



# बिरसा मुंडा ट्रायबल युनिवर्सिटी Birsā 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:** BS06MJZOO3 Practical Based on BS06MJZOO1 & BS06MJZOO2

### 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                   | BS06MJZOO3                                 |
| Course Title                  | Practical Based on BS06MJZOO1 & BS06MJZOO2 |
| Course Content Type (Th./Pr.) | Practical                                  |
| Course Credit                 | 4                                          |
| Sessions + Lab. Per Week      | 8 (4 + 4)                                  |
| Total Teaching/Lab. Hours     | 60 Practical Hours                         |
| * 2 Laboratory = 1 Session    |                                            |

### Learning Objectives

- This practical course helps students understand the anatomy and organ systems of major vertebrates such as Frog, Pigeon and Rat. Students will learn to identify external features and study important systems including digestive, circulatory, nervous, and urinogenital systems through specimens, charts and models.

### Prerequisites (if any)

- Students should have a basic understanding of vertebrate classification, elementary anatomy and physiology. Familiarity with handling laboratory materials, charts, and biological models will be helpful.

### Learning Outcomes

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

- Students will be able to identify major vertebrate structures, compare organ systems across vertebrate groups, and understand anatomical adaptations from an evolutionary perspective.







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## School of Science B.Sc. (Zoology) Programme

| Detailed Contents |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |                |
|-------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------|
| UNIT              | TOPIC/SUB-TOPIC                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 | TEACHING HOURS |
|                   | <p><b>List of Practical (Practical are demonstrated using charts, models and multimedia videos)</b></p> <ol style="list-style-type: none"><li>1. To study the Accessory Reparatory organs in fish.</li><li>2. To study various types of Dinosaurs (By chart/ models).</li><li>3. To study the Digestive system of Frog.</li><li>4. To study the Arterial system of Frog.</li><li>5. To study the Dorsal and Ventral view of brain of Frog.</li><li>6. To study the Urinogenital system of male and female Frog.</li><li>7. To study the Digestive system of Rat.</li><li>8. To study the Arterial system of Rat.</li><li>9. To study the Dorsal and Ventral view of brain of Rat.</li><li>10. To study the Urinogenital system of male and female Rat.</li><li>11. To study comparative anatomy of Heart of vertebrate.</li><li>12. To study comparative anatomy of Aortic arch of vertebrate.</li><li>13. To study comparative anatomy of Brain of vertebrate.</li><li>14. To study comparative anatomy of Urinogenital of vertebrate.</li><li>15. To study the different types of animal eggs (Microlecithal, Mesolecithal, Macrolecithal) using charts or models.</li><li>16. To study the whole mount and T.S. of Chick embryo (18 hrs, 24 hrs, 36 hrs, and 48 hrs of incubation).</li><li>17. To study the morphological evidences of evolution through homologous and analogous organs.</li><li>18. To study the phylogeny and evolution of humans through multimedia or chart.</li><li>19. To study the Pavlov's experiment of classical conditioning.</li><li>20. To study the parental care in Fishes, Amphibians and Birds.</li></ol> | 60             |

### Text Book(s)

1. A Manual of Practical Zoology: Chordates by P.S. Verma, S. Chand & Company Ltd.
2. Practical Zoology: Vertebrates by S.S. Lal, Rastogi Publications.
3. Modern Textbook of Zoology: Vertebrates by R.L. Kotpal, Rastogi Publications.







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### Reference Books

1. Comparative Anatomy of the Vertebrates by G.C. Kent and R.K. Carr, McGraw-Hill.
2. Evolutionary Biology by Veer Bala Rastogi, Kedar Nath Ram Nath.
3. Developmental Biology by Scott F. Gilbert and Michael J.F. Barresi, Oxford University Press.
4. Principles of Animal Behavior by Lee Alan Dugatkin, University of Chicago Press.
5. The Life of Vertebrates by J.Z. Young, Oxford University Press.
6. Analysis of Vertebrate Structure by Milton Hildebrand, John Wiley & Sons.
7. Animal Behaviour (Ethology) by Dr. V.K. Agarwal, S. Chand & Company Ltd.

### Web Resources

1. OpenStax Anatomy and Physiology – <https://openstax.org/details/books/anatomy-and-physiology>
2. NCBI Bookshelf – <https://www.ncbi.nlm.nih.gov/books/>
3. Biodiversity Heritage Library – <https://www.biodiversitylibrary.org/>
4. Encyclopaedia Britannica Animal Science – <https://www.britannica.com/science/zoology>
5. Khan Academy Biology – <https://www.khanacademy.org/science/biology>
6. BioInteractive – <https://www.biointeractive.org/>
7. Animal Diversity Web – <https://animaldiversity.org/>
8. e-PG Pathshala – <https://epgp.inflibnet.ac.in/>
9. National Digital Library of India – <https://ndl.iitkgp.ac.in/>
10. Virtual Labs India – <https://www.vlab.co.in/>

**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

