JYOTI NIVAS COLLEGE AUTONOMOUS BANGALORE – 560 095
DEPARTMENT OF ZOOLOGY
B.Sc. II SEMESTER ZOOLOGY PAPER II SYLLABUS (2024 SEP Batch Onwards)
DIVERSITY OF LIFE – II (Protochordata to Mammalia)

Course title	**Diversity of Life – II (Protochordata to Mammalia)**
Course code	**24IIZL2T**
Course credits	**03**
Total contact hours	**56 Hours**
Duration of ESA	**03 Hours**
Continuous Internal assessment (CIA)	**20 Marks**
End Semester Examination	**80 Marks**

Course Objectives:

The course enables the students to:

- Differentiate Protochordates, Agnatha and Vertebrates based on their unique characteristics.
- Describe the systems in certain organisms.
- Gain knowledge on interesting features and phenomenon exhibited by the vertebrates
- Understand the Evolutionary adaptations, Circulatory, Respiratory, Urinogenital, system and parental care in vertebrate animals

Course Outcomes (COs):

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

- To demonstrate comprehensive identification abilities of chordate diversity
- Able to explain structural and functional diversity of chordate diversity
- To understand evolutionary relationship amongst chordates
- To take up research in biological sciences.
- To realize that very similar physiological mechanisms are used in very diverse organisms.
- To get a flavor of research by working on project besides improving their writing skills. It will further enable the students to think and interpret individually.

UNIT 1	**14 hrs.**

Chapter 1: Protochordata • General characters of chordates. Origin of chordates. • Basic Chordate characters and outline classification up to classes. **Protochordata**: **a. Cephalochordata**: • *Amphioxus* – Morphology, digestive system, feeding mechanism and circulatory system.	**10**
b. Urochordata: • Type study of *Herdmania*- Morphology, tadpole of *Herdmania* and retrogressive metamorphosis. **Chapter 2: Agnatha** • General characters and classification up to classes. • Salient features of Cyclostomata with examples. • Differences between lampreys and hag fishes. • Ammocoete larva and its significance.	**04**
UNIT II	**14 hrs.**
Chapter 3: Super class: Pisces • Salient features and classification up to subclasses. • Differences between Chondrichthyes and Osteichthyes. • *Scoliodon*: Morphology, digestive system, circulatory system – afferent arterial system, neuromast organs (Lateral line sensory system and Ampullae of Lorenzini) and urinogenital system. • Parental care in fishes – (*Hippocampus*, *Tilapia*, Betta and *Arius jella*) • Salient features of Placodermi and Ostracodermi with examples. • *Dipnoi*: Interesting features and their evolutionary significance. **Chapter 4: Class Amphibia** • General characters and classification of class Amphibia up to living orders, with suitable examples. • Neoteny and Paedogenesis • Parental care in Amphibia – (*Pipa*, *Ichthyophis, Alytes*, *Gastrothecus*) • Origin of Amphibia.	**10** **04**
UNIT III	**14 hrs.**
Chapter 5: Class Reptilia • General characters and outline classification of modern reptiles with suitable examples. • Adaptive radiation in extinct reptiles with suitable examples. • Temporal fossae in reptiles. • Poisonous and non-poisonous snakes of India- Identification, Poison apparatus in snakes, venom composition types and its applications. Anti-venom (composition and mode of action in brief). • Interesting features of *Sphenodon*. **Chapter 6: Class Aves** • General characters and classification up to orders with examples. • Differences between Ratitae and Carinatae. • Interesting features of *Archaeopteryx*. • Flight adaptations in birds (Morphological, anatomical and physiological) • Migration in Birds – Types, causes and theories.	**08** **06**

UNIT IV	14 hrs.
Chapter 7: Class Mammalia • General characters and classification up to subclasses (Prototheria, Metatheria and Eutheria) with suitable examples.	**10**
• Interesting features of mammalian orders- Insectivora, Carnivora (Pinnipedia and Fissipedia), Chiroptera (Mega and Micro), Cetacea (Mystoceti and Odontoceti), Proboscidia (Indian Elephant and African Elephant), Ungulata (Perissodactyla and Artiodactyla) and Primates (Platyrhini and Catarhini) with examples **Chapter 8: Dentition in mammals** • Definition, structure of molar tooth. • Types – Morphological, based on attachment, succession, and kinds of teeth. Significance of teeth. • Dental formula (Horse, Dog, Man, Cat, Rabbit and Elephant) • Pattern of cheek teeth (Bunodont, Secodont, Selenodont and Lophodont). • Evolution of molar tooth	**04**

ZOOLOGY PAPER II PRACTICALS

Course title	**Diversity of Life – II (Protochordata to Mammalia)**
Course code	**24IIZL2P**
Course credits	**02**
Total contact hours	**3 Hours / week**
Duration of ESA	**03 Hours**
Continuous Internal assessment (CIA)	**10 Marks**
End Semester Examination	**40 Marks**

1. **Protochordata**: *Herdmania* and *Amphioxus,* T.S. of *Amphioxus* through pharynx and intestine.

2. **Agnatha:** *Petromyzon, Ammocoete larva* and *Myxine*.

3. **Pisces**:
a. Cartilaginous Fishes: *Narcine, Trygon, Scoliodon*
b. Bony Fishes: *Hippocampus, Muraena, Ostracion, Diodon and Echeneis.*
c. Ornamental fishes: *Betta sp*. *Neon tetra*, Zebra fish, *Molliesese*. *Guppies, Platy*
d. Accessory respiratory organs: *Saccobranchus, Clarias and Anabas*

4.Amphibia:
a. *Bufo, Hyla, Ambystoma, Axolotl larva, Necturus* and *Ichthyophis.*

5. Reptilia:
a. *Turtle, Draco, Calotes, Chameleon, Varanus.*
snakes – *Dendrophis*, *Cobra*, *Krait*, *Russell's viper* and *Hydrophis*.

6. Aves:
a. Duck, Parakeet, Woodpecker & Kingfisher

7.Mammalia:
a. Bat, Squirrel, Hedge Hog, Loris

8.Mounting: Preparation of whole mount of fish scale.

9.Virtual dissection/Cultured specimens: (Use of Dissected Animal or Photograph or Model)

a. Shark: Afferent and Efferent branchial systems, glosso- pharyngeal and vagus nerves.
b. Frog: Arterial system
c. Rat: Urinogenital system of both male and female rat.

Note: Field visit to nearby National Park/ Wildlife sanctuary/ any National laboratory at the end of semester is compulsory and the report of this is to be submitted along with practical record as a part of practical examination.

References

- Colbert et al: Colbert's Evolution of the Vertebrates: A history of the back boned animals through time. (5th ed. 2002, Wiley–Liss).
- Hildebrand: Analysis of vertebrate Structure (4thed 1995, John Wiley)
- Kenneth V. Kardong (20015) Vertebrates: Comparative Anatomy, Function, Evolution McGraw Hill
- McFarland et al.- Vertebrate Life (1979, Macmillan publishing)
- Parker and Haswell: Text Book of Zoology, Vol. II(1978,ELBS)
- Romerand Parsons: The Vertebrate Body (6thed1986, CBS Publishing Japan)
- Vimala C.M, 2005 Introductory Zoology Vol. III, Interline publishing, Bangalore.
- Weichert C. K. & William Presch (1970). Elements of Chordate Anatomy, Tata McGraw Hills
- Young: The Life of vertebrates (3rded 2006, ELBS/Oxford)