure;
- Nutrition; Genetic Control and Reproduction; Symbiotic ciliates;
- Further Phylogenetic Consideration.

3. MULTICELLULAR AND TISSUE LEVELS OF ORGANIZATION

- Evolutionary Perspective:
- Origins of Multicellularity; Animal Origins.

3.1. Phylum Porifera

- Characteristics and classification. Cell Types, Body Wall, and Skeletons;
- Water Current and Body Forms;
- Maintenance Functions, Reproduction.

3.2. Phylum Cnidaria (Coelenterata)

- Characteristics and classification. The body Wall and Nematocysts: Alteration of Generations;
- Maintenance Functions; Reproduction and
- Classification up to Class.

3.3. Phylum Ctenophora;

- Characteristics, body organization

4. THE TRIPLOBLASTIC AND WITH ACOELOMATE BODY PLAN

4.1. PHYLUM PLATYHELMINTHES

- Evolutionary Perspective; Classification up to class;
- The Free-Living Flatworms and the Tapeworms, adaptive modification for parasitic life style

Phylum Numerate; Characteristics, body organization

Phylum Gastrotricha; Characteristics, body organization

5. PSEUDOCOELOMATE BODY PLAN PHYLUM PLATYHELMINTHES

- Evolutionary perspective; General Characteristics; Classification up to order with External Features;
- Feeding and Digestive system; Other Organ System; Reproduction and Development including Phylum **Rotifera**, Phylum **Nematoda** and Phylum **Kinorhyncha**.
- Some Important Nematode Parasites of Humans;

6. PHYLUM MOLLUSCA

- Evolutionary perspective; Relationship to other animals; Origin of the Coelom;
- Molluscan Characteristics, Classification up to class. The Characteristics of Shell and Associated Structures,
- Feeding, Digestion, Gas Exchange, Locomotion,
- Reproduction and Development, Other maintenance Functions and Diversity in Gastropods, Bivalves and Cephalopods:

7. PHYLUM ANNELIDA

- The Metameric Body Form; Evolutionary perspective; Relationship to other animals,
- Metamerism and Tag-matization, Classification up to Class. External Structure and Locomotion,
- Feeding and the Digestive system, Gas Exchange and Circulation,
- Nervous and Sensory Functions, Excretion,
- Regeneration, Reproduction and Development, in Polychaeta, Oligochaeta and Hirudinea, Further Phylogenetic Consideration.

8. PHYLUM ARTHROPODA:

- Evolutionary Perspective: Classification and Relationship to other Animals;
- Metamerism and Tagmatization;
- The Exoskeleton; Metamorphosis;
- Classification up to Class; Further Phylogenetic Consideration.

9. THE HEXAPODS AND MYRIAPODS:

- Evolutionary Perspective: Classification upto class. External Structure and Locomotion,
- Nutrition and the Digestive system, Gas Exchange, Circulation and Temperature Regulation,
- Nervous and Sensory Functions, Excretion, Chemical Regulation,
- Reproduction and Development in Hexapoda,
- Insects Behavior, Insect and Human;

10. PHYLUM ECHINODERMATA

- Evolutionary Perspective: Relationship to other Animals; Echinoderm Characteristics; Classification up to class.
- Maintenance Functions, Regeneration,
- Reproduction, and Development in Asterozoa, Ophiurozoa, Echinozoa, Holothurozoa and Crinozoa;

11. SOME LESSER-KNOWN INVERTEBRATES;

- The Lophophorates, Entoprocts, Cycliophores, and Cheatognaths.

Practical:

Note: Classification of each members of each phylum upto order with adaptations in relation to habitat of the specimen. Preserved Specimen and or colored projection slide and or CD ROM projection of computer must be used.

- Study of Euglena, Amoeba, Entamoeba, Plasmodium, Trypanosome, Paramecium as representative of animal like Protists.
- Study of prepared slides of sponges, spicules of sponges, and their various body forms. Study of representatives of classes of Phylum Porifera.
- Study of principal representatives of classes of Phylum Coelenterata.
- Study of principal representatives of classes of Phylum Platyhelminthes.

- Study of representatives of phylum Rotifera, Phylum Nematoda.
- Study of principal representatives of classes of Phylum Mollusca.
- Study of principal representatives of classes of Phylum Annelida.
- Study of principal representatives of classes of groups of Phylum Arthropoda
- Study of representatives of classes of phylum Echinodermata.
- Preparation of permanent mount of Leucosolenia, Obelia, Hydra, Proglottid of Tapeworm, Parapodia of Nereis and Daphnia. Drawing and labeling.
- Preparation of permanent slide of mouthpart of insects (after dissection). Drawing and labeling.
- How to make grade-wise series for preparation of temporary and permanent slides.

Teaching-Learning Strategies

Teaching will be a combination of class lectures, class discussions, and group work. Short videos/films will be shown on occasion.

Assignments

The sessional work will be a combination of written assignments, class quizzes, presentation, and class participation/attendance.

Assessments and Examination

Sessional Work: 25 marks

Midterm Exam: 35 marks

Final Exam: 40 marks

Recommended Principal Reference Book:

1. Miller, A.S. and Harley, J.B. ; 1999 , 2002.,2007, 2009, 2012 & 2016 Zoology, 4th , 5th, 6th, 7th, 8th 9th& 10th Edition (International), Singapore : McGraw Hill.

Additional Readings:

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. BOOKS FOR PRACTICAL
8. Miller, S.A., 2002. GENERAL ZOOLOGY LABORATORY MANUAL. 5th Edition (International), Singapore : McGraw-Hill.
9. Hickman, C.P. and Kats, H.L., 2000. Laboratory Studies in integrated principal of zoology. Singapore : McGraw-Hill.