

Animal DiversityII

Contact Hours:

Theory = 48

Practical = 32

Total = 80

Credit Hours:

Theory = 3.0

Practical= 1

Total = 4.0

Course Objectives

The objectives of the course are:-

1. To enable them to understand the Taxonomic characteristics of protochordates and chordates.

2. To impart knowledge about the phylogenetic relationships of protochordates and various classes of chordates.
3. To develop critical thinking about phylogeny of chordates with respect to their physiological adaptations, behavior and ecology.

Course Learning Outcomes:

Upon successful completion of the course, the student will be able to:

1. **ACQUIRE** the basic knowledge of Taxonomic characteristics of chordates.
2. **UNDERSTAND** the phylogenetic relations and diversity of Pisces, amphibians, reptiles and mammals.
3. **ANALYZE** the process of micro evolution within chordates .
4. **DEMONSTRATE** individually Phylogentic relationships of chordates and their diversity.

Course Outline:

1. **Protochordates**
 - a. Classification of protochordates.
 - b. Structure, anatomy and organ systems of Acorn worms, Urochordates and Cephalochordates
 - c. Reproduction; life histories and metamorphosis of protochordates.
 - d. Phylogenetic relationships.
2. **Fishes:**
 - a. Vertebrate Success in Water.
 - b. Phylogenetic relationships of Pisces.
 - c. Classification of Chondrichthyes, Osteichthyes, Dipnoi and Holocephalli
 - d. Locomotory adaptations, nutrition and the digestive system, circulation, gas exchange, nervous and sensory functions, excretion and osmoregulation, reproduction and development of Chondrichthyes (*Scoliodon*) and Osteichthyes (*Cyprinus carpio* and *Wallago attu*).
3. **Amphibians:**
 - a. The first terrestrial vertebrates. Characteristics of amphibians
 - b. Phylogenetic relationships.
 - c. Classification of amphibians and characteristics of order Caudata, Gymnophiona, and Anura.
 - d. Structure and locomotory adaptations, nutrition and the digestive system, circulation, gas exchange, temperatureregulation, nervous and sensory functions, excretion and
 - e. Osmoregulation, reproduction, development, and metamorphosis of caudate, anura and Gymnophiona.
4. **Reptiles:**
 - a. The First Amniotes and cladistic interpretation of the amniotic lineage. General characteristics of reptiles.
 - b. Characteristics of Order Testudines or Chelonia, Rhynchocephalia, Squamata, and Crocodilia

- c. Adaptations in external structure and locomotion, nutrition and the digestive system, circulation, gas exchange, and temperature regulation, nervous and sensory functions, excretion and osmoregulation, reproduction and development of helonia, squamata, Rhynchocephalia and crocodilian.
- d. Further phylogenetic considerations.

5. Birds:

- a. Classification, Feathers, flight and endothermy.
- b. Phylogenetic relationships; ancient birds and the evolution of flight.
- c. Diversity of modern birds.
- d. Adaptation in external structure and locomotion, nutrition and the digestive system, circulation, gas exchange, and regulation, nervous and sensory systems, excretion and osmoregulation, reproduction and development.
- e. Migration and navigation.

6. Mammals:

- a. Classification, Specialized teeth, endothermy, hair and viviparity.
- b. Diversity of mammals.
- c. Adaptations in external structure and locomotion, nutrition and the digestive system, circulation, gas exchange, and temperature regulation, nervous and sensory functions, excretion and osmoregulation, behavior, reproduction and development.

Practicals:

1. Classification and study of lab specimens of hemichordates, fishes, amphibians, reptiles, birds and mammals.
2. Visit to PMNH for the study of diversity of chordates.

Teaching Methodology:

- Lecturing
- Written Assignments
- Practical
- Discussion

Assessment:

Mid Term (40%)

- Written (Long Questions, Short Questions) 50%
- Assignments 25%
- Quiz 25%

Final Term (60%)

- Written (Long Questions, Short Questions, MCQs) 50%
- Presentation 10%
- Assignments 20%
- Quiz 20%

Text and Reference Books:

1. Campbell, N.A. Biology. 9th Ed. 2011. Menlo Park, California Benjamin/Cummings Publishing Company, Inc.
2. Miller, S.A. and Harley, J.B. 2010. Zoology, 8th Edition (International) Singapore: McGraw Hill.
3. Miller, S.A. 2002. General Zoology Laboratory Manual. 5th Ed. (International), Singapore: McGraw Hill.
4. Hickman, C.P., Roberts, L.S. and Larson, A. Integrated Principles of Zoology, 14th Edition (International), 2009. Singapore: McGraw-Hill.
5. Pechenik, J.A. Biology of Invertebrates, 4th Edition (International), 2000. Singapore: McGraw Hill.