



**PARVATHANENI BRAHMAYYA**  
**SIDDHARTHA COLLEGE OF ARTS & SCIENCE**  
*Autonomous*  
 Siddhartha Nagar, Vijayawada-520010  
*Re-accredited at 'A+' by the NAAC*

<b>Course Code</b>				<b>23ZOMAT231</b>			
<b>Title of the Course</b>				<b>ANIMAL DIVERISTY II – BIOLOGY OFCHORDATES</b>			
<b>Offered to: (Programme/s)</b>							
<b>L</b>	<b>4</b>	<b>T</b>	<b>0</b>	<b>P</b>	<b>0</b>	<b>C</b>	<b>3</b>
<b>Year of Introduction:</b>		<b>2024-25</b>		<b>Semester:</b>			<b>3</b>
<b>Course Category:</b>		<b>MAJOR</b>		<b>Course Relates to:</b>		<b>GLOBAL</b>	
<b>Year of Revision</b>		<b>NA</b>		<b>Percentage:</b>		<b>NA</b>	
<b>Type of the Course:</b>				<b>SKILL DEVELOPMENT</b>			
<b>Crosscutting Issues of the Course:</b>				<b>NA</b>			
<b>Pre-requisites, if any</b>				<b>Basic knowledge in Vertebrates in intermediate level</b>			

**Course Description:**

This course explores the evolutionary and functional biology of the phylum Chordata, which includes vertebrates and their relatives. The course covers key concepts such as chordate anatomy, developmental biology, and evolutionary adaptations. Students will examine the structure and function of chordate systems, including the notochord, pharyngeal slits, and post-anal tail. Comparative analysis across various chordate groups, from primitive lancelets to complex mammals, will illustrate evolutionary trends and functional diversity.

**Course Aims and Objectives:**

<b>S. No</b>	<b>COURSE OBJECTIVES</b>
<b>1</b>	To understand the animal kingdom
<b>2</b>	To understand the taxonomic position of Protochordata to Mammalia.
<b>3</b>	To understand the general characteristics of animals belonging to Fishes to Reptilians
<b>4</b>	To understand the body organization of Chordata.
<b>5</b>	To understand the taxonomic position of Protherian mammals

## Course Outcomes

At the end of the course, the student will be able to...

NO	COURSE OUTCOME	BTL	PO	PSO
CO1	Describe general taxonomic rules on animal classification of Chordates.	K1	1	1
CO2	Classify Protochordate to Mammalia with taxonomic keys.	K2	1	1
CO3	Understand Mammals with specific structural adaptations.	K2	1	1
CO4	Understand the significance of dentition and evolutionary Significance.	K1	1	1
CO5	Understand the origin and evolutionary relationship of different Phyla from Protochordata to Mammalia.	K2	1	1

For BTL: K1: Remember; K2: Understand; K3: Apply; K4: Analyze; K5: Evaluate;

K6: Create

CO-PO-PSO MATRIX									
CO NO	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PSO1	PSO2
CO1	2							2	
CO2	3							3	
CO3	2							2	
CO4	2							2	
CO5	2							2	

Use the codes 3, 2, 1 for High, Moderate and Low correlation Between CO-PO-PSO respectively

### UNIT - I

- 1.1 General characters and classification of Chordata up to classes
- 1.2 Salient features of Cephalochordata, Salient features of Urochordata  
Structure and life history of Herdmania, Retrogressive metamorphosis – Process and Significance
- 1.3 Cyclostomata, General characters, Comparison of Petromyzon and Myxine  
<https://www.sciencedirect.com/topics/biochemistry-genetics-and-molecular-biology/cyclostome>

### Applications:

**Assignment 1:** Prepare a Cladogram on Chordates

## **Assignment 2:** Preparation of chart on Retrogressive Metamorphosis

Compare and contrast Retrogressive metamorphosis with progressive metamorphosis for advanced learners

### **Activity 1**

Case Study Analysis

- Assign different organisms that exhibit retrogressive metamorphosis (like certain insects or amphibians) to small groups of students.
- **Research:** Each group researches their assigned organism's life cycle and presents their findings, highlighting how retrogressive metamorphosis is displayed.

### **Activity 2**

Cyclostome Life Cycle Exploration

**Objective:** Explore the life cycle of cyclostomes.

**Materials:** Lifecycle diagrams or videos of lampreys and hagfish.

**Instructions:**

- Present a diagram or video showing the life cycle of lampreys and hagfish, from egg to adult.
- Discuss the different stages of development, including larval stages such as ammocoetes in lampreys.
- Have students create their own life cycle diagrams or timelines to illustrate and label each stage.

## **Unit – II:**

2.1 General characters of Fishes, Salient features of Dipnoi

2.2 Scoliodon: External features, Digestive system, Respiratory system

2.3 Scoliodon Structure and function of Heart, Structure and functions of the Brain.

2.4 Migration in Fishes, Types of Scales

<https://www.notesonzoology.com/phylum-chordata/dogfish/external-features-of-dogfish-scoliodon-with-diagram-chordata-zoology/7558> [https://asccollegekolhar.in/wp-content/themes/kolhar/essentials/pdf/elearning/Zoology/S.Y.B.SC. Zoology/SYBSC\\_Scoliodon\\_Hear t\\_ppt.pdf](https://asccollegekolhar.in/wp-content/themes/kolhar/essentials/pdf/elearning/Zoology/S.Y.B.SC. Zoology/SYBSC_Scoliodon_Hear t_ppt.pdf)

**Applications:**

**Assignment 1:** Develop a conservation plan for Scoliodon, considering current threats and protection strategies.

**Assignment 2:** Select a fish species known for its migration patterns (e.g., salmon, eels, tuna)

## **Advanced students**

Scoliodon Adaptation Analysis

### **Activity 1**

Interactive Fish Quiz

**Objective:** Test and reinforce knowledge about fish characteristics. **Materials:** Quiz questions, interactive quiz platforms (e.g., Kahoot!, Quizlet). **Instructions:**

- Create a quiz with questions related to fish anatomy, classification, and behaviour.
- Use an interactive quiz platform to make the activity engaging.
- Encourage students to answer questions individually or in teams.

Review the answers and discuss any misconceptions

## Activity 2

Scoliodon: Function Chart

**Objective:** Develop a chart linking structures to their functions.

**Materials:** Large paper or digital tools for chart creation.

**Instructions:**

- Create a large chart with two columns: one for Scoliodon's structures and one for their functions.
- Have students' list structures (e.g., gills, pectoral fins) and match them with their functions.
- Discuss how each structure supports the shark's lifestyle and survival

## Unit – III:

3.1 General characters of Amphibia, General characters of Reptilia

3.2 *Rana hexadactyla*: External features, Respiratory system, Structure and function of Heart

3.3 *Rana hexadactyla* structure and functions of the Brain

3.4 *Calotes*: External features, Digestive system, structure and function of Brain

3.5 Identification of Poisonous snakes

[https://youtu.be/NhtX016DbuQ?si=DIqo\\_YdKUDcUHRkj](https://youtu.be/NhtX016DbuQ?si=DIqo_YdKUDcUHRkj)

<https://youtu.be/Nr58AVtpLEQ?si=39fUmsSuq3ULvL7V>

<https://youtu.be/RTHAhn7O524?si=RLrzbN0WGLFudV7E>

## Applications:

**Assignment 1:** objective: To raise awareness about amphibian conservation issues and propose solutions. Develop a conservation plan or awareness campaign to address these issues. This could be a written report, a video presentation, or a public awareness campaign

**Assignment 2:** Compare and contrast reptiles with amphibians. Create a poster or digital presentation summarizing your findings

**Advanced students:** Observe and record the behaviour of any reptile in its natural habitat, focusing on aspects such as feeding, mating, and social interactions.

## Activity 1

### Snake and Lizard Identification

**Activity:** Use field guides or apps to identify local snake and lizard species.

**Materials:** Field guidebook or identification app, notebook.

**Outcome:** Improve skills in identifying reptiles in your area and learn more about their characteristics

## Activity 2

## Frog-Themed Creative Writing

**Objective:** To use creative writing to explore frog behaviors and systems and environments.

### Instructions:

- **Activity:** Write a short story or diary entry from the perspective of a frog.
- **Steps:**
  - Research frog behaviours, systems and environments to create a realistic portrayal.
  - Write a narrative or paragraph or short story that reflects the life of a frog, including its challenges and experiences.
  - Share your writing with the class or in a group discussion.

## UNIT - IV

4.1 General characters of Aves

4.2 Columba livia: External features, Digestive system, Respiratory system

4.3 Columba livia: Structure and function of Heart, structure and function of Brain

4.4 Migration in Birds, Flight adaptation in birds

[https://youtu.be/2vt2wRTE0N0?si=K-ze07m7\\_ikDz3KV](https://youtu.be/2vt2wRTE0N0?si=K-ze07m7_ikDz3KV)

<https://youtu.be/HjXG33Hmqm0?si=BXRe-sMS9zJvGIQX>

### Applications:

**Assignment 1:** Select a few migratory bird species and track their migration patterns.

**Assignment 2:** Create a detailed report or presentation explaining flight adaptation in birds

**Advanced students** studying migration routes, timing, and the factors influencing migratory behavior of any migratory bird of their choice

### Activity 1

Respiratory System Investigation

**Objective:** To understand the unique respiratory system of birds and its adaptations for flight. Create a diagram or model illustrating the flow of air through the bird's respiratory system.

### Activity 2

**Bird Feeder Construction:** Students build simple bird feeders from recycled materials. They can observe which bird species come to the feeders and record their observations.

## Unit – V:

5.1 General characters of Mammalia

5.2 Classification of Mammalia up to sub - classes with examples

5.3 Comparison of Prototherians, Metatherians and Eutherians

5.4 Dentition in mammals, Aquatic mammals Adaptations

<https://youtu.be/jhXqIy49YEw?si=nqcywb7aqcoW9TtB>

<https://youtu.be/CBcKovnEFZY?si=HbNSe-X8Pe0bkNwh>

[https://youtu.be/r4ZK0kexdOk?si=0CeYlX3u\\_0Jbt0It](https://youtu.be/r4ZK0kexdOk?si=0CeYlX3u_0Jbt0It)

<https://dpbck.ac.in/wp-content/uploads/2022/03/Classification-of-mammals.pdf>

## **Applications:**

**Assignment 1:** Students write a diary entry from the perspective of a mammal of their choice. They should describe a day in the life of the mammal, including its challenges and interactions

**Assignment 2: Mystery Mammal:** Provide students with clues about a mystery mammal and have them guess what mammal it is based on its adaptations, diet, and habitat

**Advanced students** Assign advanced students to compare and contrast two different mammals. They could examine aspects such as adaptations, behaviour, and ecological roles.

## **Activity 1**

**Mammal Profiles:** Have students select a mammal to research and create a detailed profile, including habitat, diet, physical characteristics, and any interesting facts. They can present their findings in a report or a multimedia presentation.

## **Activity 2**

Adaptations and Evolution of Dentition

### **Instructions:**

- **Activity:** Research and present on the adaptations and evolutionary changes in mammalian dentition.
- **Steps:**
  - Study the evolutionary history of mammals and the changes in dental adaptations over time.
  - Identify key adaptations such as tooth size, shape, and number that have evolved in response to environmental pressures.
  - Create a timeline or evolutionary tree illustrating the development of different types of teeth 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. A.J. Marshall, 1995. Textbook of zoology, Vertebrates. (The McMillan Press Ltd., UK). 852 pages. (Revised edition of Parker & Haswell, 1961).
3. P.S. Dhami & J.K. Dhami, 1981. Chordate zoology. (R. Chand & Co.). 550 pages. Gurdarshan Singh & H. Bhaskar, 2002. Advanced Chordate Zoology. Campus Books, 6 Vols., 1573 pp., tables, figs.
4. A.K. Sinha, S. Adhikari & B.B. Ganguly, 1978. Biology of animals. Vol. II. Chordates. (New Central Book Agency, Calcutta). 560 pages.

