# FOUR YEAR UNDERGRADUATE PROGRAM (2024 – 28)
## DEPARTMENT OF ZOOLOGY
## COURSE CURRICULUM

| **PART- A: Introduction** | | | | |
|---|---|---|---|---|
| **Program: Bachelor in Life Science** *(Diploma / Degree/ Honors)* | | | **Semester - IV** | Session: **2024-2025** |
| 1 | **Course Code** | **ZOSC-04T** | | |
| 2 | **Course Title** | **Diversity of Chordates and Comparative Anatomy** | | |
| 3 | **Course Type** | **Discipline Specific Course** | | |
| 4 | **Pre-requisite** (if, any) | ***As per Program*** | | |
| 5 | **Course Learning. Outcomes (CLO)** | **After successfully completing this course, the students will be able to:**<br>➢ Develop understanding of the characters used to classify and differentiate the organisms belonging to different taxa and the evolutionary history and relationship between the different classes of chordates.<br>➢ Acquire knowledge and Develop critical understanding of the comparative anatomy and functioning of complex systems of Pisces to Mammalia.<br>➢ Learn the comparative account of integument with its derivatives, digestive system and Skeletal and Muscular System.<br>➢ Understand the Digestive system and its anatomical specializations with respect to different diets and feeding habits and respiratory organs in vertebrates used in aquatic, terrestrial and aerial vertebrates.<br>➢ Understand the evolution of heart, aortic arches, and Learn the evolution of brain, sense organs and urinogenital system. | | |
| 6 | **Credit Value** | **3 Credits** | ***Credit = 15 Hours - learning & Observation*** | |
| 7 | **Total Marks** | **Max. Marks: 100** | | **Min Passing Marks: 40** |

**PART -B: Content of the Course**

**Total No. of Teaching–learning Periods (01 Hr. per period) - 45 Periods (45 Hours)**

| Unit | Topics (Course contents) | No. of Period |
|---|---|---|
| I | **Diversity in Protochordates and Chordates:** General characteristics & classification of Chordata up to orders with examples. **Cephalochordates:** Type study – Amphioxus and its affinities, **Agnatha:** Comparative account of Petromyzon and Myxine | 11 |
| II | **Structure and function of integument and skeletal systems Alimentary canal:** Structure of integument from fishes to mammals with an account on epidermal and dermal derivatives and their functional significance, Anatomy of Axial skeleton from fishes to mammals. Comparative anatomy of appendicular skeleton: limbs and girdles from fishes to mammals. Comparative account with structure of alimentary canal and digestive glands in vertebrates. | 11 |
| III | **Comparative anatomy and functional Significance of, Respiratory organs, Heart Aortic Arches and Endocrine Glands:** Structure of Gills, Lungs, Air sacs and Swim bladder in Vertebrates, Structure and evolution of heart in vertebrates, Evolution of aortic arches and their significance in vertebrates. Endocrine Glands & their function. Disorders of Thyroid, Adrenal, Pancreas and Pituitary. | 11 |
| IV | **Comparative anatomy and functional Significance of Urinogenital System, Brain & Sense Organ:** Types and development of kidneys and their ducts in anamniotes and amniotes. Nephron- structure, types and their function, Comparative anatomy of Urinogenital system. Comparative anatomy of Brain of vertebrates, Structure of Ear and Eye. | 12 |
| ***Keywords*** | *Chordates, Protochordates, Petromyzon And Myxine, Comparative Anatomy,Integument Lungs, Air Sacs Aortic Arches, Kidney, Brain* | |

***Signature of Convener & Members (CBoS) :***

## PART–C: Learning Resources

**Text Books, Reference Books and Others**

***Text Books Recommended –***

- Jordan, E. L. and Verma, P. S. (2013) Chordate Zoology (14th edition).
- Saxena, R. K. and Saxena, S. (2015) Comparative Anatomy of Vertebrates (2nd edition).
- R.L. Kotpal, Modern Text Book of Zoology, Vertebrates, Rastogi Publication, Merut
- Tiwari, V.K. Unified Zoology, B.Sc. Part I, Shivlal Agarwal and Company, Indore

***Reference Books Recommended –***

- Young, J. Z. (2004). *The Life of Vertebrates*. III Edition. Oxford university press.
- Weichert, C.K. (1970) Anatomy of Chordates (4th edition).

**Online Resources–**
**e-Resources / e-books and e-learning portal**

- **https://swayamias.com/zoology-optional-coaching/**
- **https://www.swayamprabha.gov.in/index.php/program/archive/9**
- **https://www.acsedu.co.uk/Courses/Environmental/VERTEBRATE-ZOOLOGY-BEN104-528.aspx**
- **https://www.nu.edu/degrees/mathematics-and-natural-sciences/courses/bio416/**
- **https://www.youtube.com/watch?v=qSY5iXHHi88**
- **https://www.youtube.com/watch?v=tz8liJXbBCQ**
  **https://www.youtube.com/watch?v=mXECx3s8yEQ**

## PART -D: Assessment and Evaluation

**Suggested Continuous Evaluation Methods:**

| | |
|---|---|
| **Maximum Marks:** | **100 Marks** |
| **Continuous Internal Assessment (CIA):** | **30 Marks** |
| **End Semester Exam (ESE):** | **70 Marks** |

| | | |
|---|---|---|
| **Continuous Internal Assessment (CIA):** **(By Course Teacher)** | Internal Test / Quiz-(2): **20 +20**<br>Assignment / Seminar - **10**<br>Total Marks - **30** | Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **30** Marks |
| **End Semester Exam (ESE):** | **Two section – A & B**<br>Section A: **Q1**. Objective – **10 x1= 10** Mark; **Q2**. Short answer type- **5x4 =20 Marks**<br>Section B: Descriptive answer type qts.,**1out of 2** from each unit-**4x10=40 Marks** | |

***Name and Signature of Convener & Members of CBoS:***

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## COURSE CURRICULUM

| **PART- A: Introduction** | | | | |
|---|---|---|---|---|
| **Program: Bachelor in Life Science** *( Diploma / Degree / Honors)* | | | **Semester - IV** | Session: **2024-2025** |
| 1 | **Course Code** | **ZOSC-04P** | | |
| 2 | **Course Title** | **Diversity of Chordates and Comparative Anatomy** | | |
| 3 | **Course Type** | **Discipline Specific Lab Course** | | |
| 4 | **Pre-requisite** (if, any) | ***As per Program*** | | |
| 5 | **Course Learning Outcomes (CLO)** | **After successfully completing lab course the students will be able to -**<br>➢ Develop understanding on the diversity of life with regard to different classes of vertebrates.<br>➢ Gain knowledge to identify and classify the animals on the basis of their morphological characteristics.<br>➢ Acquire the detailed knowledge about evolutionary history and relationship between the different classes of vertebrates through salient features some important animals.<br>➢ Learn comparative account of various systems in all the classes of vertebrates. | | |
| 6 | **Credit Value** | **1 Credits** | ***Credit =30 Hours Laboratory or Field learning/Training*** | |
| 7 | **Total Marks** | **Max. Marks: 50** | **Min Passing Marks: 20** | |

| **PART -B: Content of the Course** | | |
|---|---|---|
| **Total No. of learning-Training/performance Periods: 30 Periods (30 Hours)** | | |
| **Module** | **Topics (Course contents)** | **No. of Period** |
| **Lab./Field Training/ Experiment Contents of Course** | **List of labs to be conducted**<br>➢ Study of animals through models, slides and museum specimens in the laboratory with details on their classification, biogeography and diagnostic features of different class of Vertebrate.<br>➢ Study of histological slides of different class of Vertebrate.<br>➢ Study of Axial skeleton of Amphibia, Reptilia, Aves and Mammals. Comparative study of Appendicular skeleton Girdles and limb bones) of Amphibia, Reptilia, Aves and Mammals.<br>➢ Comparative study of heart of Fish, Amphibia, Reptilia, Aves and Mammals with the help of models and charts.<br>➢ Comparative study of Aortic Arches Fish, Amphibia, Reptilia, Aves and Mammals with the help of models and charts.<br>➢ Comparative study of brain of Fish, Amphibia, Reptilia, Aves and Mammals with the help of models and charts.<br>➢ Comparative study of Urinogenital system of Fish, Amphibia, Reptilia, Aves and Mammals with the help of models and charts.<br>➢ Histological study of Endocrine tissue<br>➢ Study of Vertebrate animals in nature during a survey of a National Park/ Forest area/College campus.<br>➢ **Group discussion/Viva or Seminar presentation on any one of above topics**<br>➢ An "**animal album or Practical Record**" containing sketches, photographs, cut outs, with appropriate write up about the above mentioned taxa.<br>➢ Study of some videos to develop understanding on the animals of different taxa. | **30** |
| ***Keywords*** | *Museum specimens, Histological slides, Alternative of Dissection, Practical Record* | |

***Signature of Convener & Members (CBoS) :***

## PART–C: Learning Resources

**Text Books, Reference Books and Others**

***Text Books Recommended –***

- S.S. Lal, Practical Zoology, Vertebrate. 12th Edition Rastogi Publications, Meerut, New Delhi.
- A manual of practical Zoology. Dr. P.S Verma, S. Chand Publication, New Delhi
- Saxena, R. K. and Saxena, S. (2015) Comparative Anatomy of Vertebrates (2nd edition).
- R.L. Kotpal, Modern Text Book of Zoology, Vertebrates, Rastogi Publication, Merut
- Tiwari, V.K. Unified Zoology, B.Sc. Part I, Shivlal Agarwal and Company, Indore

***Reference Books Recommended –***

- Young, J. Z. (2004). *The Life of Vertebrates*. III Edition. Oxford university press.
- Weichert, C.K. (1970) Anatomy of Chordates (4th edition).

**Online Resources–**

- **https://www.youtube.com/watch?v=W4gQxADcryw**
- **https://www.youtube.com/watch?v=Ts9GsrBvil8**

## PART -D: Assessment and Evaluation

**Suggested Continuous Evaluation Methods:**

| | |
|---|---|
| **Maximum Marks:** | **50 Marks** |
| **Continuous Internal Assessment (CIA):** | **15 Marks** |
| **End Semester Exam (ESE):** | **35 Marks** |

| | | |
|---|---|---|
| **Continuous Internal Assessment (CIA):** **(By Course Teacher)** | Internal Test / Quiz-(2): **10 & 10**<br>Assignment/Seminar +Attendance - **05**<br>Total Marks - **15** | Better marks out of the two Test / Quiz + obtained marks in Assignment shall be considered against **15** Marks |
| **End Semester Exam (ESE):** | **Laboratory / Field Skill Performance: On spot Assessment**<br>**A. Performed the Task based on lab. work - 20 Marks**<br>**B. Spotting based on tools & technology (written) – 10 Marks**<br>**C. Viva-voce (based on principle/technology) - 05 Marks** | **Managed by Course teacher as per lab. status** |

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