बिरसा मुंडा ट्रायबल युनिवर्सिटी
Birsa Munda Tribal University

राजपिपला, जि. नर्मदा Rajpipla, Dist. Narmada
Established by Tribal Development Department, Govt. of Gujarat

School of Science
B.Sc. (Zoology) Programme

Subject Code & Name: BS06MJZOO1 Structure and Functions of Vertebrates

Teaching and Evaluation Scheme:

Teaching Scheme				Examination Scheme			
Credits				Component Weightage			
				CCE		SEE	
L	T	P	Total	TH	PWE	TH	PWE
4	-	-	4	50 %	-	50 %	-

Programme Name	B.Sc. Zoology
Semester	VI
Course Code	BS06MJZOO1
Course Title	Structure and Functions of Vertebrates
Course Content Type (Th./Pr.)	Theory
Course Credit	4
Sessions	4
Total Teaching/Lab. Hours	60 Theory Hours

Learning Objectives

- Students will describe important body system of vertebrate.
- Students will describe key structural features, such as well-developed brain, nervous system brain, heart and aortic arch.
- Understand that Adaptations are traits that help animal survive.

Prerequisites (if any)

- Student must aware about specific terms used for animal organ and organ systems.
- Before studying in detail about Chordates students should have profound understanding of Chordates Animals as they will be able to identify and describe representative animals from Chordates phyla.
- Individuals with favourable traits must be able to survive long enough to reproduce, passing on those successful genes.

Learning Outcomes

On the Completion of this course, students will able to:

- Understand general topics of chordates.
- Students will learn about morphology and organ systems of vertebrates.
- Compare internal structure of organs systems of vertebrates and its significance in understanding organic evolution.
- Focus on understanding how physical and behavioural traits help organisms survive in specific environments.

School of Science
B.Sc. (Zoology) Programme

Detailed Contents

UNIT	TOPIC/SUB-TOPIC	TEACHING HOURS
I	**Protochordata: General Account** • Affinities of subphylum of Hemichordata • Affinities of Urochordata • Affinities of Cephalochordata **Cyclostomata: General Account** • Comparison between Lamprey and Hagfish • Ammocoete Larva **Pisces: General Account** • Accessory respiratory organs • Functions of Air bladder **Amphibia: General Account** • Neoteny and Paedogenesis **Types and study: Frog (*Hoplobatrachus tigerinus*)** • External features • Digestive System • Heart, Arterial System, venous System • Neural System • Urinogenital System	15
II	**Reptiles: General Account** • Detailed study of systematics of class Reptilia up to order • Snake venom, symptoms and cure of snake bite • Living fossil of *Sphinodon* • Introduction of Dinosaurs (Stegosaurus, Iguanodon, Diplodocus, Tyrannosaurus and Pterosaur) **Aves: General Account** • Detailed study of systematics of class Aves up to order • Archaeopteryx • Ratitae (Flightless birds) • Different type of Feathers • Synsacrum and Pygostyle **Type and study: Pigeon *(Columba livia)*** • External features • Digestive System • Heart and Arterial System • Nervous System • Urinogenital System	15

34

School of Science
B.Sc. (Zoology) Programme

III	**Mammals: General Account** • Detailed study of systematics of class Mammals up to order **Basal Mammals:** • Egg lying Mammals (Monotremes) • Pouch Mammals (Marsupials) **Specialized Eutherians:** • Insect eating mammals (Insectivora) • Flying mammals (Chiroptera) • Edentata (Toothless) mammals **Higher Eutherians:** • Rodentia (Gnawing) mammals • Carnivorous mammals • Cetacean mammals **Advanced Mammals:** • Primates • Hoofed mammals (Ungulates) **Type and study: Rat *(Rattus norvegicus)*** • External features • Digestive System • Heart and Arterial System • Nervous System • Urinogenital System	15
IV	**Comparative Anatomy of Anamniotes and Amniotes** **Integument and its Derivatives:** • Functions, Structure and Derivatives **Digestive system** • Stomach • Small intestine • Lager intestine **Respiratory System** • Skin, Gills, lungs and Accessory respiratory organ **Cardiovascular System:** Heart and Aortic arch • Evolution of Heart, Single Chambered, Two chambered, Three chambered, Incomplete four chambered and four chambered heart • Aortic Arches (Basic Embryonic plan and modification of aortic) **Urinogenital system** • Basic structure, Archinephrons, Pronepharus, Mesonephros, Metanephros **Nervous system** • Development of central nervous system • Comparative account of brain	15

35

School of Science
B.Sc. (Zoology) Programme

Text Book(s)
1. Modern Textbook of Zoology: Vertebrates by R. L. Kotpal, Rastogi Publications 2. Chordate Zoology by E. L. Jordan & P. S. Verma, S. Chand Publishing 3. Chordata by P. S. Dhami & J. K. Dhami, Ramesh Book Depot 4. A Textbook of Vertebrate Zoology by S. N. Lal, Rastogi Publications 5. Animal Diversity – II (Chordates) by P. C. Jain & Anil Kumar, Narosa Publishing House 6. Practical Zoology: Vertebrates by S. S. Lal, Rastogi Publications 7. Laboratory Manual in Zoology by P. S. Verma, S. Chand Publishing
Reference Books
1. Comparative Anatomy of Vertebrates by G. C. Kent & Larry Miller, McGraw Hill 2. Biology of Vertebrates by H. S. Bhamrah & Kavita Juneja, Anmol Publications 3. Comparative Anatomy of Vertebrates by Libbie H. Hyman, University of Chicago Press 4. Life of Vertebrates by John Zachary Young, Oxford University Press 5. The Vertebrate Body by Alfred Sherwood Romer, Saunders
Web Resources
1. NCERT: https://ncert.nic.in/ 2. e-PG Pathshala: https://epgp.inflibnet.ac.in/ 3. SWAYAM: https://swayam.gov.in/ 4. National Digital Library of India: https://ndl.iitkgp.ac.in/ 5. Virtual Labs: https://www.vlab.co.in/ 6. Khan Academy Biology: https://www.khanacademy.org/science/biology 7. Crash Course Biology: https://www.youtube.com/@crashcourse 8. Animal Diversity Web: https://animaldiversity.org/ 9. OpenStax Biology: https://openstax.org/details/books/biology-2e 10. Encyclopedia of Life: https://eol.org/ 11. Biodiversity Heritage Library: https://www.biodiversitylibrary.org/

L:: Lecture, **T::** Tutorial , **P::**Practical

CCE:: Continuous and Comprehensive Evaluation

(CCE Theory includes Mid Semester Examination, Assignment, MCQ quizzes, Seminar, Reflective notes, class participation, case analysis and presentation, slip tests (announced/ surprised), attendance etc. or any combination of these)

PWE:: Practical Work Examination

(PWE includes Laboratory practical work, project work, viva simulation exercise work etc.)
SEE:: Semester End Evaluation

36