

# **CURRICULUM TRANSACTIONAL STRATEGY**

## **Semester- IV**

**Course: Comparative Anatomy of Vertebrates**

**ZOO-CC-401**

**Time: 60 Hours**

**Credits: 04**

<b>Unit</b>	<b>Topic</b>	<b>Method</b>	<b>Activity</b>	<b>No. of classes needed</b>
<b>I</b>	Derivatives of the Integument, Epidermal derivatives: glands; Epidermal Scales, Horns, Feathers & Hair.	Lecture, Discussion/P PT	Library/Lab consultation, Construction of a test/Presentation	06
	Bones-Axial Skeleton	do	Do	03
	Jaw suspensorium,	do	Do	01
	Characteristic of Amphibian Skull, Characteristic of Reptilian Skull	do	Do	02
	Girdles and Limbs of terapods.	do	Do	03

### **Learning outcomes**

After going through this unit you should be able to:

- What is integument.
- Discuss the different epidermal glands in vertebrates.
- Explain the epidermal scales feathers and horns.
- What is jaw suspension.
- Compare the skull of Amphibian with Reptiles.
- Describe axial skelton.
- Explain limbs and girdles of tetrapods.

### **Points for discussion**

- Different layers of integument and their function.
- Difference between dermal and epidermal gland and scales.
- Number of bones present and absent in the skull of Amphibian and Reptiles

- Comparison of limbs and girdles among different groups of tetrapods.

**References:**

- Kardong, K. V. 2005. Vertebrate's Comparative Anatomy, Function and Evolution. IV Edition. McGraw-Hill Higher Education.
- Kent, G.C. and Carr, R.K. 2000. Comparative Anatomy of the Vertebrates. IX Edition The McGraw-Hill Company.
- Weichert, C.K. and William Presch. 1970. Elements of Chordate Anatomy . Tata McGraw Hills
- Hilderbrand, M. and Gaslow, G.E. Analysis of Vertebrate Structure. John Wiley and sons

Unit	Topic	Method	Activity	No. of classes needed
II	Digestive system:- Alimentary canal and associated glands	Lecture, Discussion/ PPT/Models	Library/Lab consultation, Construction of a test/ Presentation & Assignment	07
	Respiratory system :- skin, gills (external and internal gills) lungs and air sacs accessory respiratory organs, swim or air bladder	do	Do	08

**Learning Outcomes**

After going through this, students will be able to:

- Discuss the comparative anatomy for digestion in vertebrates,
- Describe various physiological functional and anatomical differences in digestion and respiration in vertebrates
- Evolution and significance of ruminants.  
Gut differences in animals with their significances.
- Diversity in animal respiration  
Role of accessory respiratory organs in efficient respiration.

**Points for discussion:**

1. Students were made to open some animals as fishes and birds to observe the various functional and anatomical differences so that they have the practical knowledge regarding the subject
2. The overall learning and laboratory practice was judged by conducting the CIA on multi type pattern so, that the exact feedback for learning could be evaluated.

**References**

1. Kardong, K. V. 2005. Vertebrate's Comparative Anatomy, Function and Evolution. IV Edition. McGraw-Hill Higher Education.
2. Kent, G.C. and Carr, R.K. 2000. Comparative Anatomy of the Vertebrates. IX Edition The McGraw-Hill Company.
3. Weichert, C.K. and William Presch. 1970. Elements of Chordate Anatomy . Tata McGraw Hills
- 4.Hilderbrand, M. and Gaslow, G.E. Analysis of Vertebrate Structure. John Wiley and sons.

Unit	Topic	Method	Activity	No. of classes needed
III	Circulatory system:- General	Lecture, PPT,	Library / Lab	03

	plan of circulation,	Discussion	consultation/ assignment & presentation	
	evolution of heart and aortic arches. and modifications in Aortic arches	do	do	02
	Blood, Function of blood, lymphatic system;	do	do	04
	Urinogenital system:- Vertebrate kidney: Pronephros, Mesonephros and Metanephros	do	do	02
	Gonads and their ducts in Elasmobranchs, Amphibia, Reptilia, Aves & Mammals	do	do	04

### Learning Outcomes

After going through this unit students will be able to:

- Evolution of heart and aortic arches
- Learn the composition of blood and its functions
- Understand the different types of kidneys
- .understand the gonads and their ducts in elasmobranchs, Amphibian, Reptiles, Aves and Mammals.

### Points for discussion

Discussion related to different types of heart and aortic arches was shown. Students were made to understand different types of kidneys and their functions .different types of gonads were also shown to them .

### References:

- Dorit, Walker & Barnes: Zoology. Brooks Cole; 1 edition (February 15, 1991)
- Cambell and Reece: Biology (7th ed. 2005, Pearson)

Unit	Topic	Method	Activity	No. of classes needed
IV	Nervous System	Lecture, PPT, Discussion	Library / Lab consultation/ assignment & presentation	15
	Central Nervous System in Vertebrates (Elasmobranchs, Bony fishes, Amphibia, Reptilia, Aves and Mammalia.	do	do	08
	Sense Organs – Classification of Sensory Receptors	do	do	03
	Visual Receptors in Elasmobranchs, Amphibia, Reptilia, Aves, Mammalia.	do	do	02
	Cutaneous Receptor	do	do	01
	Chemoreceptor	do	do	01

### Learning Outcomes

After going through this unit the students should be able to:

- Differentiate the brains of vertebrates.
- Define the development of brain in vertebrates.
- Classify different sensory receptors; differentiate the structure and functions of different receptors.

### Points for discussion

- We compared the brain of different vertebrates and also their differentiation and advancement during the development from one class to other. We also discussed classification of different receptors with examples.

### References:

1. Kardong, KV. 2015, **Vertebrate's Comparative Anatomy, Function and Evolution.** IV Edition, McGraw-Hill Higher Education.
2. Kent, G.C. and Carr, R.K.2000. **Comparative Anatomy of the Vertebrates.** IX Edition. The McGraw-Hill Company.
3. Weichert, C.K. and William Presch. 1970. **Elements of Chordate Anatomy.** Tata McGraw-Hills.
4. Hilderbrand, M. and Gaslow, G.E. **Analysis of Vertebrate Structure.** John Wiley and Sons.