

**ADIKAVI NANNAYA UNIVERSITY:: RAJAHMAHENDRAVARAM**  
**B.Sc Zoology Syllabus (w.e.f: 2020-21 A.Y)**

<b>B. Sc</b>	<b>Semester: II</b>	<b>Credits:4</b>
<b>Paper: 2</b>	<b>Animal Diversity-II – Biology of Chordates</b>	<b>Hrs/Wk:4</b>

**Course Outcomes: By the completion of the course the graduate should able to -**

- Describe general taxonomic rules on animal classification of chordates
- Classify Protochordata to Mammalian with taxonomic keys
- Understand Mammals with specific structural adaptations
- Understand the significance of dentition and evolutionary significance
- Understand the origin and evolutionary relationship of different phyla from Prochordata to mammalian.

**Learning objectives**

- To understand the animal kingdom.
- To understand the taxonomic position of Protochordata to Mammalian.
- To understand the general characteristics of animals belonging to Fishes to Reptilians.
- To understand the body organization of Chordata.
- To understand the taxonomic position of Protherian mammals.

**UNIT I:**

General characters and classification of Chordata upto species level Protochordata- Salient features of Cephalochordate, Structure of *Branchiostoma* Affinities of Cephalochordate. Salient features of Urochordata Structure and life history of *Herdmania* Retrogressive metamorphosis –Process and Significance.

**UNIT II:**

Cyclostomata, General characters, Comparison of *Petromyzon* and *Myxine* Pisces: General characters and classification of Fishes upto species level ***Scoliodon***: External features, Digestive system, Respiratory system, Structure and function of Heart, Structure and functions of the Brain. Migration in Fishes Types of Scales Dipnoi.

**UNIT III:**

General characters of Amphibian Classification of Amphibian upto species level with examples. ***Rana hexadactyla***: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and functions of the Brain

**Reptilia**: General characters of Reptilia, Classification of Reptilia upto species level with examples

*Calotes*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain Identification of Poisonous and non-poisonous snakes and Skull in reptiles.

**UNIT IV:**

Aves: General characters and classification of Aves upto species level *Columba livia*: External features, Digestive system, Respiratory system, Structure and function of Heart, structure and function of Brain Migration in Birds Flight adaptation in birds.

**UNIT V:**

General characters of Mammalian Classification of Mammalian upto species level with examples Comparison of Prototherians, Metatherians and Eutherians Dentition in mammals

### ***Co-curricular activities (suggested)***

- Preparation of charts on Chordate classification (with representative animal photos) and retrogressive metamorphosis
- Thermocol or Clay models of Herdmania and Amphioxus
- Visit to local fish market and identification of local cartilaginous and bony fishes
- Maintaining of aquarium by students
- Thermocol model of fish heart and brain
- Preparation of slides of scales of fishes
- Visit to local/nearby river to identify migratory fishes and prepare study notes
- Preparation of Charts on above topics by students (Eg: comparative account of vertebrate heart/brain/lungs, identification of snakes etc.)
- Collecting and preparation of Museum specimens with dead frogs/snakes/lizards etc., and/or their skeletons
- Additional input on types of snake poisons and their antidotes (student activity).
- Collection of bird feathers and submission of report on Plumology
- Taxidermic preparation of dead birds for Zoology museum
- Map pointing of prototherian and metatherian mammals
- Chart preparation for dentition in mammals.

### **REFERENCE BOOKS:**

1. J.Z. Young, 2006. The life of vertebrates. (The Oxford University Press, New Delhi). 646 pages. Reprinted
2. Arumugam, N. Chordate Zoology, Vol. 2. Saras Publication. 278 pages. 200 figs.
3. A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan PressLtd., UK). 852 pages. (Revised edition of Parker & Haswell, 1961).
4. M. Ekambaranatha Ayyar, 1973. A manual of zoology. Part II. (S. Viswanathan Pvt. Ltd., Madras).
5. P.S. Dhama & J.K. Dhama, 1981. Chordate zoology. (R. Chand & Co.). 550 pages.
6. Gurdarshan Singh & H. Bhaskar, 2002. Advanced Chordate Zoology. Campus Books, 6 Vols., 1573 pp., tables, figs.
7. A.K. Sinha, S. Adhikari & B.B. Ganguly, 1978. Biology of animals. Vol. II. Chordates. (New Central Book Agency, Calcutta). 560 pages.
8. R.L. Kotpal, 2000. Modern textbook of zoology, Vertebrates. (Rastogi Publ., Meerut). 632 pages.
9. E.L. Jordan & P.S. Verma, 1998. Chordate zoology. (S. Chand & Co.). 1092 pages.
10. G.S. Sandhu, 2005. Objective Chordate Zoology. Campus Books, vii, 169 pp.
11. Sandhu, G.S. & H. Bhaskar, H. 2004. Textbook of Chordate Zoology. Campus Books, 2 vols., xx, 964 p., figs.
12. Veena, 2008. Lower Chordata. (Sonali Publ.), 374 p., tables, 117 figs.

<b>B. Sc</b>	<b>Semester: II</b>	<b>Credits:1</b>
<b>Paper: 2(L)</b>	<b>Animal Diversity – Biology of Chordates Lab</b>	<b>Hrs/Wk:2</b>

### Learning Outcomes:

- To understand the Taxidermic and other methods of preservation of chordates
- To identify chordates based on special identifying characters
- To understand internal anatomy of animals through demo or virtual dissections, thus directing the student for “empathy towards the fellow living beings”
- To maintain a neat, labelled record of identified museum specimens

### Observation of the Following Slides / Spotters / Models

- Protochordata: *Herdmania*, *Amphioxus*, *Amphioxus* T.S through pharynx.
- Cyclostomata: *Petromyzon* and *Myxine*.
- Pisces: *Pristis*, *Torpedo*, *Hippocampus*, *Exocoetus*, *Echeneis*, *Labeo*, *Catla*, *Claries*, *Channa*, *Anguilla*.
- Amphibian: *Ichthyophis*, *Amblystoma*, *Axolotl* larva, *Hyla*,
- Reptilia: *Draco*, *Chameleon*, *Uromastix*, *Testudo*, *Trionyx*, *Russels viper*, *Naja*
- Krait, *Hydrophis*, *Crocodile*.
- Aves: *Psittacula*, *Eudynamis*, *Bubo*, *Alcedo*.
- Mammalian: *Ornithorhynchus*, *Pteropus*, *Funambulus*.

### Dissections-

1. *Scoliodon* IX and X, Cranial nerves
2. *Scoliodon* Brain
3. Mounting of fish scales

Note: 1. Dissections are to be demonstrated only by the faculty or virtual.

2. Laboratory Record work shall be submitted at the time of practical examination.

### REFERENCE BOOKS:

1. S.S.Lal, Practical Zoology –Vertebrate
2. P.S.Verma, A manual of Practical Zoology – Chordata